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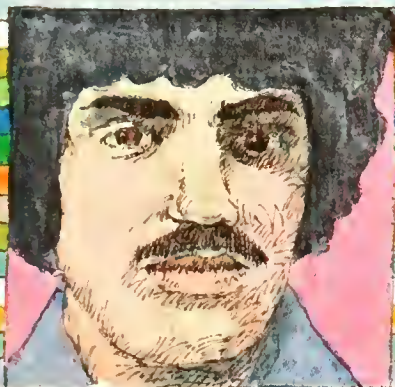
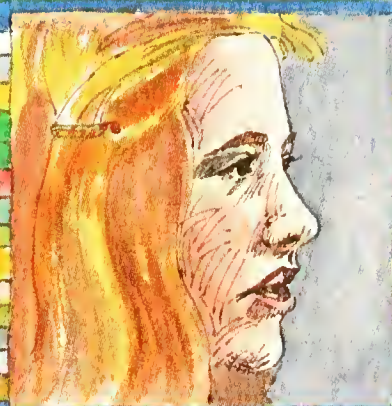






# Kansas State University Bulletin

1977-1978









# Kansas State University Bulletin

## General Catalog 1977-78



### Kansas State University

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### Information

General information about Kansas State University is obtainable from the President.

The University's main switchboard telephone number is 913-532-6011.

Prospective undergraduate students should communicate with the Dean of Admissions and Records in 118 Anderson Hall, phone 913-532-6250.

Prospective graduate students should communicate with the Dean of the Graduate School in 101 Fairchild Hall, phone 913-532-6191.

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Kansas State University is committed to a policy of non-discrimination on the basis of race, sex, national origin, or other non-merit reasons, in admissions, educational programs or activities, and employment, all as required by applicable laws and regulations, including Title IX of the Education Amendments of 1972. Inquiries may be addressed to: Director, Affirmative Action Office, Kansas State University, 207 Fairchild Hall, Manhattan, Kansas 66506, 913-532-6220 or Director, Office of Civil Rights, HEW, Washington, D.C. 20206.

### KANSAS STATE UNIVERSITY BULLETIN

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# Calendar

## Fall Semester, 1977

### August 24-26, Wednesday-Friday

Enrollment and registration of all students, including physical examinations, testing and orientation.

### August 29, Monday

Classes begin. Late fee, \$10.00 for enrollment.

### September 5, Monday

Labor Day. No classes.

### September 9, Friday

Last day to enroll without dean's permission.

### September 12-23, Monday-Friday

Sign-up for credit, no-credit grading option.

### September 23, Friday

20th class day, late fee \$25.00 for subsequent enrollment.

### October 7, Friday

Last day to withdraw and receive a partial refund.

### October 10, Monday

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

### October 14, Friday

Mid-semester grade reports due in Admissions and Records.

### October 18, Tuesday

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.

### October 28, Friday

Last day to drop course without a WP or WF being recorded.

### November 2, Wednesday

Dissertation approval forms due in graduate dean's office.

### November 9, Wednesday

Masters' approval forms due in graduate office. Non-thesis, non-report approval forms due on the same date as thesis and report approval forms.

### November 10, Thursday

Final date of doctors' oral examinations.

### November 16, Wednesday

Final date of masters' oral examinations for candidates writing a thesis or report.

### November 21, Monday

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

### November 22, Tuesday

10 p.m. Thanksgiving student recess begins.

Last day course may be dropped before end of semester.

### November 28, Monday

Final date of masters' orals for candidates on non-thesis, non-report plan.

### November 28, Monday

Classes resume.

### November 28-December 9, Monday-Friday

Early enrollment for Spring Semester.

### December 2, Friday

Last day course may be dropped before end of semester.

### December 6, Tuesday

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

### December 19-23, Monday-Friday

Semester examinations for all students.

### December 26, Monday Noon

Deadline for grades to Admissions and Records.

### January 2-17

January Intersession

# Spring Semester, 1978

## January 16-17, Monday-Tuesday

Registration of all students, including physical examinations, testing and orientation.

## January 18, Wednesday

Classes begin. Late fee \$10.00 for enrollment.

## January 27, Friday

Last day to enroll without dean's permission.

## February 6-17, Monday-Friday

Sign-up for credit, no-credit grading option.

## February 14, Tuesday

20th class day, late fee \$25.00 for subsequent enrollment.

## February 24, Friday

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

## March 3, Friday

Mid-semester grade reports due in Admissions and Records.

## March 8, Wednesday

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

## March 11, Saturday Noon

Spring break begins.

## March 20, Monday

Classes resume.

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

## March 24, Friday

Last day to drop course without a WP or WF being recorded.

## March 27, Monday

Holiday. No classes. Easter is March 26.

## March 31-April 1

All-University Open House

## April 6, Thursday

Dissertation approval forms due in graduate dean's office.

## April 12, Wednesday

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

## April 14, Friday

Final date of doctors' oral examinations.

## April 20, Wednesday

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

## April 21, Friday

Final date of masters' oral examinations for candidates writing a thesis or report.

## April 24-May 5, Monday-Friday

Early enrollment for Fall Semester.

## April 26, Wednesday

Final date of orals for candidates on the non-thesis, non-report plan.

## April 27, Thursday

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

## April 28, Friday

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

## May 15-19, Monday-Friday

Semester examinations for all students.

## May 19, Friday

Commencement.

## May 22, Monday Noon

Deadline for grades to Admissions and Records.

## May 22-June 2

May Intersession.

## SUMMER TERM 1978

## June 5-July 28

Sessions of eight, three and one week's duration.



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# General Information

## The University

The University, founded February 16, 1863, was 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 315-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 Lake, one of the largest in the Midwest.

Beyond the campus is more than 4,000 acres of University land used for experimental work in agriculture.

The five branches of the Agricultural Experiment Station at Hays, Colby, Garden City, Mound Valley, and Tribune include 6,000 acres plus a num-

ber of outlying experimental fields. Altogether research through the Agricultural Experiment Station involves more than 11,000 acres.

## Objectives of the Educational Program at Kansas State University

The objectives of the educational program at Kansas State University are to develop individuals capable of applying an 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 while at the University. Specifically, this means to:
  1. Learn and make known to students before they enroll all that is possible and useful about their interests, aptitudes, and abilities.
  2. Apply that knowledge to the students' choice of courses and curriculums as fully as possible





without encroaching harmfully on their initiative and feeling of self-responsibility.

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

- II. To prepare students adequately in a technical sense for an occupation or a profession which includes an organized body of information and theory so that they may realize their creative potentialities in the field of their choice. More specifically this means that students should acquire:

1. The ability to recognize and master fundamental principles in their fields of specialization.
2. The knowledge basic to their special fields of study.
3. The ability to reason critically from facts and recognized assumptions to useful technical conclusions.
4. The basic skills associated with their fields of study.
5. A professional attitude in their chosen work.

- III. To provide all students with an opportunity to gain the knowledge and abilities which members of a democratic society, relative to their capabilities, need to possess in common, whatever occupation or profession they expect to enter. Specifically, this means that through its total program the University undertakes to help the student to:

1. Develop communication skills.
2. Develop the ability to apply critical and creative thinking to the solution of theoretical and practical problems.
3. Understand the basic concepts of the natural sciences, the interrelations of the natural and social sciences, and the impact of science on society.
4. Comprehend and evaluate the processes and institutions in society at home and abroad, and develop a dynamic sense of personal responsibilities as effective citizens in a democratic society.
5. Develop habits of self-evaluation, responsibility, and enterprise which will increase the effectiveness of the educative process in

college, and provide the basis for continued self-improvement.

6. Develop well-adjusted personalities, good character traits, and sound philosophy of life.
7. Prepare for effective participation in family life.
8. 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 which the institution serves.

## Accrediting

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

## Admission

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

## Admissions Counseling

The Admissions Office is open weekdays from 8:00 a.m. to 11:50 a.m. and from 1:00 p.m. to 5:00 p.m. during the academic year for admissions counseling. Campus offices are closed Saturdays and Sundays.

Students and parents are always welcome, and are encouraged to visit the campus for individual counseling. However, it is advisable to write two weeks in advance for an appointment. Normally several counselors are available for consultation concerning

educational plans.

The Admissions Office is in the center of the main administration building, Anderson Hall.

## High School Graduates

Residents of Kansas who graduate from an accredited Kansas high school are admitted to Kansas State University. Out-of-state applicants are expected to have a strong academic rank in class and to have made good scores on the American College Test battery.

No academically qualified applicant will be denied admission to the University on the basis of race, color, sex, religion, 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. See pages 12-13.

- (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.

In addition, entering freshmen should have completed at least three units of high school English and one unit of high school science.

## 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 to Kansas and out-of-state transfer students.

Most credits from junior and senior col-

leges and universities are transferable to K-State. Transcripts of record should be sent to the Admissions Office directly from each institution previously attended. Unofficial transcripts and grade summaries should not be submitted by the student since these are not acceptable. 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.

## 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.

## Advanced Placement Examinations

Students who have completed one of the College Entrance Examination Board Advanced Placement Tests should have a report of their scores sent to the director of admissions at Kansas State University. College Board Advanced Placement Tests are given in May of the senior year in high schools offering advanced placement courses. Subjects include American history, biology, chemistry, English, European history, French, German, Latin 4, Latin 5, mathematics, physics and Spanish. Credit is given for scores of 5, 4, or 3. Scores of 2 are referred to the appropriate department head for review. No credit is given for scores of 1.

## Late Admission

A student who seeks to enter the University later than ten calendar days after the start of the semester is admitted only by special permission of the 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. University staff members, including graduate assistants and graduate research assistants and teachers employed in elementary and secondary schools, do not pay this fee. However, anyone enrolling after the 20th day of class must pay a \$25.00 late enrollment fee.





all fees, regular attendance at classes and maintenance of satisfactory standing.

## Extension and Correspondence Credit

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

## Credit by Examination

Students who take the College Level Examination Program tests should have the results sent to the Office of Admissions and Records for departmental review and credit recommendation.

Any student who is enrolled at KSU is eligible to gain undergraduate credit by examination. Credit may be granted for any course with the consent of the head of the department offering credit for that subject.

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. Non-graded credit by examination shall be treated as graded hours in implementing credit/no credit policy.

## Service School Credit For Veterans

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.

## Assignment to Classes

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

# Enrollment

Students who have been admitted to Kansas State University will be scheduled for enrollment. Enrollment of new students for the fall semester normally takes place in June of each year. Students are scheduled in groups of approximately 200 for enrollment sessions in June.

## New Student Advisement

All new students are assigned faculty advisers at the beginning of the school year. These advisers are available to them any time they need help. Faculty advisers assist students in defining goals to be reached in college, give information regarding appropriate curriculums and courses, and discuss personal problems students may have, especially problems related to the student's progress and plans for subsequent work.

## Medical History

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

## Special Students

A special student is one not regularly enrolled in work for a degree. Special students are expected to meet the same admission requirements as regular students. Students who will enroll for only a few courses may wish to apply under this category.

Under certain circumstances, outstanding high school students are admitted for the summer only as special students to take several courses between their junior and senior years. To be considered for such admission, students must have the recommendation of their high school principal and have an outstanding high school academic record.

Adults who are not high school graduates are sometimes admitted as special students 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.

Special students are subject to regulations for regular students, and are responsible for payment of

Catalogs are maintained for student use in the Admissions Office, all deans' offices, the library, and all departmental offices. If a student wishes a personal copy, it may be purchased at the K-State Union Bookstore.

No student can be enrolled in classes or for private lessons in music or other subjects before getting an assignment. **No assignment is complete until all fees and charges are paid.**

Registration and assignment of courses take place as shown on the calendar on pages 2 and 3 of this catalog. Later assignments to courses are made during regular office hours by the student's dean or adviser. A student may not enroll later than ten class days after the beginning of a semester (five days for summer session) except by permission of the dean. Students should enroll during the regularly scheduled registration periods in order to avoid penalty fees.

A student may not enroll for more than 18 hours including correspondence and extension study unless granted permission to do so by the dean or dean's representative. However, if the normal assignment in a curriculum is 18 hours, a student may enroll for one additional hour without special permission.

A student whose grades were "B" or better during the preceding semester, and who did not have a deficiency of any kind in that period, may ask to take additional hours. In no case may the total assignment, including correspondence and extension work, exceed 21 hours.

A non-graded class is one in which no traditional "letter grade" is given. The grades of CR (credit) and NCr (no credit) are given.

A regularly enrolled student must have the permission of the dean to take correspondence or extension courses while enrolled and these are counted as part of the student's semester load.

## 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 his adviser.

The last day for dropping a course without a WP or WF being recorded is at the end of the ninth week of classes. During the last two weeks of classes, courses may not be dropped.

Students desiring to transfer from one college to

another within the University should confer with both deans concerned.

## Retake Policy

Students may retake courses taken in an earlier semester in order to improve the grade. If a course is retaken, the original grade is lined out, a retake notice inserted, and removed from the grade point average. 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 a credit-no credit basis if appropriate or if originally taken on a credit-no credit 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. There is no limit to the number of courses that can be retaken or the number of times a particular course can be retaken.

## Class Attendance

Class attendance policies shall be determined by the instructor of each course. Instructors are strongly encouraged to adopt a policy of optional attendance. 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 nine weeks of the semester, no mark shall be reported to the Director of Records. Thereafter, a mark of WP is reported in all courses in which the student is passing, and WF is reported for courses in which satisfactory work has not been done. A student may not withdraw during the last two weeks of classes.

## Auditing Classes

Auditing consists of attending a class regularly without participating in class work and without receiving credit. Permission to audit a class is granted by the dean of the college in which the class is offered. A nonrefundable fee of \$1 a semester hour is charged each auditor except full-time University faculty members, employees, and full-time students. Laboratory courses may not be audited.





## 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
- Cr, for credit in courses for which no letter grade is given, (non-graded courses)
- NCr, for no credit in courses for which no letter grade is given, (non-graded courses)
- WP, for withdrawn passing
- WF, for withdrawn failing.

The report I (incomplete) is used at the discretion of the instructor when a student may have further time to complete the required work.

Hours taken on a non-graded basis will be graded by Cr, if passed, or NCr, if not passed. Courses in which a Cr grade is received will be used in fulfilling graduation requirements. Only the grades A, B, C, D, F and WF are used in calculating resident grade averages.

## 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.

A student whose semester grade in any subject is "A" may be excused from the final examination in that subject at the discretion of the instructor.

Permission for special examinations in subjects not taken in class, or for advanced credit, or to make up failures, must be obtained, on recommendation of the department head in which the course is given, from the dean of the college in which the student is enrolled. 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 special examination may be given only to a student who has enrolled at KSU, and credit earned is considered resident credit.

## Report Of Grades

Mid-semester grade reports for new freshmen are

sent to deans' offices and to students at the close of the 7th week of classes.

Other students desiring reports of grades must supply instructors with properly self-addressed official cards, with postage affixed, after the seventh Saturday of the semester or with their final examination papers. Instructors send reports so requested to the students or to student organizations.

The instructor reports semester grades, based on the examination and class work, to the director of records.

If a student drops a subject after the ninth week of classes, a mark of either WP or WF is reported, depending on whether the student was passing or failing at the time of dropping the subject. 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. If the student's absence is not excused by the dean, a semester grade is reported on the basis of zero for the final examination; but if the absence is excused, a reasonable time, usually not over one month, is allowed within which the examination may be taken.

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

## Points

For each semester hour of graded work, a student earns points according to the grades he makes, as follows: A, 4; B, 3; C, 2; D, 1; F, 0; WF, 0.

## Scholarship Deficiencies

**Probation, Dismissal.** A student's Kansas State University academic record of resident work is used to establish probation or dismissal status.

Undergraduate students (excluding students in the College of Veterinary Medicine) are placed on probation if they have 60 or more resident graded hours at Kansas State University with less than a 2.0 (C) overall or semester grade-point average. Students

with less than 60 hours are placed on probation whenever they have more than five grade points less than needed for a 2.0 (C) overall or semester grade-point average.

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

Students on academic probation, who have completed 20 or more graded hours at Kansas State University, will be dismissed when their total resident grade points are not within 18 points of a 2.0 (C) overall average on the resident work.

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

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

**Reinstatement.** Dismissed students will be readmitted only when approved for readmission by the academic standards committee of the college they are attempting to enter. Normally students must wait at least one semester before they will be considered for readmission.

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 "C" (2.0) or better average on 12 or more credits during the semester they are dismissed can be considered for immediate reinstatement.

## Scholastic Honors

Bachelors degree candidates in May, 1978, and following 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 their college graduating class are designated "Magna Cum Laude." Those remaining in the upper ten per cent are graduated "Cum Laude."

For the unofficial Commencement Program, honors will be determined on a minimum of 45 hours in residence completed prior to the term of

graduation with at least 36 credit hours in graded courses.

Honors for those graduating prior to 1978 will be based on the General Catalog statement of 1975-76.

The "Cum Laude" grade point average for graduation honors in May, 1978 and in following years will be used in the succeeding summer and fall terms to determine semester honors on a minimum of 12 undergraduate semester hours of graded KSU course work.

Graduate School students are ineligible for these honors.

## Student Records

Students and former students are entitled to inspect and copy all education records relating to them, subject to certain exceptions. They may also challenge the content of such records at a hearing. Personal records or information regarding K-State students will not be released without their written consent, except in specified cases. See page 324 for a detailed statement.

## 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 & 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	4
Royal Purple journalism .....	1	4
Men's Athletics .....	1	4
Women's Athletics .....	1	4

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 might exceed the maximum usable for graduation.

## Military Training

Reserve Officer Training is offered by both the Air Force and the US Army. Students who qualify can enter the program during their freshman year and compete for a commission as a 2nd Lieutenant upon graduation. 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.

Scholarships are awarded on a competitive basis to entering freshmen, sophomores, and juniors. Military scholarships pay all university fees, lab fees, 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 only 4 hours toward their degree requirements. The other colleges recognize the full 16 hours of the 4-year ROTC program.

## Course Description Key

Course Number	Description
000-099	Courses carrying no credit.
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 eligible for graduate credit. Courses numbered 500 may be taken for graduate credit only in a minor field. Courses numbered 600 may be taken as part of a graduate student's major field.
700-799	Graduate and upper division, primarily for graduate level.
800-899	Graduate level for primarily masters' courses and professional courses beyond undergraduate level.
900-999	Graduate level primarily for doctoral courses.

Within the parentheses ( ) after each course title are shown the semester hours of the course, followed by the terms it is offered. Each unit usually represents one 50-minute period of lecture or

recitation, or two or three 50-minute periods of laboratory each week of the semester. I, II, S indicate when the course is offered. I means fall semester; II, spring semester; and S, summer session. I, II, means both semesters. Pr. indicates "prerequisite." Conc. means concurrent.

## Classification Of Students

A student who is a high school graduate, or who offers 15 acceptable units of high school work, is classified as a freshman. A student is advanced to a higher classification when upon successful completion of sufficient credit hours to meet the requirements as listed below:

Sophomore	Junior	Senior	Fifth-year Student
30	60	90	120

## Common Degree Requirements

The common requirements for all curricula leading to an undergraduate degree are: English Composition, 6 credits; Oral Communications, 2 credits; Concepts of Physical Education, 1 credit.

## Undergraduate Degree Requirements

To be graduated, 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 160 hours, according to the curriculum taken. To be awarded an undergraduate degree a student must have earned a grade-point average of a least 2.0 (C) on all Kansas State University courses taken for resident graded credit and applied toward the degree. Professional curriculums may impose additional degree requirements.

Up to one-half of the credit required for an 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 this institution. 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 ac-

ceptance 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, medical technology and physical therapy prior to earning a degree here.

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

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. Summer and fall graduates are invited to participate in the following spring commencement exercises. Also, prospective graduates may participate in the spring exercises prior to 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 the new degree requirements if a change has occurred.

## KSU Honor And Conduct Code

The members of the university community at K-State expect its students to make mature responses to problem situations and to conduct themselves in exemplary fashion as they interact with all members of the learning community. Individual responsibility and self-government are the major principles in maintaining honorable relations among K-State students and other members of the local community. For a detailed statement, see page 324.

## Degrees

The degrees shown below are conferred on completion of the prescribed curriculums: The letter which precedes each curriculum indicates the prerequisite high school courses as listed below. It is recommended that entering freshmen complete the prerequisite 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 (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.

### College of Agriculture, page 42.

(Bachelor of Science in Agriculture)

(E) Agriculture, General

(E) Agricultural Economics

(E) Agricultural Education

(E) Agricultural Journalism

(E) Agricultural Mechanization

(E) Agronomy (Crops and Soils)

(E) Animal Science and Industry

(E) Bakery Science and Management (BS in Bakery Science and Management)

(E) Crop Protection

(E) Dairy Production

(E) Feed Science and Management (BS in Feed Science and Management)

(E) Food Science and Industry (BS in Food Science and Industry)

(E) Horticulture

(E) Horticultural Therapy

(E) Milling Science and Management (BS in Milling Science and Management)

(E) Natural Resources Management

(E) Poultry Science

(E) Pre-Forestry (non-degree)

(E) Pre-Veterinary Medicine (non-degree)

(E) Retail Floriculture (certificate)

### College of Architecture and Design, page 80.

(E) 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, page 90.**

(Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Music, and Bachelor of Science)

(B) Anthropology, BA or BS

(A) Art, BA or BFA

(E) Biochemistry, BA or BS

(E) Biology, BA or BS

General Biology

Microbiology

Fisheries & Wildlife Biology

(E) Chemistry, BA or BS

General Chemistry

Chemical Science

(B) Computer Science, BA or BS

(A) Dance, BA or BS

(B) Economics, BA or BS

(A) English, BA

General or Area Studies

(A) Humanities, BA

(D) Life Science, BA or BS

(E) Physical Science, BA or BS

(A) Social Science, BA or BS

(B) Geography, BA or BS

(E) Geology, BA or BS

(A) Health, BA or BS

(B) Journalism & Mass Communications, BA or BS

Journalism & Mass Communications (Print)

Radio-Television

(F) Mathematics, BA or BS

(E) Medical Technology, BS

(A) Modern Languages, BA

(A) Music

Music, BA

Applied Music, BM

Music Education, BS in Music Education

(A) Philosophy, BA

(A) Physical Education, BA or BS

(E) Physics, BA or BS

(B) Political Science, BA or BS

(E) Pre-Dentistry, BA or BS

(E) Pre-Law, BA or BS

(E) Pre-Medicine, BA or BS

(E) Pre-Nursing (non-degree)

(E) Pre-Optometry (non-degree)

(E) Pre-Pharmacy (non-degree)

(E) Pre-Physical Therapy (non-degree)

(E) Pre-Veterinary Medicine (non-degree)

(E) Psychology, BA or BS

(A) Recreation, BA or BS

(E) Social Work, BA or BS

(E) Sociology, BA or BS

General Sociology

Correctional Administration

(A) Speech, BA or BS

General Speech

Speech Pathology-Audiology

(A) Statistics, BA or BS

### **College of Business Administration, page 191.**

(Bachelor of Science in Business Administration)

(E) Accounting

(E) Finance

(E) General Business Administration

(E) Labor Relations

(E) Management

(E) Marketing

(E) Office Administration

### **College of Education, page 199.**

(A) Elementary Education (BS in Elementary Education)

(A) Elementary Education—Special Education (BS in Elementary Education)

Secondary Education (Bachelor of Science)

(A) Education—Adult

(A) Education—Art

(A) Education—Biological Science

(A) Education—Business

(A) Education—Chemistry

(A) Education—Earth Science

(A) Education—Economics

(A) Education—English

(A) Education—Geography

(A) Education—History

(A) Education—Journalism

(A) Education—Mathematics

(A) Education—Modern Language

(A) Education—Physical Science

(A) Education—Physics

(A) Education—Political Science

(A) Education—Psychology

(A) Education—Sociology

(A) Education—Speech

### **College of Engineering, page 221.**

(F) Agricultural Engineering (BS in Agricultural Engineering)

(F) Architectural Engineering (BS in Architectural Engineering)

(F) Chemical Engineering (BS in Chemical Engineering)

(F) Civil Engineering (BS in Civil Engineering)

(F) Construction Science (BS in Construction Science)

- (F) Electrical Engineering (BS in Electrical Engineering)
- (E) Engineering Technology (BS in Engineering Technology)
- (F) Industrial Engineering (BS in Industrial Engineering)
- (F) Mechanical Engineering (BS in Mechanical Engineering)
- (F) Nuclear Engineering (BS in Nuclear Engineering)

#### **College of Home Economics, page 258.**

- (Bachelor of Science in Home Economics)
- (C or D) Consumer Interest
- (C or D) Dietetics and Institutional Management
- (C or D) Early Childhood Education
- (C or D) Family Life and Human Development
- (C or D) Fashion Design
- (C or D) Fashion Marketing
- (C or D) Food Science and Industry (BS in Food Science and Industry)
- (C or D) Foods and Nutrition in Business
- (C or D) Foods and Nutrition Science
- (C or D) Home Economics Education
- (C or D) Home Economics Extension
- (C or D) Home Economics/Liberal Arts
- (C or D) Home Economics and Mass Communications (BS in Home Economics and Mass Communications)
- (C or D) Housing and Equipment
- (C or D) Interior Design
- (C or D) Restaurant Management (BS in Restaurant Management)
- (C or D) Textile Science

#### **College of Veterinary Medicine, page 282.**

- Veterinary Medicine (Doctor of Veterinary Medicine)
- (See Colleges of Agriculture and Arts and Sciences for BS degrees in connection with College of Veterinary Medicine.)

## **Fees**

**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 prior to 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, either by cash or by check. Late registration fees are assessed those who register after the regular registration period. Students receiving scholarships or grants not processed through the Kansas State University Aids and Awards Office must present evidence of the award to the Aids and Awards Office prior to registration or they will be required to pay the full amount of their fees from personal resources.

**Withholding Student Records.** When necessary, the University withholds students' academic records for non-payment of fees, loans and other appropriate charges.

**Incidental Fee.** The incidental fee is the student's contribution toward the costs of instruction and covers approximately 20 to 25 percent of the instructional costs.

**Student Health Fee.** For a description of the services provided by this fee, see page 27.

**Student Union Annex I Fee.** This fee is used to retire the K-State Union Annex I building revenue bonds.

**Student Union Annex II Fee.** This fee is used to retire the K-State Union Annex II building revenue bonds.

**Stadium Bonds Fee.** This fee is used to retire the KSU Stadium revenue bonds.

**Student Recreational Building Fee.** This fee will be used to retire the Student Recreational building revenue bonds.

**Student Activities Fee.** The student activities fee is used for numerous student functions which include a broad range of student interests and activities. Those enrolling in six credit hours or less do not pay a full activities fee and thus are not entitled to the yearbook and certain student events without additional payment nor are they entitled to student ticket rates for athletic events.

## **Fees for Fall and 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 prior to the beginning of any semester.

**For seven or more semester credit hours:**

<b>Fees</b>	<b>Resident</b>	<b>Non-resident</b>
<b>Incidental Fee:</b>		
All except Veterinary		
Medicine students .....	\$255.00	\$750.00
Veterinary Medicine students .....	305.00	825.00





Student Health .....	37.00 <sup>1</sup>	37.00 <sup>1</sup>
Student Union Annex I .....	2.25	2.25
Student Union Annex II .....	10.25	10.25
Stadium Bonds .....	4.25	4.25
Student Recreational Building .....	12.00	12.00
Student Activities (including Union operations) .....	24.25 <sup>2</sup>	24.25 <sup>2</sup>
Totals—All except Veterinary Medicine students .....	\$345.00	\$840.00
Totals—Veterinary Medicine students .....	\$395.00	\$915.00

#### For six or fewer semester credit hours:

Fees	Resident	Non-resident
Incidental Fee:		
All except Veterinary Medicine students .....	\$ 17.00	\$ 50.00
Veterinary Medicine students .....	20.00	55.00
Student Health .....	37.00 <sup>1</sup>	37.00 <sup>1</sup>
Student Union Annex I .....	1.50	1.50
Student Union Annex II .....	6.50	6.50
Stadium Bonds .....	.50	.50
Student Recreational Building .....	6.00	6.00
Student Activities (including Union operations) .....	11.50 <sup>4</sup>	11.50 <sup>4</sup>

#### For employees enrolled in Graduate School:

Incidental Fee .....	per cr. hr.	\$ 17.00
Special Fees:		

##### A. If enrolled in seven or more credit hours:

Student Health .....	total fee	37.00 <sup>1</sup>
Student Union Annex I .....	total fee	2.25
Student Union Annex II .....	total fee	10.25
Stadium Bonds .....	total fee	4.25
Student Recreational Building .....	total fee	12.00
Student Activities (including Union operations) .....	total fee	24.25

##### B. If enrolled in six or fewer semester credit hours:

Student Health .....	total fee	37.00 <sup>1</sup>
Student Union Annex I .....	total fee	1.50
Student Union Annex II .....	total fee	6.50
Stadium Bonds .....	total fee	.50
Student Recreational Building .....	total fee	6.00
Student Activities (including Union operations) .....	total fee	11.50 <sup>4</sup>

<sup>1</sup> Students enrolled in a spring semester, who pay the Student Health fee, and are pre-enrolled for the following fall semester may elect to use the "no charge services" of the Student Health Center between the end of the spring semester and the end of the summer session by paying a \$10 fee prior to the end of the spring semester.

<sup>2</sup> 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 and the Student Activities fee.

<sup>3</sup> Full-time employees, and spouses of full-time Kansas State University employees, enrolled in six or fewer credit hours, may elect to be exempted from the Student Health fee and thereby not be eligible for Student Health Center services.

<sup>4</sup> Not a full activity fee and does not entitle student to the yearbook and certain student events without additional payment, nor to student athletic ticket rates.

## 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 prior to the beginning of any summer session.

Fees	Resident	Non-resident
Incidental Fee (per credit hour) .....	\$ 17.00	\$50.00
Special Fees (per credit hour) .....	7.00 <sup>1</sup>	7.00 <sup>1</sup>

## Persons Eligible For Resident Fees

**1. Residents.** Usually includes adults and minors of parents who have been residents of Kansas for twelve months or more prior to registering for any semester or session. The official residency determination for fee purposes is made by the Dean of Admissions and Records.

**2. Staff Members.** Employees of universities or colleges under the Kansas Board of Regents, other than hourly student employees, working four-tenths time or more during at least a part of each of the following months:

For fall semesters—Sept., Oct. & Nov.

For spring semesters—Jan., Feb. & Mar.

For summer sessions—June or the preceding Jan., Feb. & Mar.

**3. Federal Employees.** Federal employees given adjunct appointments at Kansas State University.

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

**5. Dependents.** Dependents (as defined for federal income tax purposes) of staff members, federal employees and military personnel defined above.

**6. Employees.** Same as staff members defined above, plus federal employees defined above and ROTC staff members of Kansas State University. Dependents are not entitled to the fees for employees.

## Other Fees And Refund Policy

**Private Music Lessons and Practice Facilities.** University students enrolled in a bachelor's or master's degree program with a major in music,

<sup>1</sup>The Summer School 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 Health, Union Building Bonds, Stadium Bonds, Student Recreational Building Bonds, Student Activities and Parking fees.

music education or applied music are exempt from fees for private music lessons and music practice facilities. Fees for all others, payable in advance, are as follows (Subject to the availability of staff, facilities and the following refund policy).

	University Students	Non- University Students
Two 30-minute lessons a week, per semester .....	\$50	\$87
One 30-minute lesson a week, per semester .....	30	45
Two 30-minute lessons a week, summer session .....	26	43
One 30-minute lesson a week, summer session .....	15	22
Single lessons, each .....	5	5
Practice piano, 1 hour daily, per semester .....	6	6
Practice piano, 2 hours daily, summer session .....	6	6
Practice organ:		
Two-manual, 1 hour daily, per semester .....	12	12
Two-manual, 2 hours daily, summer session .....	12	12
Three-manual, 1 hour daily per semester .....	25	25
Three-manual, 2 hours daily, summer session .....	25	25

**Field Geology Fee.** The fee for the summer geology field camp is \$100, which is the additional amount required from all students enrolled in this course for their transportation and lodging for the field camp.

**Refund policy.** (Applies to semester, summer session, field geology, music lessons and music practice facility fees only.) Refunds will not be made until sufficient time has elapsed to insure that fee payment checks have been honored—usually 15 days after students register. If an enrollee withdraws during a regular semester or eight-week summer session, the following schedule of refunds shall apply. However, the student activities fee is not refunded if the student does not return the student fee receipt card.

	Regular Semester	8-week Summer Session
During the first academic week .....	100%	100%
During the second academic week .....	90	75
During the third academic week .....	80	50
During the fourth academic week .....	70	no refund
During the fifth academic week .....	60	no refund
During the sixth academic week .....	50	no refund
After the sixth academic week .....	no refund	no refund

**Late Registration, Including Re-registering After Withdrawal.** A late registration fee of \$10.00 shall be assessed and collected from each person registering after the regular scheduled registration period. A larger late registration fee of \$25 shall be assessed and collected from each person registering, re-registering or paying fees after the 20th day of classes of a semester or 10th day of classes of a summer session; however, only one or the other of these fees shall be collected for each late registration, or re-registration. Late registration fees shall not be subject to refund, and payment thereof shall be considered a part of the registration process.

**Student Identification Card.** A charge for the original card is included in the Student Activities fees. A \$2 fee is assessed for each card replaced.

**Transcript Fee.** A fee of \$1 is charged for each transcript of academic record requested by a student after six transcripts have been furnished at no charge.

**Auditing Fee.** A person who is neither an enrollee paying full incidental fee, nor a staff member, is assessed \$1 per semester credit hour audited. Laboratory or Continuing Education courses may not be audited. This fee is not subject to refund.

**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 chemistry laboratory courses, geology field camps, and for excessive usage, breakage or losses due to personal negligence on the part of the student. Charges then can only be for the actual fair value of supplies used 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, 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, University of Kansas, Lawrence, Kansas 66044.

**Charges to Government or Private Agencies.** The fees collected under arrangements with governmental or other agencies follow in general the fees outlined above, and in all cases the charges are equal to or greater than the fees stated herein.

**Military Uniforms.** Every student who takes military training must have a uniform. The uniform is furnished by the government. The money value of any missing articles will be collected when the uniform is returned. Failure to return or pay for missing articles of the uniform may result in withholding of credit and in extreme cases may cause the University to refuse a transcript or to graduate the student concerned.

**Other Expenses.** In addition to the applicable fees, students are required to purchase textbooks, drawing instruments, slide rules, gym suits 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 a Kansas resident . . . . .	\$ 345*
Books and supplies, about . . . . .	83
Room and board in University housing . . . . .	612
Clothing, laundry, postage, travel, extra meals & social activities (varies with the individual) . . . . .	365

Total estimated expenses  
(half of academic year) . . . . . \$1,400

\* Non-resident fees are \$840 per semester and Veterinary Medicine students pay an additional \$50 (if a resident) or \$75 (if a non-resident)

## Student Employees

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 during the fall and

spring semesters, and at least three resident semester credit hours during the regular summer session.

To be employed on the hourly student payroll, a student must be enrolled in at least seven resident semester credit hours (six for graduate students) at K.S.U. during a fall or spring semester; and at least four resident semester credit hours (three for graduate students) at K.S.U. during a summer session, or been enrolled in at least seven resident semester credit hours (six for graduate students) at K.S.U. during the preceding spring semester.

## Housing

*Thomas J. Frith, Director*

*Jean M. Riggs, Associate Director*

Kansas State University considers the housing of students as part of the total educational plan. All students are invited to live in the University residence halls. All single freshmen are required to live in a residence hall or Greek chapter house if space is available. General exceptions to this policy are veterans of the armed forces or students living at home.

Other exceptions to this policy must be cleared through the Director of Housing.

**Available Housing Facilities.** Kansas State University provides residence hall living for 4,300 students, cooperative housing for approximately 45 men and 64 women, 576 apartments and 52 mobile home lots for student families. Sororities provide 600 places for women, and fraternities have accommodations for 1,400 men. Others find privately owned rooms and apartments.

**Self-Government in Residence Halls.** Learning to manage your own affairs is certainly a part of university life. This takes maturity and self-discipline. K-Staters start as freshmen with self-government within the framework of general University regulations. In all University residences, elected hall councils assume responsibility for many activities. Married students on campus use the mayor-council form of government to regulate their community life.

**Residence Halls.** Each residence hall is staffed with a professionally trained director and staff. The total residence hall personnel program is coordinated by the Director of Housing.

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, closet facilities and study tables. The resident furnishes pillow, towels, bedspreads, etc.

Each hall has lounges and recreation rooms for relaxation and social activities—with TV sets, hi-fi equipment, ping-pong tables and the like providing for any occasion from a game-watching party to a Christmas ball.

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

Contracts are issued on receipt of a residence hall room application and \$25 non-refundable 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.

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

**Payment Schedule.** (A) Full payment of \$600 or (B) Payment schedule (if not paid in full) below:

Fall Semester		Spring Semester	
Payment with contract	\$153	January 10	\$153
September 10	153	February 10	153
October 10	153	March 10	153
November 10	153	April 10	153

Rates are subject to change.

Applications and further detailed information are available through the Department of Housing.

**University Cooperative Housing.** There are many students who would profit greatly from a university education, but do not feel they can afford four years of college. Kansas State University offers, in addition to scholarships, two cooperative living houses designed to lessen the financial burden of attending

the University.

These are cooperative units in the sense that the students do their own housekeeping—cooking, cleaning, and dishwashing. In this way living costs, a big item in the budget, are lowered considerably.

Smith Cooperative House houses 45 men who spend about six hours a week at their house duties.

Smurthwaite House for women provides cooperative living for 64 freshmen and upperclass women at low cost. This is a new and contemporary house.

At Smurthwaite, house duties are rotated so each student has a chance to learn all aspects of house management. The duties take about an hour daily. Everyone lends a hand on special occasions.

Applications for these houses are considered on the basis of academic ability and financial need. Write to the Department of Housing for applications and information.

**Family Housing.** Student families have not been overlooked in the housing program at Kansas State University. One- and two-bedroom apartments at Jardine Terrace are available both furnished and unfurnished. These low-cost apartments are close to the campus. Each group of buildings has a central laundry.

In addition, there are mobile home lots in North Campus Courts.

The furnished apartment rates are \$97 a month for a one-bedroom apartment and \$115 a month for a two-bedroom apartment. A limited number of unfurnished apartments is available; one-bedroom \$91 per month, two-bedroom \$105. The trailer parking lot rental is \$25 a month. For the apartments the rental includes utilities such as gas and water. The rental for the trailer parking lot includes sewer and water. Rates are subject to change.

Applications are available at the Department of Housing, Pittman Building.

**Graduate Student Housing on Campus.** Single graduate students are welcome to live in the residence halls. When possible, these students are assigned to a graduate area of a hall.

Single graduate students qualify for the Evans Apartments. There are 20 apartments in this building which rent for \$97 a month for a one-bedroom and \$115 a month for a two-bedroom. These are furnished and water and heat are furnished. Applications are available from the Department of Housing.





**Off-Campus Housing.** The Department of Housing, Pittman Building, has a card file of rooms and apartments which are available in Manhattan. It is necessary that students who wish to live off campus visit Manhattan and personally select their own rooms and apartments.

Listings change too rapidly to be of use by mail. Rent ranges from \$35 to \$55 a month for one person to a room and \$25 to \$35 a month per person when two or more reside in a room. Meals at the K-State Union Cafeteria and local cafes will cost \$70-90 a month. Apartments rent from \$75-275 a month, depending upon the size of the family and the facilities required.

All Manhattan householders who rent to students are expected to follow the University policy of making accommodations available to all students regardless of race, color, or national origin.

**Sororities.** Booklets describing sororities and setting forth the provisions regulating selection of new members are provided to all prospective freshmen and interested upperclass women by Panhellenic Council. These may be obtained by writing to the Faculty Adviser to Sororities.

House bills in sororities will average approximately \$675 a semester. This includes room, board, and sorority dues. Freshman members, however, live in residence halls and pay sorority dues of approximately \$40 a month.

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

**Fraternities.** Fraternities select new members primarily during the summer months. High school seniors are often guests at fraternity houses during their senior years, 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 an invitation to membership before classes start and if they cancel their residence hall contract. Costs will average \$675 a semester. For more information, write to the Faculty Adviser to Fraternities.

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 Chi, Delta Sigma Phi, Delta Tau Delta, Delta Upsilon, FarmHouse, Kappa Alpha Psi, Kappa Sigma, Lambda Chi Alpha, Omega Psi Phi, 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.

**Clovvia.** Clovvia 4-H House provides accommodations for 62 upperclass women. Although 4-H members are given preference, any coed is eligible for membership. Since Clovvia 4-H House is a cooperative unit with the members supplying the labor for cooking and cleaning, monthly housebills are approximately \$110 including social fees. The women spend about six hours a week at their house duties. Applications are made through the County Extension Offices, the State 4-H Department at Kansas State University, or the Clovvia Membership Chairman, 1200 Pioneer Lane, Manhattan, Kansas 66502.

## Research Resources

### Particle Accelerators

Kansas State University, in cooperation with the Energy Research and Development Agency, operates a major facility for the acceleration of atomic particles, particularly heavy ions. There are numerous accelerators associated with this facility including a 12 MeV tandem Van de Graaff accelerator with an "on-line" PDP-15 computer and a 3 MeV, high-current Van de Graaff accelerator. In addition, there are two low-energy, high-current accelerators. The accelerators provide the University and the State of Kansas with particle accelerator capabilities over an unusually large range of projectiles and energies up to 55 MeV.

These accelerators are housed in Cardwell Hall. A professional staff and graduate students maintain an active research program which addresses problems in atomic physics related to the development of fusion energy as well as problems in heavy-ion nuclear physics and solid-state physics. For further information concerning this facility, write to the Director, Nuclear Science Laboratories, Physics Department.



## Nuclear Reactor

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, Nuclear Engineering Department.

## Konza Prairie

Konza Prairie Research Natural Area is an 8,136 acre area within a few miles of the University which is dedicated for 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 for assessing the nature and magnitude of the ecological changes resulting from human activity.

A floating laboratory on the 15,000-acre Tuttle Creek Reservoir is used for limnological and fisheries studies. Also associated with the reservoir is the Tuttle Creek Fisheries Research Laboratory. This laboratory has 28 quarter-acre plastic-lined ponds for research on fish nutrition, growth, and population dynamics.

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.

## 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:

- Editorial offices of major journals in history, English, economics, horticulture, and education, and modern languages.
- Scanning electron microscope
- Transmission electron microscope
- Nuclear magnetic resonance spectrometers

- Recording Raman spectrometer
- X-ray diffractometers
- Mass spectrometric laboratory
- Population and demographic laboratory
- Statistical laboratory
- Wind and soil erosion laboratory
- Controlled environment test facility
- Audio visual materials center
- Experimental animal facilities
- Data banks of the Consortium for Political Research
- Arp electronic music synthesizer
- Laboratory for physiology of exercise
- Glassblowing and instrument shops
- High power, pulsed nitrogen laser
- Continuously tunable lasers
- Fourier transform spectroscopic laboratory

## Computing Center

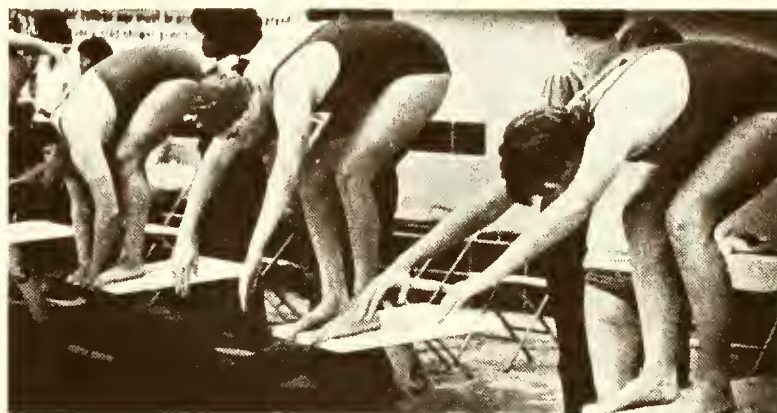
*Tom L. Gallagher, Director*

The Computing Center is a service department of the University and functions directly under the authority of the Vice-President for Academic Affairs. The Kansas State University Computing Center IBM System/370 Model 158 computer, peripheral equipment and supporting services are intended for the research and instructional computer needs of the faculty, staff, and students. In addition, the Computing Center participates in the coordination of computer efforts among the State Board of Regents' Institutions.

The IBM S/370 Model 158 has one megabyte of main core with 500 million bytes of associated direct access storage; this machine and other support services allow the Computing Center to provide a wide spectrum of applications. Other equipment includes tape and disk drives, remote-job-entry stations, card readers, a card punch, line printers, low-speed interactive terminals, an incremental plotter, and supportive card-processing equipment. Remote-job-entry stations are directly available to users for fast turnaround of short student-written batch jobs in WATBOL, WATFIV, PLC, and ASSIST.

The Computing Center is on the ground floor of Cardwell Hall, and two Remote Computing Laboratories are on the lower levels of Fairchild and Seaton Halls where data preparation equipment, several interactive terminals, and a remote-job-entry station are housed. The professional staff provides assistance in the use of the hardware and software. Manuals, texts, publications, program listings, and other reference materials are available in the Computing Center User Information Center in Cardwell Hall. Additionally, manual racks are maintained in several convenient locations on campus.





FORTRAN, COBOL, PL/I, APL, LISP, SNOBOL, and Assembler are among the programming languages on the system. Application packages including SPSS, SAS, BMD, GPSS, and CSMP also are available. CMS is an interactive operation system that provides BASIC, SCRIPT, VS Assembler, and WATFIV at interactive terminals. In addition to basic software for the incremental plotter, SYMAP and SURFACE2 provide high level support for spatial analyses applications. Non-credit seminars and classes are held through the year to acquaint users with the services available through the Computing Center.

For further information about the Computing Center, write to the Director, Computing Center, Cardwell Hall.

## Library System

*G. Jay Rausch, Dean*

The Francis David Farrell Library, named after Kansas State University's eighth president, is the central unit of the University library system. It is supplemented by six branch libraries in other buildings: Architecture, Chemistry, Physics, Veterinary Medicine, and two dormitory libraries, Derby and Kramer.

The libraries contain 780,000 cataloged volumes. Growth is at 30 to 40 thousand volumes a year. In addition to the cataloged volumes, the libraries contain a full government depository collection, including the publications of the Atomic Energy Commission and the Energy Research and Development Administration, a teaching materials collection, an extensive microform collection and 50,000 records, tapes and slides. The library receives a current list of 8,500 journals.

Farrell Library now provides more than 200,000 square feet of space. Seating is available for 3,000 students. One hundred locked study carrels are provided for doctoral candidates. Five hundred additional individual study spaces are available to graduate and undergraduate students.

Except for the rare book room, reserve collection, and the phono record collection, the library is entirely open shelf. Collections are organized into three subject areas: Social Science-Humanities, Education and Science. These departments are supplemented by a general reference and bibliography department, a documents department, a special collections department, and a minorities center.

With its land-grant background, the library has always had a superior science collection. During recent years, to meet its multi-purpose university responsibility, significant additions have been made to the collections in the humanities and the social sciences. Much of this material has been in microform as evidenced by the need for a microform reading room in each of the subject areas.

To take advantage of the library resources in the region, the library operates a courier service which travels twice a week east to Kansas City and twice a week south to Wichita. Much use is made of the collections in the Linda Hall Library and the University of Kansas Library. The six state-supported institutions of higher education belong to a teletype network. They also permit direct borrowing by students and faculty. The library is a member of the Kansas Information Circuit—a teletype network of the larger public and system libraries of the state. Direct teletype connection is also available to many other libraries.

## Services and Facilities

### Postal Service

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 University Postal Center in Anderson 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.

An inter-office campus mail delivery service is operated by the Physical Plant Department. Since this service is operated with state funds, it may be used only for official University business.

Inquiries regarding specific use of the campus mail service should be addressed to the Vice President for University Development, while inquiries regarding U.S. Postal Service should be addressed to the University Comptroller.

## The Speech and Hearing Clinic

The clinical facilities and services of the Speech and Hearing Clinic, Room 107, Leasure Hall, are available for consultation, examination and therapy. Services are extended to University students who have impairments of their speech, hearing or language functions. These clinical services are also available to children and adults of the surrounding communities. A purpose of the clinic is to provide educational and clinical experiences to students at Kansas State University who are preparing for careers in speech pathology and audiology. Students may call for information or they may be referred by instructors or other interested persons.

## Data Processing Center

*Melvin Kepple, Director*

This center has the responsibility to provide data processing services to the administrative community at Kansas State University. These services consist of systems, programming, operational and keypunch functions performed by the employees of the center. The center operates on a closed-shop basis and all work is done by employees of the Data Processing Center. Some of the computerized processing services performed directly for the student community are student registration, personnel changes, payrolls, student health billings, and student union concessions.

The computer in the Data Processing Center is an IBM S360/30 with 256K bytes of main core. Supporting equipment to this machine includes tape and disk drives, card reader, card punch, line printer, and card processing gear. In current use is the COBOL programming language.

## Kansas State University Publications

### University Publications

*General Catalog Bulletin*

*Student Catalog Bulletin*

(information for prospective students)

*Summer School Bulletin*

*Late Afternoon, Evening, Weekend and Off-Campus*

*Courses Bulletin* (spring and fall)

*Biennial Report*

*Financial Report*

*Extension Bulletins*

*Agricultural Experiment Station Bulletins*

*Engineering Experiment Station Bulletins*

### Student Publications

*The Kansas State Collegian*—student newspaper

*The Royal Purple*—yearbook

*The University Directory*—published annually

### Other Publications

*The Agriculturist*—published quarterly

*The Kansas State Engineer*—published six times a year

*The K-Stater*—published eight times a year by the Alumni Association

## The Regents' Press of Kansas

Kansas State University, together with the University of Kansas and Wichita State University, is a sponsor of the Regents' Press of Kansas, an organization dedicated to the advancement of scholarship through publication of scholarly books, as well as material on Kansas and mid-America. Stemming from the former University of Kansas Press, the current organization was established July 1, 1967. It is the first university press in the United States to be operated on a statewide level under the specific sponsorship of all the state's universities.

Administrative control of the Press rests with a board of trustees composed of the academic vice-presidents of the sponsoring institutions. The Press's chief executive officer is the director, who is assisted in editorial decisions by a nine-member editorial committee, of which he is chairman. Three faculty members from each of the universities, or their alternates, serve on the committee, with each delegation headed by a vice chairman. The Press offices are at 366 Watson Library, The University of Kansas, Lawrence, KS 66044.

## The Summer School

*E. Norman Harold, Director*

The Summer School is an integral part of the educational program of Kansas State University. It is designed to meet the needs of the following groups:

1. Undergraduate 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. Graduate students, for whom the Summer School offers an opportunity to make more rapid progress towards a degree, and teachers who are unable to attend the University during the two semesters.
3. Special interest, non-degree groups, including public school, business and industrial personnel. High school graduates expecting to enter the





University for the first time are urged to attend the Summer School. These students find it valuable in establishing study habits, becoming acquainted with the campus and faculty, and adjusting to university life.

The Summer School has available all the facilities and services of the University which are available in the regular semesters, including housing, food service, counseling and testing services, Student Health Center, and K-State Union recreational programs. A large number of the classrooms and library study rooms are air conditioned.

A special recreation program is planned for each summer session. It includes dancing, parties, movies, lectures, concerts, plays, tennis, boating, water skiing, swimming, fishing, bowling and other sports.

The Summer School consists of an eight-week session in which a student may earn as many as nine semester hours of credit. Full credit two, three and four-week concentrated courses are offered to accommodate students who cannot attend the eight-week session. The length of these special sessions varies from a week to four weeks.

The *Summer School Bulletin* gives complete and detailed information about the Summer School. It is available in February each year. A copy may be obtained free of charge by requesting it from the Dean of Admissions and Records.

Through the Regents' Continuing Education Network, some K-State summer courses are offered at more than 20 Kansas locations. The network allows individuals to enroll in courses offered by the six state colleges and universities as well as KSU.

The teaching staff of the Summer School is formed from the regular instructional staff of the University, supplemented by visiting professors and lecturers.

The courses offered in the summer are chosen from among those offered in regular semesters with the addition of conferences and workshops planned to meet special needs. The particular courses chosen for Summer School are determined by student demand.

## Student Personnel Services

*Chester E. Peters, Vice President for Student Affairs*

Kansas State University has developed a complete program of student personnel services because education involves many experiences outside the

classroom.

This philosophy stresses the importance of providing students with a variety of opportunities and services aimed at improving and supporting their academic activities; intellectual development; vocational interests, aptitudes, and skills; emotional balance; social relationships; moral and religious values; physical health; and aesthetic appreciations.

Student needs for adequate medical care, housing, food, financial assistance, employment, counseling, recreation, and spiritual inspiration, have been anticipated in this program.

The Vice President for Student Affairs is responsible for maintaining a close relationship with the faculty and administrative staffs in helping to interpret student needs.

The vice president has general responsibility for the administration and coordination of the following divisions comprising the Student Personnel Program: Aids, Awards, and Veterans Services; Career Planning and Placement Center; Center for Student Development; Housing; Recreational Services; K-State Union; and Lafene Student Health Center and University Hospital.

The Vice Presidents for Academic and Student Affairs have a special assistant, an Associate Dean for Minority Affairs, who is responsible for counseling and programs with minority groups.

## Center for Student Development

*Earl Nolting, Director*

Staff members of the Center for Student Development work in a variety of ways with individual students and student groups, and serve as liaison to all elements of the University community.

Units within the center are organized to identify and meet the needs of K-State students. Responsibilities include maintaining a working relationship with residence halls, fraternities and sororities, student government, student organizations, campus religious groups, and the University judicial system.

Also, major direction for many programs comes from the Center for Student Development including: summer enrollment and orientation, special assistance to minority and foreign students, a women's resource center, student leadership and staff training, workshops for housemothers, group life seminars, discussion groups in study skills instruction, vocational and occupational information,



or interpersonal relations.

Another major emphasis is on individual development. Counseling assistance is available, and students are encouraged to examine their potentials and to increase their ability to become self-directed individuals.

The various programs are evaluated by research staff members who also study characteristics of K-State students and changes which occur. Several staff members hold part-time academic appointments in addition to their positions in the center.

**New Student Programs.** The new student orientation program assists approximately 3,000 entering students during summer pre-enrollment. The summer program usually is the students' initial encounter with the University and, in addition to providing needed information, often results in the beginning of meaningful friendships. A concurrent program assists parents of new students in becoming acquainted with the University, its programs and facilities, University staff, and student leaders. Orientation also is offered for new students in January and August.

The group life seminar course gives new students a chance to meet with small groups of other entering students and upperclass student leaders. The weekly meetings provide opportunities for personal development and for learning more about the University. New students receive one hour of academic credit for the course.

Religious life at the University finds expression in many church-sponsored student organizations and in more than 30 church congregations in Manhattan. Student Services staff assists in coordinating campus religious activities. On campus there are two memorial chapels—Danforth and All Faiths—which are available for student religious services and private meditation. Use of these chapels is scheduled through the Center for Student Development.

**Minority and Cultural Programs.** The primary thrust of this area is to assist low-income and minority students in maximizing their educational development at Kansas State University. There are several components within this area.

*The Educational Opportunities Program* assists low-income and minority students in setting and attaining realistic educational goals, provides them with information about post-secondary educational opportunities at Kansas State, and assists them in securing the necessary financial resources.

*The Cultural Enrichment Program* encourages minority students to seek leadership roles on campus, advises minority student organizations including the Black Student Union, MECHA (a Chicano student organization), and the American Indian student organization, and assists student organizations in sponsoring programs and lectures which bring minority leaders to KSU and heighten multi-racial awareness within the community.

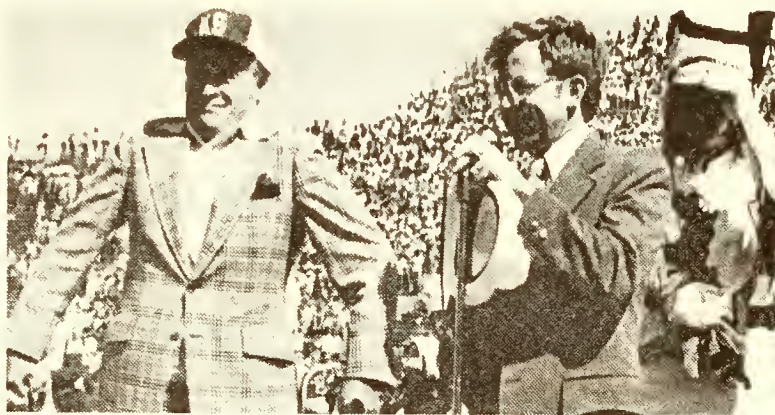
*TRIO Program—Upward Bound/Special Services.* This federally funded program's primary mission is to provide services for low-income and culturally different students which will enhance their chances of academic success. The Upward Bound Program is designed to generate functional skills and motivation in young people with inadequate secondary school preparation and of low-income backgrounds. It focuses on students completing the 10th, 11th and 12th grades of Manhattan and Junction City high school communities. The Special Services Program is geared for students admitted and enrolled at K-State. Services include counseling (personal, vocational and financial), academic advising, tutorial assistance and a variety of referral services. Student eligibility is determined by income criteria established by federal guidelines.

**Counseling Center.** The Counseling Center offers the assistance of professional counselors and counseling psychologists to KSU students and their spouses (and others on a limited basis) throughout the academic year. The intent of this counseling assistance is to facilitate wise choices regarding the "problems of living" that are a natural and potentially positive consequence of growth and development.

Attending a large university with its challenges, excitement and frustrations frequently brings about substantial changes in the students' attitudes, style of life, and goals for the future. The center provides persons an opportunity to regroup their coping strengths, check out ideas, and obtain support while dealing with the problems facing them. The more persons become aware of the patterns they have built up through previous development—abilities and talents, social assets and liabilities, interpersonal style, emotional strengths and weaknesses, wishes, values and aspirations—the more they are able to influence their subsequent development by the choices they make. The main purposes of counseling are to promote this kind of awareness and to facilitate this kind of choice.

Clients are encouraged to keep the responsibility





for their own lives firmly in their own hands. Decisions must be **their** decisions, and they must know on what basis they make them in order to develop increased capacity to meet and deal with life's challenges and opportunities.

Individuals and couples seeking assistance may choose to meet with a counselor to explore educational-vocational possibilities and/or discuss personal-social concerns, or they may choose to meet with other individuals and couples in small counseling groups (C-groups) led by center staff for mutual help and support.

In addition, a wide range of Counseling Center programs is offered to facilitate personal growth and development, including the following: assertive training, biofeedback and relaxation training, career life planning (earns academic credit, ED 405-511), life planning workshops, pre-marriage and marriage workshops, peer sex education, pregnancy counseling, psychological testing, study skills (earns academic credit, ED 415-051), leadership training, and value clarification. Audiotape, videotape and other forms of instrumental feedback frequently are used in these programs.

Center staff members also consult with individuals and groups (students, staff and faculty) about classroom interaction, group dynamics, group decision-making and goal-setting, interpersonal communication, leadership skills, organization development and program planning. These consultations often include participation in the implementation of these programs. Interested persons are invited to solicit the help of center staff in developing additional programs and/or workshops on various aspects of university experiences.

At most hours of the day, a counselor is available to see immediately anyone coming to the Counseling Center. High school seniors may use the service before entering college by writing for an appointment. The Counseling Center is in the West Lobby of Holtz Hall.

**International Center.** The Kansas State University International Center, situated at the corner of Mid-campus Drive and Claflin Road on the campus, makes available to each K-State student, faculty, and staff person the opportunity for a true international sharing and learning experience. The center allows campus, community, and state involvement in international programs. The large number of international students attending KSU represents a rich educational and cultural resource. These resources

provide a nucleus about which existing international programs can be revitalized and new ideas initiated. Center programs can assist the campus and community to attain goals and aspirations which transcend race and nation. The International Center includes a lounge, multi-purpose room, kitchen, dining room, and office areas. The Foreign Student Office also is in the International Center.

**Foreign Student Office.** The Foreign Student Office serves more than 500 foreign students on the Kansas State University campus. It also serves over 50 who have graduated and are in a Practical Training status but for whom the office provides administrative services. Frequently, it is called upon to advise students about renewals of stay, passports, work permits, finances, travel, housing, university services, etc. In addition, the office acts as a resource for the campus, community and state in questions concerning international programs and services. It also serves in developing programs for foreign students. The Foreign Student Office works with all facets of the University to implement and support the goals of the students and the University in international education.

The Foreign Student Adviser advises and provides referral services for all international students on campus. This person helps promote mutual concern between foreign and American students, as well as concern among the foreign students, the faculty and the community.

**Program Development and Research.** The Program Development and Research staff assists with the planning, implementation and evaluation of programs within the Center for Student Development and works closely with faculty, advisers, students, and other student personnel staff in the development of student assistance programs. Programs and workshops will, upon request, be designed to assist faculty groups, student personnel staff, student organizations, and volunteers in improving their programming effectiveness.

The staff conducts and publishes research on the characteristics, attitudes, and needs of the K-State student body for purposes of assisting academic departments, student personnel staff, and students in their program development efforts. This research is published in the report series entitled *Studies in Student Personnel*.

**CLEP Testing Center.** The Center for Student Development is the service agency on campus for the College Level Examination Program (CLEP).



CLEP examinations may be taken on the third Saturday of every month by anyone properly registered with the College Entrance Examination Board. In addition, special testing dates are scheduled at the start of each academic semester for students desiring to test out of courses in which they are currently enrolled. The Center staff will also conduct utility studies and provide consultation to academic departments interested in implementing CLEP examination procedures for their courses. Students desiring information about the CLEP program at K-State and those wishing to register for these examinations are invited to stop by the Center for Student Development in Holtz Hall.

**Student Activities.** This office, which is in the K-State Union, provides coordination of the University judicial system, advises the University Learning Network (ULN) and the Student Governing Association (SGA), and assists individuals and groups who wish to organize and register their activities on the K-State campus. University Learning Network (ULN) is K-State's educational information and campus assistance center. Questions regarding academics, campus activities, student or faculty locations and campus/community services may be directed to 532-6442.

**Entrance and Professional Examinations.** The Center for Student Development also is responsible for administering the following entrance and professional examinations:

- Allied Health Professions Admissions Test
- American College Test (Residual)
- American College Test-Proficiency Examination Program
- Dental Admissions Testing Program
- Graduate Management Admission Test
- Graduate Record Examination
- Law School Admission Test
- Miller Analogies Test
- Scholastic Aptitude Test
- Test of English as a Foreign Language
- Veterinary Aptitude Test

These examinations are often required by colleges and universities for entrance into undergraduate study or graduate and/or professional programs. Anyone desiring to register for these examinations or desiring information about them should contact the Center for Student Development.

**Women's Programming and Resource Center.** The K-State Women's Programming and Resource Center is concerned primarily with raising the level of

awareness of students regarding the changing roles of men and women and the broad implications of these changes. It serves both as a center of information and as a referral agency regarding opportunities and programs about and for women students. Special features include assertive training, rape prevention, and a variety of discussion groups, some of which concentrate on the needs of re-entry students and of single parents. Both men and women are invited to use the center.

## Aids, Awards and Veterans Service

*Michael A. Novak, Director*

**Loan Programs.** Many Kansas State University students who qualify on the basis of financial need are assisted with student loans through the National Direct Student Loan Program. The NDSL is made at no interest while the student is enrolled and at 3% beginning 9 months after termination of studies.

While no absolute deadline has been established for submitting loan applications, it is advisable to plan early and apply for loan assistance prior to April 1 of each academic year.

Many students borrow up to \$2,500 a year without a need verification if family adjusted gross income is less than \$25,000 through the Guaranteed Student Loan Program. Applications may be obtained from participating lenders, banks, savings and loans, etc., or from any student financial aid office.

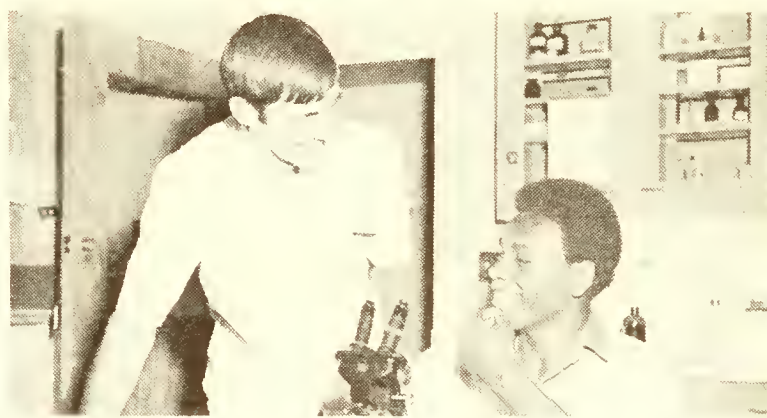
Qualified students may also borrow through Emergency, University, Alumni and Endowment funds to meet specific needs. Interested students should contact the Aids, Awards and Veterans Service Office, Fairchild Hall.

**Scholarship Programs.** More than 1,000 Kansas State University undergraduate students receive scholarship assistance each year based on their academic record and financial need. The priority date for submitting the financial aid application is February 15 prior to the fall semester in which the student intends to enroll.

**Part-Time Work.** Kansas State University employs more than 3,500 students each year and they earn in excess of \$2.1 million. Approximately 700 students, qualified on the basis of need, are employed on the Work-Study Program while the remainder are on regular campus payroll.

All of the above programs, except regular campus jobs, require a student to submit a KSU Financial Aid Application and a Family Financial Statement.





Students living in Kansas may obtain the KSU Financial Aid Application and the Family Financial Statement (FFS) from any high school counselor. Those applicants living out of state may obtain the FFS from a high school counselor or college financial aid office and write to the Office of Aids, Awards and Veterans Service for the KSU application.

**Services for Veterans.** The University maintains a Veterans Service Office 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 veterans 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 Viet Nam.

Information may be obtained from your nearest Veterans Administration Office or the Aids, Awards, and Veterans Service Office 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 Division of the State Board for Vocational Education, Topeka, Kansas.

## Career Planning And Placement Center

*J. Bruce Laughlin, Director*

One vital criterion in the selection of a college or university should be the career development services it provides. On this basis Kansas State University compares most favorably with other institutions.

The Career Planning and Placement Center, in Anderson Hall, assists prospective freshmen, undergraduates, graduating seniors, graduate students and alumni with career planning and employment—assisting in searches for both summer and full time positions.

As its name implies, 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. Service

provided includes employment vacancy referrals, data sheet and resume preparation assistance, interview workshops, career counseling, self-instructive video taping, government/industrial employer interface workshops, etc.

Although not all curricula are heavily involved, the center successfully attracts hundreds of business and industrial recruiters to the campus each year for employment interviews. Students in curricula not regularly sought on campus have access to career counseling and guidance to develop job search strategies effective off-campus.

The Career Library reflects current employment trends and opportunities in business, industry, agriculture, education, and government. Although much employer literature is transitory, a comprehensive collection of materials is maintained to assist students in assessing occupations in the broad sense as well as individual employment settings.

In the field of education, current information is filed on positions open and qualifications required in elementary, secondary, and college-level work, including administration. Information on employment opportunities is available, and qualified staff members are eager to help students and alumni with employment considerations.

## Lafene Student Health Center

*Robert E. Sinclair, M.D., Director*

The Lafene Student Health Center and University Hospital is a Joint Commission accredited hospital serving the health needs of K-State students. It is conveniently located in the center of the campus just west of the Library. It is made up of a large outpatient clinic and a 26-bed hospital unit where students may be hospitalized when necessary. It is a modern facility, caring for all needs of the students, with the exception of major surgery, and contains a pharmacy, physical therapy department, medical laboratory, and X-ray department.

The Mental Health Section on the lower level of the center provides diagnostic, consultative treatment and referral services to students experiencing emotional or psychological problems. As the center is also responsible for the environment of the campus, the Environmental Health and Safety Section also is housed in this unit, along with a health educator.

The center is staffed by full-time physicians with adequate medical supporting personnel. When necessary, the student is referred to specialists for treatment. If, for example, surgery is necessary, the patient has a choice of several able Manhattan surgeons. Treatment is at the student's expense and can be performed at one of the two local hospitals.

Medication, laboratory tests, and X-rays are available at the center at reduced rates. Many services are offered at no cost. Hospitalization in the University Hospital is provided at special rates for the first 21 days—thereafter, the charge is reasonable and comparable to that of other Kansas hospitals.

After regular clinic hours a student who is ill or injured may receive medical care through the emergency clinic of the Lafene Health Center. Home calls are not made.

It is strongly recommended that all students at Kansas State University carry medical insurance, either through the parent's plan at home or through the health insurance program available to students at special rates. This plan supplements the coverages 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. The student may purchase this insurance at the time of class enrollment.

Kansas State University requires a complete medical history 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 would assist the staff in evaluating any illness while at K-State. 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.

Since certain diseases are more prevalent in some areas of the world, all new international students are required to have a physician complete the Kansas State University Medical Certificate prior to admission.

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

*Walter D. Smith, Director*

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

The 5.5-million-dollar building features an open space concept of architecture highlighted by a three-story courtyard in the center of the building.

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, etc.), art gallery, central information desk, lounges, banquet rooms, copy center and Student Governing Association offices.

In operation since 1956, the Union operates on a self-supporting basis with income from eight operating units and student fees.

The K-State Union director and staff operate the building under the guidelines and policies established by the Union Governing Board. The board consists of students, faculty and alumni and acts as a board of directors for the operation of the Union.

The Union Program Council, a 250-member student volunteer organization, with offices in the Activities Center, provides over 400 programs annually for the cultural, educational and personal growth of students. All students are welcome to participate in the Union Governing Board or the Union Program Council.

## Recreational Services

*Raydon H. Robel, Director*

It is the desire of the Recreational Services Department to provide every student in the University the opportunity to participate in some recreation activity. No activity is compulsory, but an attempt has been made to make activities appealing and desirable.

Recreation is a renewal of the mental, emotional and physical state of mind and body for the continuance of personal and professional well-being. As such, it has a vital function in any university community. The philosophy of the Recreational Service





Department is that students should have freedom of choice, equality of opportunity, and responsibility for sharing in planning, supervising, administering, and participating in the recreational programs and services.

The department offers three areas for physical recreation programs. These three areas are emphasized in the following preferential order: (1) free time recreation, (2) competitive intramurals, and (3) sports clubs and special programs.

The department attempts to sponsor as much free play and recreational use of facilities for the students, faculty, staff, and their families as is possible. Free time recreation is unstructured; set up for a time to recreate at your own convenience, and is away from schedules and academic pressures. This area includes free time use of all facilities and a variety of fitness and special programs.

Intramural sports are the scheduled competitive activities of the University's recreation program. Teams are organized from fraternities, sororities, residence hall floors, independent groups, co-rec, and faculty groups. Thousands participate each year in the varied intramural activities. They engage in both team and individual sports without regard to their level of skill. The department offers 30 different activities on the competitive level.

Sports clubs exist primarily as an outlet for special interests rather than for outside competition. The purpose in establishing a sports club program is (1) to offer sports activity to interested students which goes beyond intramural and classroom competition, (2) to help students learn and develop special skills in sports areas, and (3) to encourage the growth and expansion of local competition. Clubs operating under the department are fencing, jitsu, canoe-kayak, and power volleyball.

The L.P. Washburn Recreational area north of the campus includes lighted tennis and handball courts, outdoor basketball, multi-purpose fields for games and sports activities of all kinds, a golf driving area, and an archery range. Also in this area is an equipment check-out center for various types of sports equipment, plus outdoor recreation equipment for canoeing and camping on a rental basis. The regular sports equipment is loaned to all university-connected people.

The indoor facilities at KSU feature a natatorium with two 25-yard swimming pools, one diving pool with two 1-meter and two 3-meter boards, and a sun deck area. The remainder of the indoor facilities are

in Ahearn Gymnasium and Fieldhouse. Facilities include basketball, volleyball, and badminton courts, a weight lifting room, men's and women's locker rooms, and a tartan jogging track.

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

## Operation Of Motor Vehicles

Possession of cars by students is discouraged. All motor vehicles operated on the campus or in Riley County must be registered with the University Traffic and Security Office. Students living in residence halls and freshmen cannot secure parking permits for the campus proper. However, upperclass residence hall students can purchase a parking permit for their residence hall lot only as space is available. Driving and parking of motor vehicles are governed by regulations established by a student-faculty Traffic and Parking Committee, by authority of Chapter 484 of the Laws of Kansas, 1957.

## Student Organizations

There is something for everyone. More than 200 clubs, interest groups and professional societies offer students a nearly unlimited scope of extracurricular activities.

There are recreation clubs for those interested in skiing, sailing, horseshoes, judo, sports cars, flying and fencing. Dance clubs, literary clubs and many music ensembles and choirs offer cultural expression and appreciation.

A great number of professional societies exist to promote interest in subjects from nuclear engineering to photojournalism to geography.

There are also environmental interest groups, political clubs and service organizations which encourage social participation and responsibility.

Many of the college departments have organizations which permit students to take an active role in curriculum selection and course evaluation.

All these groups have an important place in student life, providing opportunities for recreation and a chance to make new friends, besides broadening knowledge and raising awareness of issues.

# Graduate School

*R. F. Kruh, Dean*

*John P. Noonan, Associate Dean*

*John P. Murry, Associate Dean for Sponsored Programs*

## Graduate Study At Kansas State University: Its Beginning And Development

Although the first graduate student enrolled in 1868, the year 1886 is the significant date for graduate study at Kansas State University. In that year a standing committee on graduate work was created, and it was then established that a Master of Science degree would be granted to candidates who demonstrated a proficiency in one of the industrial arts or sciences and who presented a thesis reporting original research. Industrial arts included agriculture, horticulture, engineering, architecture and design, and domestic economy. The sciences were botany, chemistry, zoology, entomology, and physics.

Requirements for the master's degree evolved through the years and by 1912 definite procedures had been worked out whereby all applications for graduate study were passed upon by the Council of Deans, with student programs determined by the dean of the division (now college) in which the student did his major work. In October, 1919, a Graduate Council of seven members was created to administer graduate courses. It represented the divisions of Agriculture, Engineering, General Science (now Arts and Sciences), Home Economics, and Veterinary Medicine. The Council members and its chair were appointed by the president. At that time members of the Graduate Faculty were selected by department heads and approved by the Council. In November, 1931, a separate Division of Graduate Study was established under a dean, and in 1931 the Board of Regents authorized doctoral programs in

chemistry, milling industry, bacteriology, and entomology. The Graduate School acquired its present name in 1942, and its policy-forming group is an elected Graduate Council representative of each college or school and the major areas of graduate study.

## The Graduate School Today

The Graduate School's continued development is demonstrated by increased enrollments, improved quality of its programs, and the diversity of the offerings. More and more students are being attracted to graduate study because they have developed interests in advanced scholarly work and because their career opportunities are improved as result of advanced training. The quality of the programs has been recognized by awards for increased research and training support from outside agencies and for the acquisition of sophisticated research apparatus and new library facilities. Faculty members from various departments have pooled their talents and resources in cooperative research and training activities with the result that students' programs of study may readily cross traditional departmental lines.

Graduate study is based on the proposition that students work individually or in small groups with a major professor. Most advanced graduate courses are, therefore, taught in small seminars which provide for the exchange of ideas among the students and instructor. The ultimate objective is to create the desire and capacity for independent study and research.

In keeping with today's trends in higher education, the Graduate School is concerned with a program designed to aid the student to achieve the maximum possible liberality in education while pursuing the specialized professional courses of study. Graduate students are encouraged, therefore, to aspire to a well-rounded self-development, and with



it an outlook of a more adequate world view, through participation in those chosen university courses and activities which may enable them individually to gain such ends.

Wide support of research programs is provided through the Agricultural Experiment Station, the Engineering Experiment Station, and the Bureau of General Research. Each of the experiment stations offers backing for relevant research in many quarters of the campus beyond those traditionally identified with such stations, and the Bureau of General Research specifically serves units not supported by the experiment stations.

## 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 department, which will supply application blanks and supplementary information about its program. Applicants should see that each undergraduate or graduate institution previously attended sends two copies of 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 from within the United States are required to fill out a Medical History form for Lafene Student Health Center. International students must submit a health certificate as part of their application and report to the Student Health Center during enrollment for a physical examination.

**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:

- (1) A bachelor's degree from an institution accredited by one of the regional accrediting associations,
- (2) Adequate undergraduate preparation in the proposed major field or equivalent evidence of an appropriate background for undertaking an advanced degree program, and
- (3) An undergraduate average of B or better in the junior and senior years.

Probationary admission to the Graduate School will be considered if all of the foregoing requirements are not met, 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 deficiencies or 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 two copies 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.** The Graduate School requires each foreign applicant, whose national 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 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 their enrollment. Students who fail to meet this requirement must enroll in and satisfactorily complete English 075, Speech 101, or both, as appropriate.

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 nine 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 adviser 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 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 students (or their 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 may make arrangements to enroll by mail but should request permission for doing so by writing the Graduate Office prior to the enrollment period.

**Fees.** See the General Information section in the front of this catalog for detailed information about fees.

**Graduate Study by Seniors.** Seniors at Kansas State University who are within two semesters of receiving the bachelor's degree may enroll for one or more courses for graduate credit, **provided they have at least a B average on their prior work at the junior-senior level.** The total enrollment in such cases may not exceed 17 hours per semester or nine hours per summer session, and not more than 12 semester hours of graduate work may be accumulated in this way.

## Degrees

### Requirements

**Student Responsibility.** Graduate students are held responsible for knowing the academic policies

and degree requirements set forth in this bulletin. 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 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 adviser 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 make a grade of B or better in three-fourths of the credit hours attempted at KSU (excluding research, problems, internships, practicums 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 depends 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," exclusive of problems courses, practicums, 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 for reinstatement to the same curriculum or for admission to a different curriculum.

**Non-Graded 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. 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.** All credits, whether from Kansas State University or transferred and 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 area, or by successfully completing a validation examination. However, credits in a doctoral program which have been earned as part of a master's degree remain valid and require no further validation. The department may choose which of the above methods is to be used for validation, and 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.

**Master's Degree.** Candidates for the master's degree are normally required to spend one academic year in residence. Subject to the approval of the major department, the candidate may choose one of the following 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 Regional and Community Planning degree must satisfactorily complete a minimum of 48 hours.

The student's program of study is prepared with the assistance of an advisory committee consisting of the major adviser 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 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 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 an approved bindery. 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 \$20.

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.

**Doctor of Philosophy.** At least three years of two semesters each of graduate study beyond the bachelor's degree, equivalent to about 90 semester hours, and a dissertation are required of candidates for the degree of Doctor of Philosophy (Ph.D.). Students admitted to doctoral programs must complete a year of full-time study in residence at Kansas State University as a degree requirement. Furthermore, a minimum registration of 30 hours in research is required for the doctoral degree, not including work done toward a master's degree. Each candidate also must have completed at least 24 hours of regular degree credit in course work at Kansas State University. 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, home economics, 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.

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 adviser, subject to approval by the department head, and are appointed by the Dean of the Graduate School. The committee consists of at least four members of the Graduate Faculty, one of whom is the major adviser who serves as chair, and at least one member shall

\*As used in the Graduate School the term, department, refers to interdepartmental graduate groups as well as to departmental faculties in the usual sense.



be from a department different from that of the major adviser. 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 Office. 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 must be submitted to the Dean of the Graduate School as a last requirement to be met for award of the degree.

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, the student must deposit a money order made out to an approved bindery with the dissertation. 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 \$25.

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 Office in the case of any student seeking to copyright a dissertation.

## Assistantships And Fellowships

In order to support research, scholarship, and the acquisition of advanced degrees, the University offers several different 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 usual appointment is for half-time, but appointments for lesser fractions also may be made. Students are eligible for resident fees during each term in which they hold an appointment for at least two-fifths time. In addition, students who have been on appointments for at least two-fifths time during the academic year are eligible for resident fees during the following summer term even though they do not hold assistantships. The maximum enrollment for assistants is ten hours for half-time and twelve hours for two-fifths time appointments; the minimum is six hours in the regular terms and three in the summer. The corresponding maxima 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.

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.

## 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 adviser 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 Office.

## Organizations, Housing, Loans

For information about student organizations, graduate student housing and loans, see the General Information section of this catalog.



## Offerings Of The Graduate School

**Major Fields for Master of Science.** Major work leading to the degree Master of Science is offered in the following fields:

Agricultural Economics	Genetics
Agricultural Education	Geology
Agricultural Engineering	Grain Science
Agricultural Mechanization	Health, Physical Education and Recreation
Agronomy	Home Economics Education
Animal Sciences	Horticulture
Biochemistry	Industrial Engineering
Biology	Infectious Diseases
Chemical Engineering	Institutional Management
Chemistry	Journalism and Mass Communications
Civil Engineering	Mathematics
Clothing, Textiles and Interior Design	Mechanical Engineering
Computer Science	Microbiology
Crop Protection	Nuclear Engineering
Education	Parasitology
Electrical Engineering	Pathology
Entomology	Physics
Family and Child Development	Physiology
Family Economics	Plant Pathology
Food Science	Psychology
Foods and Nutrition	Statistics
General Home Economics	Surgery and Medicine

**Major Fields for Master of Arts.** Major work leading to the degree Master of Arts is offered in the following fields:

Art	History	Radio and Television
Economics	Mathematics	Sociology
English	Modern Languages	Speech
Geography	Political Science	

**Major Fields for Master of Architecture.** Major work leading to the degree Master of Architecture is offered in the following fields: Architecture, Interior Architecture, Environmental Technology, and Urban Design.

**Master of Business Administration.** Major work leading to the degree Master of Business Administration is offered in the College of Business Administration.

**Master of Landscape Architecture.** Major work leading to the degree Master of Landscape Architecture is offered in the College of Architecture and Design.

**Master of Music.** Major work leading to the degree Master of Music is offered in the Department of Music.

**Master of Regional and Community Planning.** Major work leading to the degree Master of Regional and Community Planning is offered on an interdepartmental basis, with the program centering administratively in the Department of Regional and Community Planning.

**Major Fields for Doctor of Philosophy.** Major work leading to the degree Doctor of Philosophy is offered in the following fields:

Agronomy	Engineering	Mathematics
Animal Sciences	English	Microbiology
Biochemistry	Entomology	Parasitology
Biology	Food Science	Pathology
Chemistry	Foods and Nutrition	Physics
Computer Science	Genetics	Physiology
Economics (Agricultural)	Grain Science	Plant Pathology
Economics (Arts and Sciences)	History	Psychology
Education	Home Economics	Sociology
	Horticulture	Statistics

## 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

*Don L. Good and Charles L. Norton, Faculty Co-chairmen*

The interdepartmental graduate program in Animal Sciences is offered by faculty members in the Departments of Animal Science and Industry, Dairy and Poultry Science, Biochemistry, Statistics, Biology, Physiology, and Grain Science and Industry.

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 Meat and 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, 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, Chairman*

Professors Craig and Wheat; Associate Professors Dayton, Kemp, Schalles, and W. Smith.

The major in Animal Breeding is designed to equip 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**

*B. A. Koch, Chairman*

Professors Bartley, Deyoe, Harbers, Koch, Parrish, Richardson, Sanford, Smith, and Ward; Associate Professors Adams, Allee, Ames, Bolsen, Brent, Frey, Hines, Morrill, and Riley.

Course work for candidates specializing in Animal Nutrition will include graduate level work in areas such as nutrition, biochemistry, physiology, histology, microbiology, statistics, computer science, grain science and others necessary to meet the specific needs of individual candidates.

### **Animal Production and Management**

*A.W. Adams, Chairman*

Professors Adams, Bartley, Craig, Farmer, Good, Koch, Norton, E. Smith, Ward, and Wheat; Associate Professors Allee, Allen, Ames, Dikeman, Hines, Kiracofe, Morrill, Riley, Schalles, and W. Smith; Assistant Professors Bolsen.

Graduate programs in this area are planned to 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; college algebra plus one additional course 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, and animal physiology.

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 science and industry, agricultural engineering, agronomy, animal behavior, biology, business administration, communications, mathematics, computer science, dairy and poultry sciences, economics, education, food sciences and grain science.

### **Animal Products**

*Donald Kropf, Chairman*

Professor Kropf; Associate Professors Allen, Bassette, Cunningham, and Dikeman; Assistant Professors Hunt and Kastner.

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, Chairman*

Professors Farmer and Gier; Associate Professors Able, Ames, and Kiracofe.

Degrees are designed to equip students for vocations in general animal reproduction. Study will be in the areas of reproductive endocrinology, developmental reproductive anatomy, environmental effects on reproduction, milk secretion, and applied use of reproductive control techniques.

Degree candidates will acquire training in physiology, biochemistry, and statistics. Additional course work may be required to meet specific needs of individual candidates.

### **Biochemistry**

*R.E. Clegg, Chairman*

Professors Bode, Burkhard, Clarenburg, Clegg, Cox, Hedgcoth, H.L. Mitchell, Nordin, Parrish, Ruliffson, and Tsen; Associate Professors B. Cunningham, Klopfenstein, Mueller, Roufa and Seib; Assistant Professors Center, Davis, K. Kramer, Marchin, Reeck, Roche.

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 the Departments of Biochemistry, Physiological Sciences, Grain Science and Industry, and the Division of Biology.

Entering graduate students must meet the entrance requirements of the Graduate School and must have completed one year of analytical, organic and physical chemistry; differential and integral calculus; and a course in biology, including a laboratory. Students entering this program with considerable training in biology must meet these requirements, but they may satisfy the physical chemistry requirement by including the year of physical chemistry as a part of their graduate program. A year of French, German or Russian is a requirement for admission into the Graduate Biochemistry Program.

### **Crop Protection**

*O.J. Dickerson, Chairman*

Professors Dickerson,\* Greig, and Murphy; Associate Professors Miles,\* Stuteville, Thompson, and Wilde; Assistant Professors Ehler,\* Long, Poston,\* and Tillman.

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 and Forestry, and Plant Pathology.

The curriculum is designed to train 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 is concentrated in the areas of crop protection, entomology, plant pathology, nematology, and weed science. Students will generally complete the non-thesis option of the Master of Science degree. Those interested in a research-oriented degree should investigate programs offered in the various cooperating departments.

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.

## Food Science

*R.J. Robinson, Chairman*

Professors Bowers, Caul,\* Clegg, Deyoe, Erickson,\* Fan, Farrell, Finkelstein, B. Fryer, Greig, Harrison,\* Hoover, Hosenev,\* Kropf,\* Kyle, H.L. Mitchell, P. Nordin, Parrish, Pfost, Ponte, Ruliffson, Schruben, Tsen, and Ward; Associate Professors Allen, Bassette,\* Brent, Chung,\* B. Cunningham, F. Cunningham,\* Klopfenstein, Paulsen, Robinson,\* and Seib; Assistant Professors Bates, Dikeman, Hunt, Iandolo, Kastner, Mugler, Setser and Varriano-Marston.

Graduate work leading to the degrees Master of Science and Doctor of Philosophy in Food Science is offered in the Departments of Animal Science and Industry, Biochemistry, Chemical Engineering, Dairy and Poultry Science, Dietetics, Restaurant and Institutional Management, Grain Science and Industry, Foods and Nutrition, Horticulture and Forestry, 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 student will be expected to include in the program of study general biochemistry, statistics, microbiology of foods or dairy bacteriology, food chemistry, and a course in food processing if these courses are not included in previous preparation. Course requirements will be evaluated by the student's advisory committee, but must include one credit of Food Science Colloquium for the M.S. degree and two credits of Food Science Colloquium for the Ph.D. degree. At least one member of the Food Science Coordinating Committee should serve on the student's advisory committee.

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.

There is no foreign language requirement.

Following are selected courses in Food Science:

### Animal Science and Industry

Institutional Meats  
Meat Technology  
Meat Packing Plant  
Operation  
Advanced Meat Science  
Analytical Techniques in  
Animal Science  
and Industry

### Biochemistry

Proteins  
Chemistry of Carbo-  
hydrates  
Lipids  
Advanced Biochemistry  
Laboratory  
Enzyme Chemistry  
Enzyme Laboratory  
Physical Biochemistry

### Chemical Engineering

Transport Phenomena  
Chemical Reaction  
Engineering  
Biochemical Engineering  
Biotransport Phenomena  
Selected Topics in Bio-  
chemical Engineering

### Dairy and Poultry Science

Fundamentals of Milk  
Processing  
Poultry Products  
Technology  
Chemistry of Foods  
Principles of Dairy Foods  
Processing  
Food Plant Management  
Lipids in Food Systems  
Practical Quality Control  
of Dairy and  
Food Products  
Dairy Bacteriology

### Dietetics, Restaurant and Institutional Management

Food Production  
Management  
Quantity Food Purchasing  
and Control  
Food Service Equipment  
and Layout

### Division of Biology

Microbiology of Foods

### Foods and Nutrition

Food Science  
Principles of Nutrition  
Advances in Foods  
Food Research Techniques  
World Nutrition  
Fundamentals of Food  
Flavor Analysis  
Bionutrition  
Advanced Nutrition  
Fundamentals of Meat Pro-  
cessing and Preparation  
Proteins in Food Systems  
Food Systems  
Advanced Foods  
Research Methods in Foods  
and Nutrition  
Food Science Colloquium  
Principles of Food Product  
Development and Control  
Nutrition and Aging  
Nutrition Needs Through-  
out the Life Cycle  
Diet Therapy  
Advances in Nutrition  
Child Nutrition

### Grain Science and Industry

Milling Technology I  
Flour and Dough Testing  
Baking Science I  
Baking Science II  
Bakery Technology  
Cereal Science  
Food and Feed Plant  
Sanitation  
Milling Technology II  
Fundamentals of Grain  
Storage  
Principles of Food Analysis  
Qualities of Feed and  
Food Ingredients  
Enzyme Applications  
Fundamentals of Processing  
Grains into Foods  
Advanced Cereal Chemistry

### Horticulture and Forestry

Handling and Processing Fruits  
and Vegetables  
Vegetable Crop Physiology

## Genetics

*E.G. Heyne, Chairman*

Professors Bode, Casady, Craig,\* Heyne,\* Nassar,\* Pittenger,\* Sorenson, Wassom, and Wheat;\* Associate Professors Barnett, Burlingham, Clayberg,\* Liang, T.R. Manney, Nickell, Roufa, Smith, Schalles, and Tomb; Assistant Professors L. Bates, Campbell, R. Denell, Rodkey, Slesinski, and Williams.

Graduate work leading to the M.S. and Ph.D.

\*Crop Protection Curriculum Steering Committee

\*Members of the Genetics Coordinating Committee.



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. Graduate students are associated with the department to which their major professor belongs, but the graduate degrees are awarded in genetics.

In addition to the general entrance requirement set up by the Graduate School, students in genetics should have an introductory course in genetics and six hours of biological sciences. Students who do not meet these requirements can make up these deficiencies either by examination by the appropriate departments 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. These requirements, outlined below, are a minimum to allow specialization in different areas of genetics such as plant and animal breeding, plant and animal genetics, population and statistical genetics; and microbial, cellular and molecular genetics. The minimum academic requirements are as follows:

An introductory course in biochemistry or statistics for the M.S. degree.

An introductory course in both biochemistry and statistics for the Ph.D. degree.

Three of the following courses will be required for the M.S. degree and five will be required for the Ph.D. degree.

#### **Agronomy**

Plant Breeding  
Plant Genetics

#### **Animal Science and Industry**

Population Genetics

#### **Biology**

Genetic Analysis of Eukaryotic Organisms  
Molecular and Cellular Biology  
Molecular Genetics  
Regulation of Gene Expression

#### **Dairy and Poultry Science**

Dairy Cattle Genetics  
Quantitative Genetics and Poultry Improvement

#### **Horticulture and Forestry**

Plant Breeding  
Plant Genetics

#### **Statistics**

Statistical Population and Quantitative Genetics I  
Statistical Population and Quantitative Genetics II

Descriptions of these courses can be found in the respective departmental sections of this catalog.

The participating Departments are Animal Science and Industry, Agronomy, Horticulture and Forestry, Dairy and Poultry Science, Grain Science and Industry, Statistics, and the Division of Biology.

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.

## **Home Economics**

*Allene G. Vaden, Chairman*

Professors Bollman, Hoeflin, Kennedy, McCord, Morse, Spears, and Stith; Associate Professors Bergen, Davis, Jurich and Perenich; Assistant Professors Annis, Cabradillo, Grando, Poresky, Roach, Russell, Scheidt, Vaden and Villasi.

The Ph.D. program in Home Economics is interdepartmental and is designed for advanced study of the family—its development, its effective utilization of resources, and its critical role as determinant of future generations. Subject matter is integrated from those home economics fields based largely on social sciences along with related fields outside the College. A home economics emphasis is developed for each student relative to a family concern such as: effective utilization of family resources; family decision making; family interaction and development throughout the family life cycle; cultural, economic and socio-psychological influences of clothing, textiles, equipment and housing of families; and effectiveness of institutions serving families.

The Ph.D. program is offered by the graduate faculty members of the Departments of Clothing, Textiles and Interior Design; Dietetics, Restaurant, and Institutional Management; Family and Child Development; and Family Economics. 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. Students entering the program are required to show evidence of a broad background in home economics including course work in four of the five departmental areas in the College of Home Economics.

The Ph.D. program is administered by a Coordinating Committee composed of five graduate faculty members elected from the participating departments. The Coordinating Committee is responsible for implementation of policy regarding admission to the doctoral program, approval of major professor and supervisory committee members and review of guidelines for development of programs of study.

Inquiries should be directed: Chair, Coordinating Committee, Ph.D. in Home Economics Program, Justin Hall.

## **Parasitology**

*C. W. Pitts, Chairman*

Professors Dickerson, Elzinga, Hansen, Harvey, Knutson, Kramer, Leland, Lindquist, and Pitts; Associate Professor Johnson.

Graduate study leading to the degrees Master of Science and Doctor of Philosophy in Parasitology is offered in the Division of Biology and the Departments of Entomology, Infectious Diseases and Plant Pathology. Graduate courses related to parasitology will be found listed under the above division and departments in this catalog. Supporting courses may be taken in any of the scientific disciplines or in other academic areas with approval of the parasitology faculty and the student's advisory committee.

One foreign language is required for the degree Doctor of Philosophy in Parasitology.

Facilities for research work in parasitology in-



clude rearing rooms; small and large parasite-free domestic animals; environmental control chambers; animal rooms; in vitro culturing; toxicology, physiology, and behavioral laboratories; scanning electron microscope, and field study areas.

## Pathology

*H.W. Leipold, Chairman*

Professors Anthony, Coles, Cook, Dennis, Kelley, Leipold, Leland, Lindquist, Oehme, Trotter, and West; Associate Professors Burroughs, Kruckenberg, Minocha, Moore, Smith, and Strafuss.

Graduate programs are offered by the Departments of Pathology and Infectious Diseases in the College of Veterinary Medicine leading to the degrees of Master of Science and Doctor of Philosophy.

Facilities of the departments for advanced work include a clinical pathology laboratory; animal isolation units; parasitological, mycological, bacterial, viral, immunological, histopathological research laboratories; and laboratories in perinatal diseases and public health. There are extensive files of tissue slides and opportunities for experimental work with animals in studying diseases.

Requirements for entering graduate study in pathology and infectious diseases are completion of a four-year curriculum in veterinary medicine or equivalent training in basic sciences and approval of the interdepartmental graduate faculty.

There are no requirements for a reading knowledge of a foreign language.

## Interdisciplinary Program In Regional And Community Planning

Graduate study leading to the two-year professional degree, Master of Regional and Community Planning, is offered through the faculty in the Department of Regional and Community Planning. The program is strongly interdisciplinary in scope, and it benefits from the participation of a number of related departments such as Sociology, Economics, Political Science, Architecture, and Geography. A Coordinating Committee consisting of faculty from these departments assists in planning the program. The program is designed to prepare its graduates for professional careers as planners for cities, regions and states, schools, colleges and universities, businesses, industrial plants, military installations and other organizations. Students with backgrounds in planning or in related areas are encouraged to undertake graduate work leading to the MRCP.

## Center For Aging

In 1975 the Kansas Board of Regents approved the establishment of a Center for Aging, which coordinates the University's resources and programs related to aging. More than 50 faculty members from 25 departments are associated with the center and carry out a variety of activities in teaching, research, and public service. Students wishing to pursue a program of study in the area of aging may address inquiries to Director, KSU Center for Aging, Justin Hall, Manhattan, KS 66506.

# Intercollegiate Program in Women's Studies

The purposes of the women's studies program at K-State are to serve the needs of the student who wishes to take a series of courses emphasizing women within the context of traditional academic disciplines and to provide official recognition through an intercollegiate interdisciplinary, secondary major for those who complete this course of study. The women's studies program recognizes that women are a legitimate subject for academic study. The study of women appropriately includes educational, sociological, anthropological, historical, economic, biological, familial, artistic, political, vocational and professional perspectives, but may include many other disciplines.

The women's studies program is a collection of courses supervised by an intercollegiate women's studies committee. The committee is chaired by the coordinator of women's studies, who also advises and keeps records for students from any college who wish to pursue this secondary major. To complete the secondary major, a student must take two required courses (Introduction to Women's Studies and Senior Seminar in Women's Studies) plus 18 semester hours in elective courses from the Colleges of Arts and Sciences, Business Administration, Education, and Home Economics, for a total of 24 semester hours. Elective courses must be taken in at least two colleges. The women's studies program also may serve to meet general education requirements. Courses listed below are those for which students may receive credit in the women's studies program. Other courses are being developed, and the course list will be updated regularly.

## Intercollegiate Courses in Women's Studies:

\* **105. Introduction to Women's Studies.** (3) I, II. Introduces the student to women's studies as an academic discipline. Demonstrates the philosophical background, presenting perspectives on the study of women: educational, sociological, anthropological, historical, political, economic, biological, psychological, familial, artistic and vocational/professional. Includes participation of faculty from cooperating departments and colleges. 200-105-0-4903

\* **405. Senior Seminar in Women's Studies.** (3) I, 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. 200-405-0-4903

## Courses Comprising the Women's Studies Program:

### Arts and Sciences:

#### Biology

215 325. Topics in Biology: Science, Sex, and Society

#### English

229 395. Seminar: Women in Literature

#### History

241 541. Women in American History

#### Modern Languages

253 519. Special Studies in French: Women in French Literature

#### Political Science

269 706. Sex and Politics

#### Sociology

277 545. The Sociology of Women

277 701. Problems in Sociology: Women in Latin America

277 301. Introduction to Sex Roles in Society

#### Speech

281 799. Problems in Speech: Women Playwrights

### Business Administration:

305 590. Women in Business

### Education:

405 686. Topics in Education: Programing for Women's Concerns

### Home Economics:

#### Clothing, Textiles, and Interior Design

610 440. Socio-Psychological Aspects of Clothing

#### Family and Child Development

620 350. Family Relationships and Sex Roles

#### Family Economics

630 600. Economic Status of Women

#### Foods and Nutrition

640 603. Maternal and Child Nutrition

#### General Home Economics

650 385. Problems in General Home Economics: Women as Decision Makers

For more information about the secondary major in women's studies, contact coordinator, Women's Studies Program, Eisenhower Hall, Kansas State University, Manhattan, KS 66506.







# College of Agriculture

*Carroll V. Hess, Dean*

*Frank R. Carpenter, Assistant Dean*

*David J. Mugler, Assistant Dean*

## Objectives

The College of Agriculture offers 16 Bachelor of Science degree programs and a total of 26 academic programs ranging from two years to the Ph.D. Some of the programs have four options: production, science, communications and business-industry. Other curriculums such as Grain Science and Industry, Natural Resource Management, and Food Science and Industry offer three options. The many curriculums and options provide flexibility to meet the needs of students who will be entering the broad field of professional agriculture. All programs are designed to bring about changes in students in the following areas:

**1. Knowledge and understanding.** Here the students are directed toward the mastery of one or more important areas of scientific agriculture. They gain understanding of supporting areas so that they can reason and grasp new technological developments, and assist in solving practical problems.

**2. Professional attitudes and orientation.** This phase of the students' education helps them identify with and understand professional agriculture, its ethics and goals, and how to continue learning through life.

**3. Skills.** Part of the student's training is the development of abilities and skills to perform tasks efficiently and expertly in the area of professional agriculture.

**4. Personal and leadership development.** An important part of each student's training is the development of an appreciation for the present-day civilization. The student needs to understand that many subject areas are required to solve some

problems. He or she needs to develop and understand a philosophy of life and values and develop abilities to work with others in the role of leadership as well as being a supporter of 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 development and related fields. This broad profession also includes areas such as soil physics, animal nutrition, cereal chemistry and land economics. Examples of positions held by recent agriculture graduates are:

1. Superintendent, flour mill
2. District sales manager, feed company
3. Research director, fertilizer manufacturer
4. County extension agricultural agent
5. Produce manager, retail food chain
6. Beef editor, farm magazine
7. Vocational agriculture instructor
8. Farm appraiser and loan officer
9. Graduate student, for Ph.D.
10. Fieldman, farm management company
11. Technical representative, pesticide company
12. Work unit conservationist, SCS, USDA
13. Commission salesman, livestock market
14. Editor, flower and garden magazine
15. Assistant manager, meat department
16. Economist, Foreign Agricultural Service, USDA
17. Farm or ranch manager
18. Owner, city flower shop
19. Medical entomologist
20. Meat inspector



## The Faculty

More than 95 per cent 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, factual and relevant.

## Facilities

Effective instruction in the application of basic sciences to modern agricultural industries requires land, buildings, livestock and equipment. More than 4,000 acres of land are used for experimental work and for instruction.

A feed mill, flour mill and bakery include modern equipment from eight countries. Well-equipped drafting rooms are used by milling students. Greenhouses and field plots provide plants for horticulture courses.

Modern animal industry and dairy and poultry buildings contain 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.

## Agriculture Honors Program

In Agriculture the honors program 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. Students with high academic records are invited into the honors program.

The honors program is a method of intensive self-directed study, not a method of search. The student wishing to enter the program should have fairly definite educational goals.

### Objectives:

1. To expose academically successful freshmen to:
  - a. various areas of interest with an emphasis on agriculture.
  - b. The honors program in the College of Agriculture.
2. To provide the academically successful student with an opportunity for greater curriculum flexibility.
3. To encourage undergraduate research.

### Eligibility:

Students in the College of Agriculture may petition to enter the honors program when they have completed 15 or more hours with a cumulative GPA of 3.0 or higher at Kansas State University.

## Student Selection of a Major

Students usually select a curriculum or major at the time they enter the College. They are provided an academic adviser in their major field. 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 adviser who is a representative of the dean's office. These students are urged to choose a major 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.

Some programs are closely related to agricultural resources and products. For example, agronomy is related to crops and soils; and animal science and industry to livestock and livestock products.

Electives permit adaptation of the program to the student's goals.

A student planning to farm, for example, might enroll in any one of several majors and work with an adviser in developing an academic program most effective and valuable. One who wants to write for a flower and garden magazine might major in agricultural journalism and minor in horticulture, or vice versa.

Many students work part time in the laboratories, greenhouses and on the farms. This experience adds greatly to students' learning and understanding.

## General Agriculture

Students who are undecided regarding the selection of a major in Agriculture may want to enroll in General Agriculture. Courses taken while in this area are selected with the help of an adviser 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:

Semester Course Load:

Example I:

English Composition I	3
Ag Orientation	1
Principles of Animal Science	3
College Algebra	3
Plant Science	4
Concepts in Phys. Ed.	1
	<hr/> 15

Example II:

Principles of Ag. Economics	3
Ag Orientation	1
Chemistry I or General Chemistry	4 or 5
Intermediate Algebra	3
Home Horticulture	2
Concepts in Phys. Ed.	1
	<hr/> 14 or 15

Example III:

Oral Communication I	2
Ag Orientation	1
Economics I	3
Agricultural Mechanics Practices	2
Graphic Communications I	2
Introductory Food Science	3
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## Professional Programs in Agriculture

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2. Agricultural Education (teaching); B.S. ....	49
3. Agricultural Journalism; B.S. ....	50
4. Agricultural Mechanization; B.S., M.S. ....	51
5. Agronomy (Crops and Soils); B.S., M.S., Ph.D. ....	52
6. Animal Science & Industry; B.S., M.S., Ph.D. ....	55
7. Bakery Science & Mgmt.; B.S. ....	66
8. Crop Protection; B.S. ....	58
9. Crop Protection; M.S. ....	36
10. Dairy Production; B.S., M.S. ....	59
11. Entomology; M.S., Ph.D. ....	61

12. Feed Science & Mgmt.; B.S. ....	67
13. Food Science; M.S., Ph.D. ....	37
14. Food Science & Industry; B.S. ....	64
15. Genetics; M.S., Ph.D. ....	37
16. Grain Science; M.S., Ph.D. ....	69
17. Horticulture; B.S., M.S., Ph.D. ....	70
18. Horticultural Therapy; B.S. ....	71
19. Milling Science & Mgmt.; B.S. ....	68
20. Natural Resource Management; B.S. ....	75
21. Plant Pathology; M.S., Ph.D. ....	77
22. Poultry Science; B.S., M.S. ....	59
23. Pre-Forestry (2 years) ....	72
24. Pre-Veterinary Medicine (2 years) ....	46
25. Retail Floriculture (2 years) ....	72

## Options and Courses Required in Agricultural Journalism, Agricultural Mechanization, Agronomy, Animal Science &amp; Industry, Dairy Production, and Poultry Science

Courses	Science Option	Business and Industries Option	Production Option	Communications Option
<b>Agriculture:</b>				
Soils Plant Sci. or Crop Sci. Prin. An. Sci. Prin. Ag. Econ. A course in Ag Engineering Econ. Entomology or Lvstk. Entomology Plant Pathology or Int. Plant Pest Control Natural Resources and Man Int. Food Science and Technology	Five of the courses listed	Prin. Ag. Econ. <sup>1</sup> & second Ag Econ. course plus three other courses listed <sup>2</sup>	Five of the courses listed	Four of the courses listed <sup>3</sup>
<b>Biological Science:</b>				
Gen. Botany <sup>3</sup> Organismic Biology Genetics Microbiol.	Gen. Botany plus two other courses listed	Gen. Botany plus one other course listed	Gen. Botany plus one other course listed	Principles of Biology or Gen. Bot. and one other course listed
<b>Mathematics, Statistics, and Computer Science:</b>				
Plane Trig Calc. I Biometrics I <sup>4</sup> Fund. Comp. Prog.	Plane Trig. plus two other courses listed	Two of courses listed	One of courses listed	One course in statistics or computer science
<b>Physical Science:</b>				
Desc. Physics Physics I Physics II Geology I  Chem. II Chem. Anal.  Elem. Org. Chem. Gen. Org. Chem. Org. Chem. I  Intro. Org. Chem. & Biochem. Elem. Biochem. Gen. Biochem.	One course from each of three of the four groups	One of the courses listed	Two of courses listed, including one Org. Chem. course or the course Intro. to Org. & Biochem.	One physical science listed
<b>Business Administration and Agricultural Economics:</b>				
Small Business Operations Managerial & Cost Controls Business Law I Management Concepts Marketing Sales Management Money & Banking Labor Economics Economic Principles of Agri- cultural Business Firms Prin. of Transportation All other courses in Ag. Econ. with a 500 or higher course number	Fund. of Accounting	Fund. of Accounting plus 4 courses listed	Fund. of Accounting plus 1 course listed	Fund. of Accounting plus 1 course listed

1. Econ. II may substitute.

2. Plants and Soils for Crop Production may be taken in lieu of either Soils or Crop Science in the Business and Industries and the Communications Options.

3. Principles of Biology may substitute.

4. Stat. Meth. I may substitute.



## Science Option

### (Preparation for Research & Graduate Study)

Nearly 20 per cent 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, economics, and in communications.

## Business and Industries Option

Nearly half the recent graduates of the College of Agriculture are now employed in off-farm agribusiness, such as salesmen, plant superintendents, buyers and writers. This shows that many students should take courses to prepare them to compete in industry. Suggested course areas include: accounting, labor relations, corporation law, sales psychology and journalism.

## Production Option

Nearly 30 percent of recent graduates return to the farm or ranch. Those who plan to do so should consider their future community responsibilities and the changing characteristics of farming as they select their courses. Farmers will want 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.

## Communications Option

This option provides the student with some professional skill in journalism and mass communications. These courses are organized to give the student an introduction to news writing and editing. The three areas of specialization allow the student to select more advanced communications courses according to interests and needs. Such additional skills and abilities will make the student more effective in active citizenship roles and more proficient in his or her profession.

### Communication Courses (15 credit hours required)

**Reporting I** (3), **Reporting II** (3) and **Editing I** (3) plus six additional credit hours from the following listings which suggest areas of specialization students may choose to pursue.

#### Advertising and Sales Communications

Principles of Advertising	3
Advertising Media	2
Advertising Copy & Layout	3
Administrative Communications	3
Sales Communications	3
Design I	2
Commercial Art Techniques	2

#### Organizational Communications

Oral Communications II	2
Persuasion	3
Group Discussion Methods	3
Discussion and Conference Leadership	3
English Composition III	3
Introduction to Instructional Media	1
Audio-Visual Instruction	2-3

#### Mass Communications

Editing II	3
Magazine Article Writing	3
Magazine Production	3
Public Relations	3
Public Information Methods	2
Photojournalism I	3
Ag Student Magazine	1-3
Fundamentals of Radio-Television Production	3
Fundamentals of Radio-Television Performance	3
Radio-Television Continuity	3
Reporting II (Radio-Television)	3

## Suggested Humanities and Social Science Electives

*College of Architecture and Design*—Any course in history or appreciation of architecture  
*Art*—Courses in appreciation and theory  
*Economics*—(above Economics I)  
*English*—Any except courses in composition  
*Family and Child Development*—Any course  
*Geography*—Any except Environmental Geography I and II  
*History*—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 and Anthropology*—Any course  
*Speech*—Any course in theater and interpretation

## Suggested Additional Communications Courses

035 410 Agricultural Student Magazine (1-3)  
 229 200 English Composition III (3)  
 281 226 Argumentation and Debate (3)  
 281 220 Oral Communication II (2)  
 281 726 Persuasion (3)  
 281 727 Group Discussion Methods (3)  
 289 235 Survey of Mass Media (3)  
 289 275 Reporting I (3)  
 289 250 Agricultural Journalism (3)  
 290 240 Fundamentals of Radio-Television Production (3)  
 290 250 Fundamentals of Radio-Television Performance (3)  
 305 391 Administrative Communications (3)  
 305 543 Sales Communications (3)  
 410 752 Principles of Teaching Adults in Extension (3)

## Agriculture And Business Administration Degree Combinations

The agribusiness complex of industries (processing, preservation, distribution and retailing of farm-produced food, and manufacture and sale of farm-used equipment, feeds and agricultural chemicals) employs a variety of professionally-trained personnel in increasing numbers. Type of education required ranges from general business or accounting to professional and scientific agriculture to biological and physical sciences. Intensity of education needed ranges from the B.S. degree to the Ph.D. degree.

Agricultural businesses have expanded in size and number in Kansas. The College of Business Administration and College of Agriculture have identified the following programs that will prepare young people for some of the jobs in this vast complex. Academic years listed are estimates.

1. A Bachelor of Science degree in some discipline within the College of Agriculture followed by a Master's degree in Business Administration (see p. 193) 5½ academic years.
2. A Bachelor of Science degree in some discipline within the College of Agriculture, followed by a B.S. degree in Business Administration see p. 192) 5 academic years.
3. A Bachelor of Science degree in some discipline within the College of Agriculture, including in the degree program a group of courses in Business Administration (see options and areas of study on page 191) 4 academic years.
4. A Bachelor of Science degree in Business Administration, including in the degree program a group of elective courses in some discipline within Agriculture.
5. A Bachelor of Science degree in Business Administration, followed by a B.S. or a master's degree in some discipline within Agriculture. 5 or 6 academic years.

To take advantage of one of these programs, students would enroll in the College of Agriculture or the College of Business Administration. The B.S. program would be based on degree requirements listed in the respective college section of the catalog, and would need to be approved by the academic adviser and dean. If they pursue a second B.S. or a master's degree, they would transfer to the second college following receipt of the first degree.

### For Prospective Transfer Students

About 40 per cent of new students entering the College of Agriculture are transfer students from a junior college or denominational college.

The 63 semester hours listed below, with exceptions and variations noted, can be transferred to any of the professional programs listed below and a degree earned in four additional semesters by capable students with good academic records.

All curriculums have opportunities for general electives. Students can take a few courses, other than those listed below, and have them apply toward the B.S. in Agriculture.

A number of community colleges in Kansas offer introductory agriculture courses approved for transfer toward a B.S. degree in Agriculture.

### Professional B.S. Programs in Agriculture

1. Agricultural Economics; B.S., M.S., Ph.D.
2. Agricultural Education (teaching); B.S.
3. Agricultural Journalism; B.S.
4. Agricultural Mechanization; B.S.
5. Agronomy (Crops and Soils); B.S., M.S., Ph.D.
6. Animal Science & Industry; B.S., M.S., Ph.D.
7. Bakery Science & Management; B.S.
8. Crop Protection; B.S., M.S.
9. Dairy Production; B.S.

10. Feed Science & Management; B.S.
11. Food Science & Industry; B.S.
12. Horticulture; B.S., M.S., Ph.D.
13. Horticultural Therapy; B.S.
14. Milling Science & Management; B.S.
15. Natural Resource Management; B.S.
16. Poultry Science; B.S.

#### Suggested basic courses:

Course	Semester Hours
English I & II	6
Speech	2
Other communications such as Journalism or a second speech course	3
(For Bakery Science and Management, Food Science and Management, or Milling Science and Management, replace with a semester of inorganic chemistry or organic chemistry, or engineering graphics.)	
College Algebra	3
Trigonometry	3
(Required only in Professional Programs, numbers 4, 7, 8, 10, 11, 14 and 15.)	
Calculus	5
(Required only in chemistry and operations options of 7, 10, and 14.)	
Chemistry (Inorganic)	8
(Eight hours required in all except that only five hours are required in 1, 2, 3, 4, 6, 8, 9, 12, 13 and 16.)	
Organic Chemistry	3
(Not required in 1, 3, 4, 12, 13, 16 and option "B" of 15.)	
Economics I	3
General Physics	5
(Required only in 4, 7, 8, 10, 11 and 15.)	
Humanities and Social Sciences	9
Biological Science	10
(Required in all except that only five hours are needed in 1, 7, 13, 14 and 15. None required in 4.)	
Electives	3
	63

### Dual Degrees

Students desiring a B.S. degree in some discipline in Agriculture and a B.S. degree in some other college at K-State will need to complete the requirements for each degree and a minimum of 150 semester hours.

### Pre-Veterinary Medicine Program\* \*\*

<b>Freshman</b>	
Ag Orientation	1
Chemistry I	4
English Composition I	3
Principles of Animal Science	3
Animal Science and Industry	1
Dairy Science	1
Concepts in Physical Education	1
	14
Prin of Biology	4
Chemistry II	4
Plane Trigonometry	3
Humanities or Social Science Elec	3
English Composition II	3
Poultry Science	1
	18
<b>Sophomore</b>	
Physics I	4
General Organic Chemistry	5
Humanities or Social Science Elec	6
Oral Communication I	2
	17
Physics II	4
Genetics	3
Humanities or Social Science Elec	3
Chemical Analysis	4
General Elective	1
	15

\* Students who satisfactorily complete the Pre-Veterinary Medicine program above 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.



## Departments & Course Offerings

### AGRICULTURAL ECONOMICS

Paul L. Kelley,\* Head of Department

Edgar S. Bagley,\* Assistant Head, Teaching and Graduate Studies

Norman V. Whitehair,\* Assistant Head, Extension

Professors Erickson,\* Kelley,\* Manuel,\* McCoy,\* Orazem,\* Phillips,\* Pine,\* Schruben,\* Scoville,\* Sjo,\* Sorenson,\* and Whitehair,\* Associate Professors Biere,\* Bogle, Buller,\* Figurski, Knight,\* Koudele,\* Langemeier,\* McReynolds, Norman,\* Schlander, and Walker; Assistant Professors Flinchbaugh, Fredrick, Overley, Pretzer, Riley, Schurle, and Treat. Emeritus: Dean Howe,\* Professors Coolidge and Montgomery,\* Associate Professor Otto.\*

#### Undergraduate Study

B.S. in Agriculture; requires 127 semester hours

Agricultural economics, as a social science, is concerned with administration and management in agriculture. The curriculum in agricultural economics provides an opportunity to explore these areas in depth. Nearly one-half the requirements are electives. This provides flexibility for the student and adviser to develop a program of study meeting the interests, needs and career objectives of each student. Transfer students from junior colleges, from other majors and from the General Agriculture program should find this flexibility well-suited to their needs.

The curriculum in agricultural economics has three options for specialization: (1) agricultural business (including both farm and agribusiness management), (2) agricultural programs and (3) professional agricultural economics.

**Agricultural Business.** Students interested in combining agriculture and business management for agribusiness management or for farm management careers find this option places emphasis on agriculture, economics and business administration courses. Those interested in farm management may give more emphasis to livestock production, crop production or farm machinery than those interested in agribusiness. About 40 per cent of agricultural economics graduates will find employment in agribusiness such as banking, management, sales, finance, credit and insurance. About 20 per cent will work with farm production problems as farmers, farm managers or farm advisors.

**Agricultural Programs.** A student seeking a career in public administration and service in agriculture such as county extension, information (radio, TV or the press), federal or state agricultural and environmental programs, and international agriculture will find the agricultural programs option provides the opportunity to emphasize courses in administration, communications and public policy along with courses in agriculture and agricultural economics. Students may use the agricultural programs option as a pre-professional course of study for fields such as law or theology.

**Professional Agricultural Economics.** Students with good academic backgrounds (B+ or better) who are interested in teaching, research and extension work as agricultural economists will find the professional agricultural economics option provides

the opportunity to study techniques of economic analysis. Complementary to the emphasis on economic theory, the student builds his skills in methods of analysis through courses in mathematics, statistics and computer science.

**General Requirements.** All options have the following common course requirements with the special requirements listed separately under each option. It is suggested students follow courses in the sequence as listed:

#### Department Requirements

229 100	English Composition I	3
229 120	English Composition II	3
281 105	Oral Communication I	2
245 100	College Algebra	3
221 110	General Chemistry	5
	Concepts in Phys. Ed	1
	Humanities <sup>1</sup>	6
269 110	Principles of Political Science	3
277 211	Introduction to Sociology	3
215 198	Principles of Biology	4
	Agriculture <sup>2</sup>	12

#### Major Courses

010 100	Principles of Agricultural Economics <sup>3</sup>	3
010 500	Production Economics	3
010 505	Agricultural Market Structures	3
	Major Electives <sup>1</sup>	18

#### Supporting Courses

	Two communications courses <sup>1</sup>	6
271 110	General Psychology	3
305 260	Fundamentals of Accounting	4
245 500	Introduction to Analytical Processes	3
	Supporting Electives <sup>1</sup>	20

Depending upon the option chosen and the student's professional interests and objectives, he may select with the consent of his adviser, courses from the following areas

Professional Agriculture	
Business Administration	
Extension Education	
Economics, Political Science, Sociology, and Psychology	
General Electives	19

These may be selected by the student with the consent of his adviser to fulfill the student's personal educational interests and objectives

1 To be selected with the advice and consent of the student's adviser

2 To be selected from 005 102 Principles of Animal Science, 015 200 Plant Science, 015 305 Soils, 035 301 Introductory Food Science & Technology, 506 300 Engineering in Agriculture

3 A second introductory general economics course may be substituted, i.e., Economics II

#### Graduate Study

Graduate study leading to the degrees Master of Science and Doctor of Philosophy is offered in the department. Research for these may be in marketing, farm management, finance, land economics, conservation, prices, production economics, taxation, agricultural policy, international development, agricultural business and industry and in other areas.

Prerequisite to graduate work in agricultural economics is acceptable undergraduate credit in economics, including agricultural economics. Graduate students majoring in agricultural economics take courses in general economics as well as in agricultural economics.



## Courses in Agricultural Economics

### Undergraduate Credit (no prerequisite—open to all university students)

**010 100. 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. 010-100-0-0111

**010 101. Economics of Population, Food and Environment.** (3) II. A course suggested for all students interested in population, food, and environmental problems. Survey of the impact of economic activity on ecology; the population explosion and world food problems; the effect of economic advancement on the rate of resource utilization. No prerequisite. Three hours lec. a week. 010-101-0-0111

**010 102. Rural Poverty.** (3) I. A course suggested for all students concerned with rural poverty problems. The experience will serve as a laboratory for student study. Survey the nature and extent of rural poverty and its changes, and relate to location, occupation, migration, industrialization, education, vocational training and public policies. No prerequisite. Three hours lec. a week. 010-102-0-0111

### Undergraduate Credit

**010 441. Agricultural Economics Seminar.** (Var.) Seminars of special interest will be offered upon sufficient demand in the areas of (a) Farm Management, (b) Marketing, (c) Land Economics, (d) Policy, (e) other selected areas. Pr.: Consent of the instructor. 010-441-0-0111

**010 480. Agricultural Economics Statistics.** (3) I, II. Principles and methods involved in the collection, analysis, interpretation, and presentation of statistical materials, with special reference to agricultural economics data. Two hours rec. and two hours lab. a week. Pr.: Econ. 110 and Math. 100. 010-480-1-7-0111

### Undergraduate Credit And Graduate Credit In Minor Field

**010 500. 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. Ag. Econ. 505 is a continuation of this course and they are intended to be taken in consecutive semesters. Three hours rec. a week. Pr.: Ag. Econ. 100 or Econ. 120. 010-500-0-0111

**010 505. Agricultural Market Structures.** (3) I, II. Continuation of Ag. Econ. 500. 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.: Ag. Econ. 500. 010-505-0-0111

**010 510. Agricultural Policy.** (3) II. Analytical treatment of recent and current economic problems and governmental policies and programs affecting American agriculture; will include price and income problems, rural development, and rural poverty. Three hours rec. a week. Pr.: Junior standing. 010-510-0-0111

**010 511. Consumption Economics In Agriculture.** (3) I. Factors determining consumption patterns of individuals and households; contributions of economics and other social sciences in study of consumer behavior; macroeconomics of food consumption and distribution; consumption analysis related to problems of agriculture. Three hours rec. a week. Pr.: Econ. 110. 010-511-0-0111

**010 512. Farm Management.** (3) II. Principles and practices of organization and management; nature and structure of business; functions and operations; management tools; decision making processes. Two hours rec. and two hours lab. a week. Pr.: Econ. 110 and Ag. Econ. 100 or Econ. 120. 010-512-1-7-0111

**010 513. 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. 010-513-0-0111

**010 514. Economics of Food Marketing.** (3) I. Problems of assembly of farm products for processing and the marketing of the final food products. Special attention will be given to purchasing and distributing problems of dairy, poultry and meat processing. Three hours rec. a week and field trips. Pr.: Econ. 110. 010-514-0-0111

**010 516. Agricultural Law and Economics.** (3) I, II. The legal framework impinging upon 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. 010-516-0-0111

**010 517. 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; the 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, B.A. 260 and junior standing. 010-517-1-7-0111

**010 518. 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.: Ag. Econ. 100 or Econ. 120 and B.A. 260. 010-518-0-0111

**010 520. Grain Marketing.** (3) I. The general areas covered include 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. 010-520-0-0111

**010 521. 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. 010-521-0-0111

**010 522. Ranch and Feedlot Management.** (3) I. Organization and management of a ranch or feedlot; selection of a livestock system; economics of size of business; financial management of the business. Two hours rec. and a two-hour lab. weekly. Pr.: Econ. 110. 010-522-1-7-0111

### Undergraduate And Graduate Credit

**010 600. Bargaining and Cooperation in Agriculture.** (3) I. A study of collective bargaining and cooperative activity in agriculture. Other marketing institutions such as marketing orders, marketing agreements, and agricultural marketing boards will be included. Emphasis is placed upon assessing the potential of these marketing techniques to strengthen the economic position of farmers in the economy. Three hours rec. a week. Pr.: Junior standing. 010-600-0-0111



**010 615. 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. 010-615-0-0111

**010 625. Natural Resources Economics.** (3) I. Supply and demand for natural resources; optimal development, use and conservation of natural resources within welfare economics; benefit-cost analyses; public and private ownership and control over natural resources; particular attention given to recreational use of resources, forests, wildlife, and urban uses of natural resources; quality, esthetic, and other non-market factors associated with natural resources. Three hours rec. a week. Pr.: Econ. 110 and junior standing. 010-625-0-0111

**010 630. Rural Human Resource Development.** (3) II. Study of the nature of community development, the problems facing rural communities, and alternative solutions. Emphasis is placed on identifying problems, studying background materials such as public decision making, property rights, taxation, zoning, etc., and developing communities through industrialization, recreation, agricultural businesses and the creation of new employment centers. Three hours rec. and field work a week. Pr.: Junior standing. 010-630-0-0111

**010 631. 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. 010-631-0-0111

**010 641. Agricultural Economics Seminar.** (Var.) S. Seminars of special interest will be offered upon sufficient demand in the areas of (a) Farm Management, (b) Agricultural Finance, (c) Marketing, (d) Land Economics, (e) Policy, (f) other selected areas. Pr.: Consent of instructor. 010-641-0-0111

**010 705. Price Analysis.** (3) II. The analysis of selected agricultural prices; application of regression analysis to price analysis and special econometric considerations. Two hours rec. and two hours lab. a week. Pr.: Ag. Econ. 480 and 500. 010-705-1-0111

**010 710. 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.: Ag. Econ. 518 or consent of instructor. 010-710-1-0111

**010 712. Economic Analysis of Farm Firms.** (3) II. The application of methods such as correlation, regression and linear programming for solving farm business problems and how results are used in decision making. Three hours rec. a week. Pr.: Ag. Econ. 500 and Stat. 700 or consent of instructor. 010-712-0-0111

**010 750. Agricultural Economics Problems.** (Var.) I, II, S. Pr.: Consent of instructor. 010-750-3-0111

### Graduate Credit

**010 811. Seminar In Agricultural Policy.** (3) I. An analysis of the relation of government to the economic aspects of farming as individual enterprise and agriculture as an industry, including the international aspects of United States agriculture. Pr.: Consent of instructor. 010-811-0-0111

**010 823. 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.: Ag. Econ. 500 or consent of instructor. 010-823-0-0111

**010 829. Seminar in Land Economics.** (2) I. Comprehensive analysis of problems dealing with the control and use of public and private land resources. Pr.: Consent of instructor. 010-829-0-0111

**010 831. Agricultural Marketing Management and Analysis.** (3) 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. 010-831-0-0111

**010 832. Agricultural Marketing Organization and Institutions.** (3) I. A study of the competitive framework, firm behavior, and economic performance in agricultural product and factor markets, including an analysis of institutional arrangements, legal restraints, and marketing control programs. Pr.: Econ. 510 or consent of instructor. 010-832-0-0111

**010 898. Agricultural Economics Master's Report.** (Var.) I, II, S. Master's report. 010-898-4-0111

**010 899. Agricultural Economics Master's Research.** (Var.) I, II, S. Research for master's thesis. 010-899-4-0111

**010 901. Seminar in Economic Research.** (3) I. The scientific reasoning underlying the selection of research problems, the formulation and testing of hypotheses, and the evaluation and presentation of results. Pr.: Consent of instructor. 010-901-0-0111

**010 922. 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. 010-922-0-0111

**010 940. Seminar In Agricultural Economics.** (3) On sufficient demand. Problems and current developments in agricultural economics. Pr.: Consent of instructor. 010-940-0-0111

**010 999. Agricultural Economics Ph.D. Research.** (Var.) I, II, S. Research for Ph.D. dissertation. 010-999-4-0111

## AGRICULTURAL EDUCATION

Advisers—Albracht, Field, Welton

B.S. in Agriculture; requires 127 sem. hrs.

Agricultural Education is for those who are interested in educational work in agriculture. Students who complete the curriculum as outlined are certified to teach vocational agriculture in public schools. Many graduates perform the educational function in community junior colleges, area vocational schools, or as county agents or agribusinessmen.

### FRESHMAN

Fall Semester		Course	Sem. Hrs.
Gen Agr	035 101	Ag Orientation . . . . .	1
English	229 100	English Composition I . . . . .	3
Mathematics	245 100	College Algebra . . . . .	3
Biology	215 198	Principles of Biology . . . . .	4
		Ag Science Elec. . . . .	4
Physical Education	261 101	Concepts in Phys Ed. . . . .	1
			16

Spring Semester		Course	Sem. Hrs.
English	229 120	English Composition II . . . . .	3
Psychology	273 110	General Psychology . . . . .	3
Chemistry	221 110	General Chemistry . . . . .	5
Horticulture	040 200	Plant Science . . . . .	4
		OR	
Agronomy	015 220	Crop Science . . . . .	4
			15

## SOPHOMORE

## Fall Semester

Biology	215 201	Organismic Biology	5
Ag. Engg.	506 151	Ag. Mechanics Practices	2
Education	405 215	Educational Psychology I	3
Economics	225 110	Economics I	3
Speech	281 106	Oral Communication IA	3
			16

## Spring Semester

Biochemistry	211 120	Intro. Bio. & Org. Chem.	5
Ag. Engg.	506 351	Soils	4
		Ag. Science Elec.	3
		Farm Power	3
			15

## JUNIOR

## Fall Semester

Ag. Ec.	010 100	Prin. of Ag. Econ.	3
Education	405 315	Educational Psychology II	3
		Literature or Language	3
		Ag. Science Elec.	3
		Social Science Elec.	3
			15

## Spring Semester

Education	410 620	Prin. & Phil. of Voc. Ed.	3
Journalism	289 250	Agricultural Journalism	3
		Ag. Science Elec.	3
		Ag. or Ag. Engg. Elec.	3
		General Elec.	3
			15

## SENIOR

## Fall Semester

Education	410 621	Prog. Plan. In Voc. Ed.	3
Education	410 500	Methods of Teaching Ag.	2
Education	410 586	Tchg. Partic. Sec. Sch.	8
Ag. Engg.	506 559	Ag. Mechanic Methods	3
Ag. Engg.	506 553	Ag. Machinery Operation	3
			19

## Spring Semester

Ag. or Ag. Engg. Elec. . . . .	2
General Elec. . . . .	3
Social Science Elec. . . . .	3
Ag. Science Elec. . . . .	8
	<hr/> 16

Specialty Certification. Special certification is available for those who wish to prepare for positions in multi-teacher departments. The combination of 16 required and elective credit hours in agricultural sciences from one of the following areas is required for specialty certification:

1. Animal Sciences
2. Crops and Soils
3. Horticulture
4. Ag. Mechanics
5. Agri-Business (Cr. from Ag. Econ and B.A.)

Eight weeks during the first or second semester of the senior year are devoted to full-time student teaching. On-campus courses meet extra periods while the student is on campus, so there are no other academic responsibilities while teaching. When student teaching is taken in the spring, fall semester courses are moved to spring semester. See "Admission to Teacher Education" & "Admission to Student Teaching" in College of Education section of this catalog.

## AGRICULTURAL JOURNALISM

Adviser—Holt

B.S. in Agriculture; requires 127 sem. hrs.

The race against hunger in many parts of the world has transformed agricultural reports into front page news. Agricultural journalists throughout the world are busy interpreting new developments—not only to farm people, but also to city people, just now beginning to realize that the strength of the land is their strength.

Rapid changes in agricultural science, production, and marketing must be relayed quickly and accurately to people who need to know. Today that's almost everyone.

The demand continues strong for trained agricultural journalists who understand and can interpret and report vital agricultural news. Graduates can take their pick of newspapers, magazines, radio or television stations, or government and university information staffs.

Students majoring in this curriculum take the following courses:

English Composition I	3
English Composition II	3
Oral Communication I or IA	2 or 3
Ag Orientation	1
College Algebra	3
Economics I	3
Chemistry I or General Chemistry	4-5
Concepts In Phys. Ed.	1
Humanities and/or Social Science	12

**Agriculture Course Requirements:** Students select one of the following options: science, production, business and industry or communications options as listed on page 45, except that Physics is not to be included as a possible Physical Science course.

Agriculture courses required include those courses listed on page 43 under the option selected, plus two courses above the introductory level in one area of professional agriculture. Additional agriculture electives may be chosen by the student in consultation with the faculty adviser.

Students who select the communications option do not take the areas of specialization in communications, page 45, but do take the following group.

## Journalism and Mass Communications Requirements (30-33 hours)

Core (Required of all)	
Reporting I . . . . .	3
Reporting II (Print) . . . . .	3
Editing I . . . . .	3
Fundamentals of Radio-TV Production OR . . . . .	3
Fundamentals of Radio-TV Performance . . . . .	3
	<b>12</b>

Remaining 18-21 hours in Journalism may be chosen by the student in consultation with the faculty adviser. Note: The course Agricultural Journalism (280 250) is not open to majors in agricultural journalism.



## AGRICULTURAL MECHANIZATION

Advisers—Baugher, G. Larson, Lipper, Stevenson

B.S. in Agriculture; requires 127 sem. hrs.

Agricultural Mechanization courses are concerned with the application of power units, machines, buildings, equipment and engineered production systems for agriculture and with making productive use of and conserving our soil, water and energy resources. Courses stress learning how to acquire and use information needed for problem solving and developing independent and logical thought processes. They aim to cultivate the student's confidence in being able to apply familiar concepts from the agricultural and mechanical sciences 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 soil and water management, irrigation, animal production facilities or power and machinery related areas such as tillage, planting and harvesting. Students enrolled in this major are required to select a minor area in one of the agricultural sciences. Additional electives may be used to enhance mechanical skills or to concentrate further in some area of production agriculture or business administration.

Agricultural Mechanization is administered through the Department of Agricultural Engineering. Agricultural Engineering faculty and courses for students in the College of Engineering are given on page 232. Page 222 gives the curriculum in Agricultural Engineering.

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

English Composition I	3
English Composition II	3
Oral Communication I	2
Ag. Orientation	1
College Algebra	3
Plane Trigonometry	3
Economics I	3
General Chemistry or Chemistry I	4-5
General Physics I	4
Concepts in Physical Education	1
Communications Elective (see page 45)	2-3
Social Sciences and Humanities (see page 45)	12

### Major Courses

Agricultural Machinery Management	3
Farm Power	3
Farmstead Utilities	3
Planning and Management of Ag. Buildings	3
Conservation Surveying and Planning	3
SELECT AN ADDITIONAL 10 HOURS FROM THE FOLLOWING:	
Agricultural Mechanics Practices	2
Tillage-Planting Machinery	2
Crop Harvesting and Handling Systems	2
Agricultural Machinery Construction	3
Farm Building Construction	3
Farm Animal-Waste Management	3
Managing Farm Grain and Forage	3
Irrigation Practices	3

### Supporting Courses

Principles of Animal Science	3
Plant Science or Crop Science	4
Principles of Agricultural Econ. or Econ. II	3
Fundamentals of Accounting	4
Graphic Communications, Analysis & Design	2
Plus an additional Business Administration course*	

### Additional Requirements

#### 1. Production Option

Principles of Biology or General Botany	4
Introductory Organic and Biological Chem.	5

One of the following biological science courses: Organismic Biology, Genetics, Environmental Biology, Microbiology, a course in Plant Pathology or Entomology. Students select a minor area to give a total of 12 hours in one of the following:

1. Agricultural Economics and Journalism
2. Agronomy, Entomology, Horticulture and Plant Pathology (Courses taken to fulfill this requirement may not be used to fulfill biological science requirement.)
3. Animal Science and Industry, Dairy and Poultry Science.

#### 2. Communications Option

Requirements are the same as for the Production Option except that communications courses as listed under "Communications Option," page 45 of the catalog, must be included in the minor area or as other electives.

#### 3. 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 offered in the following colleges or departments: Economics, Agricultural Economics, Business Administration and Industrial Engineering.\*

A specialization in Irrigation is available in any of the options by including the following courses in the electives selected.

Production Economics or Farm Management	3
Management of Irrigated Soils	3
Integrated Pest Management	3
Irrigation Practices	3

\*Selected by the student with the consent of adviser.

### Graduate Study

Graduate study leading to the degree Master of Science is offered. Prerequisite is the completion of an undergraduate curriculum substantially equivalent to requirements for one of the options shown above.

## Agricultural Engineering Courses for Students in Agriculture

### Undergraduate Credit

**506 151. 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. 506-151-1-0998

**506 300. 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. 506-300-1-0998

**506 310. Farm Electrification and Soil Conservation.** (2) 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. Six hours lab. a week. 506-310-1-0998

**506 324. 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. 205 or Agron. 150. 506-324-0-0998

**506 325. 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. 506-325-0-0998



**506 330. 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.: Ag.E. 300 or Phys. 113. 506-330-1-0998

**506 351. 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. 506-351-1-0998

**506 352. Agricultural Machinery Construction.** (3) I, II. Advanced shop processes and techniques for constructing and maintaining agricultural machinery; advanced welding, metallurgy and selection of materials for construction. One hour rec. and five hours lab. a week. Pr.: Ag.E. 151 and junior standing. 506-352-1-0998

**506 353. Farmstead Utilities.** (3) I. 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. 506-353-1-0998

### Undergraduate And Graduate Credit In Minor Field

**506 552. Farm Building Construction.** (3) I, II. 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. One hour rec. and five hours lab. a week. Pr.: Math. 100. 506-552-1-0998

**506 553. 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. One hour rec. and five hours lab. a week. Pr.: Ag.E. 151, Ag.E. 352 and junior standing. 506-553-1-0998

**506 554. Planning and Management of Agricultural Buildings.** (3) I, 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. 506-554-0-0998

**506 555. 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. 506-555-1-0998

**506 558. Conservation Surveying and Planning.** (3) II. Agricultural surveying; layout and checking waterways, terraces and farm ponds; conservation planning from aerial photographs. One hour rec. and five hours lab. a week. Pr.: Math. 100. 506-558-1-0998

**506 559. 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. 506-559-1-0998

**506 560. Farm Animal-Waste Management.** (3) I. Current practices, technology, knowledge and problems relating to disposal or use of farm animal wastes. Attention is given to environmental, ecological, and socio-economic consequences of alternative ways in which such wastes are accumulated, handled, and cycled back into the environment. Three hours rec. a week. Pr.: Chem. 110 or 210 and junior standing. 506-560-0-0998

### Undergraduate And Graduate Credit

**506 615. Problems in Agricultural Mechanization.** (Var.) I, II, S. Problems in the application of technical principles to agricultural mechanization. Pr.: Approval of instructor. 506-615-3-0998

**506 651. 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. 506-651-1-0998

**506 652. 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. 205, Ag.E. 300 or Ag.E. 558. 506-652-1-0998

**506 653. 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. 205 or Agron. 150. 506-653-1-0998

**506 654. 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.: Ag.Ec. 100 and Ag.E. 651. 506-654-1-0998

**506 700. Advanced Farm Mechanics.** (3) S. For teachers of vocational agriculture and those concerned with teaching agricultural mechanics in high school; advanced shop techniques, with special emphasis on welding, machine tool, mechanical drawing, and farm carpentry. One hour rec. and six hours lab. a week. Pr.: Ag.E. 151, Ag.E. 559 plus one year's teaching experience or approval of instructor. 506-700-1-0998

**506 703. Advanced Farm Power.** (3) S. For high school teachers of vocational agriculture and others concerned with teaching agricultural mechanics. Tractor operation, service, repair and maintenance plus selection of tractors and power units. Update on small engines, depending on individual need. Develop teaching aids and instructional programs as needed. Two hours rec. and three hours lab. a week. Pr.: Ag.E. 351, Ag.E. 559 plus one year's teaching experience. 506-703-1-0998

**506 896. 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.: Ag.E. 651 or Ag.E. 653. 506-896-2-0998

**506 898. Master's Report.** Credit arranged. I, II, S. Topics selected with approval of major professor and department head. 506-898-4-0998

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## AGRONOMY

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(Crops, Soils, Range Management)

B.S. In Agriculture; requires 127 sem. hrs.

H.S. Jacobs,\* Head of Department

Professors Bldwell,\* Bleberly, Bohannon, Casady,\* Ellis,\* Heyne,\* Hobbs,\* Jacobs,\* Jones,\* Mader,\* Murphy,\* Nilson, Olson,\* Paulsen,\* Peterson, Pomeranz,\* Powers,\* Sorensen,\* Vanderlip,\* Wassom,\* and Withee,\* Associate Professors Barnett,\* Dicken, Edelblute, Follett, Kanemasu,\* Kilgore, Liang,\* Lyles,\* Nickell,\* Overlay, Owensby,\* Posler,\* Raney, Russ,\* Sloan, Skidmore,\* Teare,\* Thlen,\* and Whitney,\* Assistant Professors Armbrust,\* Burchett, Ehler,\* Lundquist, Maddux, Moore, Nuttleman, Ohlenbusch, Reinhardt, Stone,\* Swallow, and Walter; Instructors Dickerson, Hagen, Knight, and O'Connor. Emeritus: Professors Anderson,\* Axelton, Clapp, Cleavinger, Lind, Throckmorton,\* and Woodruff,\* Associate Professors Atkinson and Harper.



## Undergraduate Study

Agronomy is the science of crops and soils. It attracts students with interests ranging from soil management to the physics and chemistry of soils and from crop production to the study of photosynthesis, plant physiology and plant breeding.

Students majoring in agronomy are required to complete the following basic courses:

	Hrs.
229 100 English Composition I	3
229 120 English Composition II	3
281 105 Oral Communication	2
035 101 Ag Orientation	1
245 100 College Algebra	3
225 110 Economics I	3
015 200 Plant Science	4
OR	
015 220 Crop Science	4
015 305 Soils	4
221 210 Chemistry I	4
221 230 Chemistry II	4
215 198 Principles of Biology	4
030 300 Economic Entomology	3
305 260 Fund. of Accounting	4
261 101 Concepts in Phys. Ed.	1
Humanities and/or Social	
Sciences (see page 45)	9
Communications (see page 45)	2 or 3

There are four options available in agronomy: production, science, business and industry and communications. Programs in the science option include crop science, soil science and range management. Students may also select the soil and water conservation option of the curriculum in natural resource management (see page 75) or the crop protection curriculum (see page 58). This curriculum provides an opportunity for students to combine an interest in the natural and physical sciences with a concern for the environment and the application of ecological principles to pest control.

Considerable flexibility in programs is possible. In addition to the basic courses of Plant or Crop Science and Soils, students are required to take 18 hours of courses in agronomy. These will depend upon the students' interest and career intentions. Minimum requirements for the various options are given on page 44.

Farms, laboratories and greenhouses 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 the fields of crop production, crop physiology, crop ecology, pasture improvement, plant breeding, weed science, plant genetics, soil chemistry, soil fertility, soil physics, soil management, soil-water-plant relations, erosion, irrigation and soil classification.

A prerequisite for advanced degrees is the completion of an undergraduate curriculum substantially similar to that required of undergraduate students majoring in agronomy. This includes not only courses in agronomy but also courses in physical and biological sciences.

## Undergraduate Credit

**015 150. Plants and Soils for Crop Production.** (3) I, II, S. Resources and techniques used to produce crops; soil properties and plant processes basic to understanding cropping practices and systems. For freshmen and sophomores who want an introductory field crop production course. Three hours rec. a week. 015-150-0-0102

**015 200. Plant Science.** (4) I, II. Study of the principles of the production of economic plants, including morphology, taxonomy, physiology, ecology, propagation, preservation, storage, and utilization. Three hours lec. and one two-hour lab. a week. Taught in cooperation with the Department of Horticulture and Forestry. 015-200-1-7-0102

**015 220. Crop Science.** (4) I, II. Principles underlying practices used in the culture of crops. Application of principles to production management. Plant morphology, crop protection, seed technology. A basic course for majors in Agronomy and other undergraduates interested in crop production. Three hours rec. and two hours lab. a week. 015-220-1-7-0102

**015 230. Weed Management.** (2) II. An introductory lecture course for people interested in areas of crop production, crop protection, and agricultural education. Consideration of control systems emphasizing cultural practices and herbicides and legal implications. Includes identification of common mature and seedling weeds. 015-230-0-0102

**015 305. Soils.** (4) I, II. Fundamental chemical, physical and biological properties of soils; their formation, fertility and management. Two hours lec., one two-hour lab. a week, and self-programmed audiotutorial instruction. Pr.: Chem. 110 or 210 or credit in high school chemistry with grade of A or B. 015-305-1-7-0103

**015 340. Market Grading of Cereals.** (2) I. Market grades of cereals and factors that influence them. Six hours lab. a week. 015-340-1-0-0102

**015 350. Crop and Seed Quality.** (2) II. Identification, grading and evaluation of seeds for planting and commercial use. Visual appearance as an indication of quality of seeds, grain crops, hay silage and crop displays. Two two-hour rec. and labs per week. 015-350-1-0-0102

**015 360. Forage Crops for Livestock.** (3) I. Production and use of forage crops. Forage programs for livestock production including pasture, hay and silage. Two hours rec. and two hours lab. a week. 015-360-1-7-0102

**015 365. Soil-Plant Relationships.** (3) I. 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. 305 and 200 or 220. 015-365-0-0103

**015 405. Internship in Agronomy.** (1-2) I, S. Work study 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. 200 or 220, and 305. 015-405-2-0102

**015 415. Soil Morphology.** (1) I. Observation, recognition, measurement and recording of soil morphology properties in the field. Six hours of lab. a week for the first half of the semester. Pr.: Agron. 305. 015-415-2-0103

## Undergraduate And Graduate Credit In Minor Field

**015 500. Range Management I.** (3) II. Presents fundamental ecological principles of production, conservation, and utilization of grasslands. Applies these fundamental principles to range management. Three hours rec. a week. 015-500-0-0102



**015 505. Soil as a Natural Resource.** (3) II. Factors influencing soil development and distribution. Methods of mapping and classifying soils for agriculture and other uses by society; field trips. Two hours rec. and three hours lab. a week. Pr.: Geol. 100 and Agron. 305 or consent of instructor. 015-505-1-6-0103

**015 510. Plant Improvement.** (3) I. Methods of breeding agricultural crops and evaluation, distribution and maintenance of crop varieties. Three hours rec. a week. Pr.: Agron. 200 or 220. 015-510-0-0102

**015 525. Crop and Soil Management.** (3) II. Production management of crops and soils in semi-arid, sub-humid and humid areas. Selection of cropping systems and appropriate practices to achieve maximum production and conservation of soil resources. Three hours rec. a week. Pr.: Agron. 200 or 220 and Agron. 305. 015-525-0-0103

**015 535. 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. 015-535-1-6-0103

**015 540. Forage Utilization.** (2) I, II. Utilization of forages in livestock production. Consideration of harvest methods, storage and handling, quality and animal use. Two hours rec. per week. Pr.: Junior standing. 015-540-0-0102

### Undergraduate And Graduate Credit

**015 600. Crop Problems.** (Var.) I, II, S. Studies may be chosen in the fields of: Genetics, Crop Improvement, Pasture Improvement, Ecology, Weed Control, Plant Physiology, Production. 015-600-3-0102

**015 610. Crop Ecology.** (3) II. Study of crop plant growth with relation to genetic, climatic, biotic and soil factors, with special emphasis on the interdependency of these factors. Pr.: Agron. 200 or 220 and 305 or consent of instructor. 015-610-0-0102

**015 615. Soil Problems.** (Var.) I, II, S. Studies may be chosen in the fields of: Chemistry, Physics, Conservation, Fertility, Genesis, Morphology and Classification. 015-615-3-0103

**015 620. Weed Science.** (3) I. Principles of weeds and herbicides relating to managerial and chemical weed control. Two hours rec. and one three-hour lab. a week. Pr.: Agron. 200 or 220 and Chem. 190 or equiv. 015-620-1-6-0102

**015 625. Management of Irrigated Soils.** (2) I. Principles of soil moisture retention, movement and measurement; reclamation and management of saline and alkaline soils; water quality; management. Two hours rec. a week. Pr.: Agron. 200 or 220 and 305. 015-625-0-0103

**015 655. Integrated Pest Management.** (3) II. Offered in cooperation with Entomology and Plant Pathology. See course description, 050 655. 015-655-0-0102

**015 670. Range Management Problems.** (Var.) I, II, S. 015-670-3-0102

**015 675. Soil Interpretations for Land-use Planning.** (3) II. The effect of the physical land resource on land use and land-use planning. Three hours rec. a week and several Saturday field trips. Pr.: 235 220 or a course in Regional and Community Planning or Landscape Architectural Design or consent of Instructor. 015-675-0-0103

**015 680. Range Management II.** (3) II. Offered 1977-78 and alt. years. Application of principles of plant ecology to management and conservation of natural grazing land and to the characterization and mensuration of range vegetation, with special emphasis on ranges. Two hours rec. a week and one credit of laboratory consisting of field trips to representative range areas. Pr.: Agron. 500, Biol. 530. 015-680-1-6-0102

**015 690. Agricultural Climatology.** (2) I. 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 or consent of instructor. 015-690-0-0102

**015 705. 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. 015-705-0-0103

**015 710. Principles of Plant Breeding.** (3) I. The application of basic genetic principles for the improvement of plants. Three hours rec. a week. Pr.: A.S.I. 500 or equivalent. 015-710-0-0102

**015 725. Soil and Plant Analysis Applications.** (3) I. Offered 1977-78 and alt. 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, Chem. 271. 015-725-1-0103

**015 735. 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. 200 or 220, 305 and 365 or consent of the instructor. 015-735-0-0103

**015 745. Physical Environment of Crops and Soils.** (3) II. The properties of crops and soils as affected by their physical environment, including water content, temperature, soil structure and aeration. Two hours rec. and three hours lab. a week. Pr.: Agron. 305. 015-745-1-6-0103

**015 755. Soil Fertility.** (3) I. Advanced study of the relationship of soil chemistry to plant nutrition; interactions of nutrients and roles of nutrients in plant nutrition; soil reactions to fertilizer materials; diagnosis of soil fertility problems and formulation of recommendations. Three hours rec. a week. Pr.: Agron. 200 or 220, 305 and 365 or consent of instructor. 015-755-0-0103

**015 760. 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 Kansas State College. Pr.: Agron. 500, Biol. 530. Suitable field experience may be substituted for these prerequisites with consent of instructor. 015-760-2-0102

**015 761. Identification of Range and Pasture Plants.** (2) II. Offered 1977-78 and alt. 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. 015-761-3-0102

**015 770. Plant Genetics.** (3) I. Concepts and application of basic genetic principles in higher plants. Measurement of linkage, mapping, aneuploidy analysis, gene transfer, and estimation of genetic parameters for quantitative characters. Three hours rec. a week. Pr.: A.S.I. 500. 015-770-0-0102

**015 780. Crop Physiology.** (3) II. Principles of nitrogen metabolism, mineral nutrition, photosynthesis, growth substances, and hardness applied to crop production. Two hours rec. and two hours lab. a week. Pr.: Biol. 600. 015-780-1-6-0102



**015 805. Mechanics of Soil Erosion and Its Control.** (3) I. Offered 1978-79 and alt. years. Techniques for studying erosion. Mechanics of water and wind erosion processes and control practices. Methods of predicting quantities of erosion on agriculture and nonagriculture land. Two hours rec. and three hours lab. a week. Pr.: Agron. 305, Phys. 113. 015-805-1-6-0103

**015 810. Agronomy Seminar.** (1) I, II. A discussion of agronomic developments. Pr.: Graduate standing. 015-810-0-0102

**015 820. Plant-Water Relations.** (2) 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. 200 or 220 and 305. 015-820-0-0102

**015 870. Agronomic Plant Breeding.** (3) II. Offered in 1977-78 and alt. years. The application of principles and methods of breeding field crops, including laboratory, greenhouse, and field procedures. Two hours rec. and three hours lab. a week. Pr.: Agron. 200 or 220 and 710. 015-870-1-6-0102

**015 898. Masters' Report.** (2) I, II, S. Preparation of a written report either of research or of problem work on a topic in the major field. 015-898-4-0102

**015 899. 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. 015-899-4-0102

**015 905. Soil Physical Chemistry.** (3) I. Offered 1978-79 and alt. 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, 745 and Chem. 585. 015-905-1-6-0103

**015 910. 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 Dept. of Horticulture and Forestry. See 040 910.) 015-910-0-0102

**015 915. Soil Physics.** (3) I. Offered 1977-78 and alt. years. An advanced study of prominent theories concerning the physical behavior of soils. Three hours rec. a week. Pr.: Agron. 745, Math. 222, Phys. 211. 015-915-0-0103

**015 925. Soil Genesis.** (2) II. Offered 1978-79 and alt. years. Theories of soil formation processes. Two hours rec. a week. Pr.: Agron. 505. 015-925-0-0103

**015 930. 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 Dept. of Horticulture and Forestry. See 040 930.) 015-930-0-0102

**015 935. Topics in Soils.** (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of Instructor. 015-935-0-0103

**015 950. Advanced Crop Ecology.** (3) I. Offered 1978-79 and alt. years. Principles of growth and development of crops in relation to the environment. Three hours rec. a week. Pr.: Agron. 610, or equiv., and Biol. 600. 015-950-0-0102

**015 960. 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. 015-960-0-0102

**015 999. Ph.D. Research.** (Var.) I, II, S. Research on a problem which may extend throughout the year and furnish data for a doctoral dissertation. 015-999-4-0102

## ANIMAL SCIENCE AND INDUSTRY

B.S. in Agriculture; requires 127 sem. hrs.

*Don L. Good,\* Head of Department*

Professors Harbers,\* Koch,\* Kropf,\* McKee,\* Moyer, Richardson,\* E. Smith,\* Wheat,\* and Zoellner; Associate Professors Able,\* Allee,\* Allen,\* Ames,\* Brent,\* Dikeman,\* Francis, Hines,\* Kiracofe,\* Riley,\* Schalles,\* and W. Smith;\* Assistant Professors Bolsen,\* Corah, Davis,\* Hoover,\* Hunt,\* Kastner,\* Orwig, Schafer, Schwartz, Spaeth, and Westmeyer. Emeritus: Professors Aicher, Aubel, Cox, Mackintosh, McAdams, McCormick and Weber.

Courses in this department give the student instruction in the selection, breeding, feeding, management and marketing of horses and all classes of meat animals.

The animal science and industry buildings, lots and pastures are devoted to the maintenance of herds and flocks of beef cattle, sheep, swine and horses for the purpose of teaching and research.

The department offers the Animal Science and Industry major with options in production, business and industries, science, and communications, page 45. In addition the department helps administer and advise students enrolled in the curriculum in Food Science & Industry, see page 64.

### Graduate Study

Major work 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 and animal nutrition, as well as genetics and food science.

Prerequisite to major graduate work in these fields is the completion of a four-year curriculum substantially equivalent to that required of undergraduate students majoring in Animal Science and Industry. This will include not only several courses in the major field, but also sufficient physical and biological science courses to prepare the student for advanced work in the chosen field.

Students majoring in Animal Science and Industry take the following courses:

### General Requirements for the B.S. Degree

English Composition I . . . . .	3
English Composition II . . . . .	3
Oral Communication . . . . .	2
Ag Orientation . . . . .	1
College Algebra . . . . .	3
Economics I . . . . .	3
Chemistry I or General Chemistry . . . . .	4-5
Concepts in Physical Education . . . . .	1
Humanities and/or Social Sciences (see page 45) . . . . .	9
Communications (see page 45) . . . . .	2 or 3

Other general requirements depend upon the option selected (see page 45). Faculty advisers assist students in the selection of non-major and elective courses.

### Required Animal Science and Industry Courses

Principles of Animal Science . . . . .	3
Animal Science and Industry . . . . .	1
Fundamentals of Nutrition . . . . .	3
Principles of Feeding . . . . .	3
Livestock & Meat Evaluation . . . . .	3
Elements of Meat . . . . .	2
Animal Breeding . . . . .	3
Meat Processing . . . . .	2
An. Sci. & Ind. Seminar . . . . .	1



Two or three of the following courses depending on option selected:

Beef Science .....	3
Swine Science .....	3
Sheep Science .....	3
Horse Science .....	3
Meat Technology .....	4

One of the following courses in production option:

Environmental Physiology of Farm Animals .....	3
Reproduction in Farm Animals .....	4
Patterns of Farm Animal Reproduction .....	3

The laboratory of the animal science and industry student is the feed lot, the judging pavilion and the abattoir (as well as the animal nutrition, wool, meats, genetics and animal breeding laboratories), where animals can be studied from the standpoint of maintenance, growth, reproduction, structure and body composition.

### Undergraduate Credit

**005 102. 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. Taught in cooperation with the Department of Dairy and Poultry Science (A.S.I. 103, D.S. 103, and P.S. 104 are companion courses). 005-102-0-0104

**005 103. Animal Science 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. per week. A companion course to A.S.I. 102 and Dy. and Pl. Sc. 102. 005-103-1-0104

**005 200. Fundamentals of Nutrition.** (3) I, II. Elementary principles of comparative nutrition of farm animals. Three hours rec. a week. Pr.: Chem. 110 or 210. Taught in cooperation with the Department of Dairy and Poultry Science. 005-200-0-0104

**005 250. Elements of Meats.** (2) I, II. A survey and discussion of the red meat industry and the product quality, processing, merchandising and promotional trends and techniques. Two hours lec. a week. Pr.: A.S.I. 102 and 103 or consent of instructor. 005-250-0-0104

**005 261. Meat Processing.** (2) I, II. Converting meat animals into carcasses, and processing techniques for meat products. To include slaughtering, inspection, by-product handling, carcass grading, meat cutting, retail cut identification, preservation, meat cookery, meat specifications, and product control. Three hours lab. and one hour rec. per week. Pr.: A.S.I. 102 and 103, 250 or concurrent assignment. 005-261-1-0104

**005 270. Principles of Meat Evaluation.** (2) I. Introduction to subjective and objective standards employed in evaluating beef, lamb and pork carcasses and also wholesale cuts. Application of these factors to carcass grade, and yield of edible portion; value and consumer acceptance. Two hours rec. and lab. per week. Pr.: A.S.I. 250, 261, or conc. enrollment (or consent of instructor) and sophomore standing. 005-270-1-0104

**005 300. 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 A.S.I. majors. Student cannot apply credit for both A.S.I. 300 and 320 toward a B.S. degree. Pr.: Chem. 110 or equivalent. 005-300-0-0104

**005 305. 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. 005-305-0-0104

**005 315. 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.: A.S.I. 102 and 103 or consent of instructor. 005-315-1-0104

**005 320. 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.: Fundamentals of Nutrition or equivalent. 005-320-1-0104

**005 330. Patterns in Farm Animal Reproduction.** (3) II. Elementary anatomical and physiological principles as related to the patterns of reproduction in the bovine, equine, porcine, and ovine. Demonstrations of current techniques such as artificial insemination and semen collection and handling are provided in the recitation section. Pr.: A.S.I. 102. 005-330-0-0104

**005 385. Wool Grading and Classification.** (1) I, II. 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.: A.S.I. 102. 005-385-1-0104

**005 395. Classification, Grading and Selection of Meats.** (1) 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.: A.S.I. 250, 261. 005-395-1-0104

**005 450. 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.: A.S.I. 102, A.S.I. 103 and 315. 005-450-1-0104

**005 470. Form & 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.: A.S.I. 450. 005-470-1-0104

### Undergraduate And Graduate Credit In Minor Field

**005 500. Genetics.** (3) I, II, S. Variation, Mendelian inheritance and related subjects. Three hours lec. a week. Pr.: Biol. 198 or 210. 005-500-0-0104

**005 510. Animal Breeding.** (3) I, II. Present status of livestock improvement; function of purebred livestock; breeding systems and practices; application of genetics to problems in animal breeding. Pr.: A.S.I. 500. 005-510-0-0104

**005 512. 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. 005-512-2-0104

**005 515. 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 or consent of instructor. 005-515-0-0104

**005 521. 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.: A.S.I. 200 or consent of instructor. 005-521-0-0104



**005 525. Sheep Science.** (3) I. Survey of the sheep and wool industry. Application of scientific principles and research findings to lamb and wool production. Attention given to different production programs. Three hours rec. a week. Pr.: Senior standing or consent of instructor. 005-525-0-0104

**005 535. 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 or consent of instructor. 005-535-0-0104

**005 555. 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 or 205 and junior standing. (Offered in the Dairy and Poultry Department.) 005-555-0-0104

**005 580. Animal Science and Industry Seminar.** (1) II. Open only to senior students majoring in animal science and industry. One hour rec. a week. 005-580-0-0104

### Undergraduate And Graduate Credit

**005 605. Commercial Cattle Feedlot Management.** (3) I, S. Principles of commercial cattle feedlot management including cattle management, animal health, feed yard maintenance, feed mill operation, office management, and animal evaluation. A maximum of two hours credit for each four weeks of supervised work-study at an approved commercial cattle feedlot. Pr.: A.S.I. 515. 005-605-2-0104

**005 615. Swine Production Unit Operation.** (3) I, S. A maximum of two hours credit for each four weeks of supervised work-study at an approved commercial swine production unit. Pr.: A.S.I. 535. 005-615-2-0104

**005 625. Beef Cow Herd Unit Operation.** (3) I, S. Principles of management in a beef cow unit involving direct contact in physiology, reproduction, breeding programs, nutrition, ranch accounting and other management procedures. Maximum of four total credits. Pr.: A.S.I. 515 or consent of instructor. 005-625-2-0104

**005 640. Livestock Production and Management.** (2) I, 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 A.S.I. course (515, 521, 525, or 535) and consent of instructor for specific area. 005-640-2-0104

**005 660. Animal Science and Industry Problems.** (1-3) I, II, S. Pr.: Consent of instructor. Work offered in: Animal Breeding, Animal Nutrition, Beef Cattle Production, Horse Production, Livestock Evaluation, Meats, Sheep Production, Swine Production. 005-660-3-0104

**005 671. 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-hour period weekly of lecture-recitation and two hours laboratory. Pr.: 640 400 or 640 601 or 660 440. 005-671-1-0104

**005 700. Animal Nutrition.** (3) I. Intended for graduate-level course in animal nutrition. An in-depth study of digestion, absorption, and metabolism in both monogastric and ruminant species. Three hours rec. per week. Pr.: Biochemistry 521 or equivalent. 005-700-0-0104

**005 720. Meat-Packing Plant Operation.** (2-6) I, S. A minimum of two weeks intensive study, or six weeks work study in a commercial meat plant for each two credits. Exposure to procurement, selection and grading, slaughter, processing/fabrication, quality control, by-products, accounting and mechanical/maintenance areas of a meat plant. Prior arrangements must be made. Pr.: A.S.I. 250 and senior or graduate standing. 005-720-2-0104

**005 735. 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. per week with frequent laboratory demonstrations. Pr.: Physiol. 530 or consent of instructor. 005-735-0-0104

**005 741. Population Genetics.** (4) 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.: A.S.I. 500 and three hours in statistics. 005-741-0-0104

**005 777. 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.: A.S.I. 250 and 261; senior or graduate standing. 005-777-1-0104

**005 818. 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.: 640 601 or equivalent and concurrent enrollment in 640 818. 005-818-1-0104

### Graduate Credit

**005 835. Research Techniques in Animal Reproduction.** (3) II. Study of experimental techniques used in animal reproduction. Current literature studies and laboratory experiments. Pr.: Background in anatomy and physiology or consent of instructor. 005-835-1-0104

**005 850. Analytical Techniques in Animal Science and Industry.** (3) I, II. Principles of analytical procedures used in research in Animal Science and Industries. One hour rec. and six hours lab. a week. Pr.: Consent of instructor. 005-850-1-0104

**005 886. 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. Pr.: Third year Veterinary Medicine or A.S.I. 005 700. 005-886-0-0104

**005 890. Graduate Seminar in Animal Science 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. 005-890-0-0104

**005 898. Master's Report.** (2) I, II, S. Pr.: Consult major professor. 005-898-4-0104

**005 899. Research in Animal Science and Industry (M.S. degree).** (Var.) I, II, S. Pr.: Consult instructor. 005-899-4-0104

**005 900. Topics in Ruminant Nutrition.** (2) II. 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.: A.S.I. 700 or equivalent and Dy. and Pl. 820. 005-900-0-0104



**005 901. Topics in Monogastric Nutrition.** (2) I. 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.: A.S.I. 700 or equivalent. 005-901-0-0104

**005 906. Animal Breeding Seminar.** (1) ii. Evaluation of animal experimentation as related to reproduction and breeding. Pr.: Consent of instructor. 005-906-0-0104

**005 930. Advanced Meat Science.** (3) I. (Offered in fall on 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.: A.S.I. 777 or equivalent and Biochem. or consent of instructor. 005-930-0-0104

**005 999. Research in Animal Science and Industry.** (Ph.D. degree). (Var.) i, ii, S. Pr.: Consult instructor. 005-999-4-0104

## CROP PROTECTION

B.S. in Agriculture; requires 127 sem. hrs.

**Advisers:** Dickerson, Plant Pathology; Ehler, Agronomy; Miles, Horticulture and Forestry; Poston, Entomology; Tillman, Plant Pathology.

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, produce nutritious food and good fiber while avoiding adverse effects on man, wildlife and the environment. Those who are trained in Crop Protection monitor the environment and supervise environmental monitors, become agricultural extension agents, pest management supervisors, technical sales representatives, research assistants, retail salesmen, regulatory specialists, research specialists and private practitioners.

The Crop Protection curriculum is administered by a committee of faculty from the Departments of Agronomy, Entomology, Horticulture and Forestry, and Plant Pathology. Persons interested in the curriculum should contact the Dean's Office, College of Agriculture, for additional information and assignment of an adviser. It offers options as discussed below.

The pest management option is designed to prepare a student to 1) recognize and analyze factors that cause pest problems, 2) prescribe an economical control that does not violate state or federal regulations and that has minimal adverse effects on the environment, 3) advise on control programs, including ecologically sound preventative measures and 4) 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. (See page 62 for the entomology science option and page 77 for the plant pathology science option.)

Students majoring in Crop Protection are required to complete the following basic courses.

### General Requirements

229 100	English Composition I	3
229 120	English Composition II	3
281 105	Oral Communication	2
035 101	Ag Orientation	1
245 100	College Algebra	3
221 210	Chemistry I or 221 110 Gen. Chem.	4-5
289 250	Agricultural Journalism (or equiv. communications course)	3
225 110	Economics I	3
261 101	Concepts in Physical Education	1
	Humanities and Social Sciences (See page 45)	9

Other requirements depend upon the option selected.

### 1. Pest Management Option

#### Curriculum Requirements

050 210	Intro. to Plant Pest Control	2
030 312	General Entomology	2
030 313	General Entomology Lab.	1
030 666	Insect Pest Mgmt.	3
030 780	Insects Attacking Field Crops, Grasslands, Livest.	3
	OR	
030 782	Insects Attacking Hort. Crops and Forests	3
050 420	Plant Nematology	2
050 501	Plant Pathology	3
050 610	Plant Disease Diagnosis	1
050 615	Diseases of Field Crops	3
	OR	
050 625	Diseases of Horticultural Crops	3
015 620	Weed Science	3
050 635	Properties of Pesticides	2
030 645	Federal and State Regulations of Pesticides	1
030 611	Insect Pest Diagnosis	1
050 655	Integrated Pest Management	3
050 651	Internship in Crop Protection	1-2
040 680	Plant Protection	3

#### Supporting Courses—Agriculture and Biological Sciences

015 200	Plant Science	4
015 305	Soils	4
215 198	Principles of Biology	4
215 201	Organismic Biology	5
215 530	Ecology	3

#### Four or more of the following suggested

005 102	Principles of Animal Science	3
005 500	Genetics	3
015 365	Soil-Plant Relationships	3
015 500	Range Management I	3
015 505	Soils as a Natural Resource	3
015 525	Crop and Soil Management	3
015 610	Crop Ecology	3
030 710	Insect Taxonomy	3
030 745	Insect Control by Host Plant Resistance	2
040 281	Forest Conservation	2
040 508	Landscape Horticulture	3
040 520	Fruit Production	3
040 560	Vegetable Crop Ecology	3
506 300	Engineering in Agriculture	4

#### Supporting Courses—Physical Sciences and Mathematics

265 113	General Physics I or 265 115 Descriptive Physics	4
221 190 and 221 191	Elementary Organic Chemistry Lec. and Lab.	5
211 201 and 211 202	Elementary Biochemistry Lec. and Lab.	5
285 340	Biometrics I	3

### 2. 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—Biological Sciences**

015 200	Plant Science	4
015 305	Soils	4
215 198	Principles of Biology	4
215 530	Ecology	3

**Two or more of the following suggested**

005 102	Principles of Animal Science	3
015 365	Soil-Plant Relationships	3
015 500	Range Management I	3
015 505	Soils as a Natural Resource	3
015 525	Crop and Soil Management	3
015 610	Crop Ecology	3
040 281	Forest Conservation	2
040 508	Landscape Horticulture	3
040 520	Fruit Production	3
040 560	Vegetable Crop Ecology	3
506 300	Engineering in Agriculture	4

**Supporting Courses—Physical Sciences and Mathematics**

285 340	Biometrics I or 010 480 Agricultural Economics Statistics	3
265 113	General Physics I or 265 115 Descriptive Physics	4
211 120	Intro. Organic and Biol. Chemistry	5

**Supporting Courses—Business Administration and Economics**

305 260	Fundamentals of Accounting	4
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**Four or more of the following suggested**

305 202	Small Business Operations	3
305 270	Managerial and Cost Controls	3
305 292	Business Law I	3
305 420	Management Concepts	3
305 440	Marketing	3
305 542	Sales Management	3
225 530	Money and Banking	3
225 620	Labor Economics	3
225 631	Principles of Transportation	3
010 518	Economic Principles of Agricultural Business Firms	3

All other courses in Ag. Econ. with a 500 or higher course number.

## DAIRY AND POULTRY SCIENCE

**C. L. Norton,\* Head of Department**

Professors Adams,\* Bartley,\* Craig,\* Farmer,\* Norton,\* Sanford,\* and Ward;\* Associate Professors Bassette,\* Bonewitz,\* Call,\* Cunningham,\* Dunham, and Morrill;\* Assistant Professors Marshall and Roberts; Instructors Helsei and Kahrs. Emeritus: Professors Claydon\* and Martin.\*

### Dairy Production

**B.S. in Agriculture; requires 127 sem. hrs.**

#### Undergraduate Study

A wide application of science to the problems of milk production requires technical training. Courses below provide excellent background for training in the dairy industry.

University-owned herds provide animals for classwork and for research projects.

The department offers the Dairy Production major with options in production, business and industries, science, and communications page 45. In addition the department helps administer and advises students enrolled in the curriculum in Food Science and Industry, see page 64.

Students majoring in Dairy Production are required to complete the following basic courses:

English Composition I	3
English Composition II	3
Oral Communication	2
Ag Orientation	1
Economics I	3
College Algebra	3
Chemistry I or General Chemistry	4-5
Concepts in Phys. Ed	1
Humanities and/or Social Sciences (see page 45)	9
Communications (see page 45)	2 or 3

Other general requirements depend upon the option selected (see page 44).

**Major courses include:**

Principles of Animal Science	3
Dairy Science	1
Fundamentals of Nutrition	3
Genetics	3
Dairy Cattle Nutrition	3
Dairy Cattle Management	3
Dairy Cattle Genetics	3
Dairy Cattle Judging	2
Milk Secretion	3
Reproduction in Farm Animals	4
Fundamentals of Milk Processing	3
Dairy Seminar	1

**Non-Major Courses**—To be chosen in consultation with adviser.

### Poultry Science

**B.S. in Agriculture; requires 127 semester hours**

**Undergraduate Study**

A research center capable of handling 13,800 birds provides excellent facilities for the breeding, rearing and management of poultry for classroom and experimental work. In addition, modern laboratory and teaching facilities are available for poultry science training in Call Hall.

Students majoring in Poultry Science are required to complete the following basic courses:

Other general requirements depend upon the option selected (see page 44)

**Required major courses Include:**

English Composition I	3
English Composition II	3
Oral Communication	2
Ag Orientation	1
College Algebra	3
Economics I	3
Chemistry I or General Chemistry	4-5
Concepts In Physical Education	1
Humanities and/or Social Sciences (see page 45)	9
Communications (see page 45)	2 or 3
Principles of Animal Science	3
Poultry Science	1
Nutrition of the Fowl	3
Quantitative Genetics and Poultry Improvement	3
Avian Metabolism	3
Poultry Products Technology	3
Mgmt. of Domesticated Poultry and Game Birds	3
Poultry Seminar	1

**Non-Major Courses**—To be developed in consultation with adviser.

This department also participates in the Food Science and Industry curriculum. (See p. 64).



### Graduate Study

Major work in both dairy and poultry leading to the degrees Master of Science and Doctor of Philosophy is offered in the fields of animal sciences and food science which are interdepartmental programs. Subdivisions of the animal sciences program include animal breeding, animal nutrition, animal production and management, animal products, and animal reproduction.

Prerequisite to major graduate work in these fields is the completion of a four-year science-oriented curriculum that will provide an adequate background for further study as determined by the departmental graduate study committee.

### Undergraduate Credit

**025 102. Principles of Animal Science.** (3) I, II. Basic principles which apply to the broad field of animal agriculture; survey of the industry; types, purposes and products of livestock; principles of breeding, selection, nutrition, lactation, reproduction, management and marketing. Three hours lec. a week. Taught in cooperation with the Department of Animal Science and Industry. (A.S.I. 103, Dy. and Pl. Sc. 103 and 104 are companion courses in the respective departments.) 025-102-0-0105

**025 103. Dairy Science.** (1) I, II. Application of basic principles of animal agriculture to dairying. Two hours lab. a week. Pr.: Dy. and Pl. Sc. 102 or A.S.I. 102 or consent of instructor. 025-103-1-0105

**026 104. Poultry Science.** (1) I, II. Application of basic principles of animal agriculture to the poultry industry. Two hours lab. a week. Pr.: Dy. and Pl. Sc. 102 or A.S.I. 102 or consent of instructor. 026-104-1-0106

**025 196. Dairy Cattle Judging.** (2) II. Six hours lab. a week. Pr.: Dy. and Pl. Sc. 102 and 103. 025-196-1-0105

**025 200. Fundamentals of Nutrition.** (3) I and II. Elementary principles of comparative nutrition of farm animals. Three hours rec. a week. Pr.: Chem. 110 or 210. Taught in cooperation with the Animal Science and Industry Department. 025-200-0-0105

**025 305. 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. 025-305-0-0105

**026 310. Poultry Judging.** (3) I. Production characteristics of present breeds and types. Judging standard breeds and varieties by comparison; judging hens for egg and meat production; evaluation of ready-to-cook poultry; and grading of eggs. One hour rec. and six hours lab. a week. Pr.: Dy. and Pl. Sc. 102 and 104. 026-310-1-0106

**025 311. 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 two hours lab. a week. Pr.: Biochem. 120. 025-311-1-0105

**025 402. Fundamentals of Milk Processing.** (2) II. 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 rec. Pr.: One course in microbiology or consent of instructor. 025-402-1-0105

**025 403. Fundamentals of Milk Processing Lab.** (1) II. Laboratories are designed to supplement materials presented in 025 402. Students will study the principles of centrifugals, pasteurizers, homogenizers, fillers and instruments that control processing operations. They will learn the important quality control tests in a dairy plant laboratory. Pr.: 025 402 concurrently. 025-403-1-0105

**025 420. Advanced Dairy Cattle Judging.** (1) Three hours lab. a week. Pr.: Dy. and Pl. Sc. 196. 025-420-1-0105

**025 430. Food Products Evaluation.** (3) II. Fundamentals of sensory evaluation of dairy, egg, poultry, meat and other agriculture 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.: Intro. Food Science and Tech. 035 301 or consent of instructor. 025-430-1-0105

### Undergraduate And Graduate Credit In Minor Field

**025 500. Dairy Seminar.** (1) II. Study of dairy periodicals, bulletins, books, other dairy literature. One hour rec. a week. Pr.: Junior standing in dairy science. 025-500-0-0105

**025 501. Principles of Dairy Foods Processing.** (3) II. Offered 1979 and alt. 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. Pr.: A course in microbiology, Dy. and Pl. Sc. 311 or consent of instructor. 025-501-0-0105

**025 505. Principles of Dairy Foods Processing Laboratory.** (1-3) II. Offered 1978 and alt. years. Laboratories are integrated with the lecture offered in Principles of Dairy Foods Processing and with outside reading materials. One paper and from five to fifteen laboratory assignments required depending on credit hours enrolled. The paper is to be handled on a tutorial basis and developed from assigned reading. Pr.: Dy. and Pl. Sc. 501 or concurrent enrollment. 025-505-0-0105

**025 550. Dairy Bacteriology.** (4) II. Offered 1979 and alt. years. 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 per week. Pr.: Biochem. 120 or equiv. 025-550-1-0105

**026 555. 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. 026-555-0-0106

### Undergraduate And Graduate Credit

**025 601. Milk Secretion.** (3) II. Offered 1979 and alt. years. Anatomy and histology of mammary gland. Physiology of lactation, milk constituents and management practices that alter qualitative and quantitative aspects. Contemporary milking practices and mastitis control. Two hours lec. and two hours lab. a week. Pr.: Junior standing or consent of instructor. 025-601-1-0105

**025 610. Dairy Cattle Nutrition.** (3) I. Application of principles of nutrition to feeding of dairy cattle; exercises in practical feeding problems; designing and balancing rations. Two hours lec. and two hours lab. a week. Pr.: Dy. and Pl. Sc. 200, or 102 and 103, or consent of instructor. 025-610-1-0105

**025 621. Dairy Cattle Management.** (3) II. Offered 1978 and alt. years. 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.: Dy. and Pl. Sc. 102 and 103 and junior standing. 025-621-1-0105



**026 630. Poultry Problems.** (1-3) I, II, S. Investigations of a practical nature which may be continued into the next semester if necessary. The area of study might include incubation, brooding, feeding, management, breeding, survey of literature, or closely related subjects. Pr.: Dy. and Pl. Sc. 102 and 104 or consent of instructor. 026-630-3-0106

**025 637. Dairy Cattle Breeding.** (3) II. Introduction and application of quantitative genetic principles to the improvement of economically important traits in dairy cattle with emphasis upon selection, variation, heritability estimates, breeding systems and estimates of breeding value of sires and dams through pedigree analysis. Three hours rec. and three hours lab. a week. Pr.: One semester each of elementary genetics and statistics or consent of instructor. 025-637-1-0105

**026 640. Management of Domesticated Poultry and Game Birds.** (3) II. Offered 1979 and alt. years. A detailed study of the production and management practices involved in commercial poultry and game bird enterprises. Two hours rec. and three hours lab. a week. Pr.: Dy. and Pl. Sci. 102 and 104, senior or graduate standing, or consent of instructor. 026-640-1-0106

**025 665. Dairy Production Problems.** (1-3) I, II, S. Pr.: Junior standing. 025-665-3-0105

**025 675. Dairy Food Science Problems.** (1-3) I, II, S. Pr.: Junior standing in dairy manufacturing. 025-675-3-0105

**025 690. Practical Quality Control of Dairy and 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. One hour rec. and five hours lab. a week. Pr.: One course in bacteriology. 025-690-1-0105

**025 694. Food Plant Management.** (2) II. 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—Food Science and Industry. Pr.: Junior standing or consent of instructor. 025-694-0-0105

**026 700. Poultry Products Technology.** (3) I. Offered 1979 and alt. years. Emphasis on the technological problems that exist between producer and consumer in the production and distribution of poultry and eggs. Poultry processing, tenderness, shelf-life and packaging. Egg grading, preservation, chemical changes, problems, and egg products. Two hours rec. and three hours lab. a week. Pr.: Dy. and Pl. Sc. 102, 104; Biochem. 200, or consent of instructor. 026-700-1-0106

**025 705. Reproduction in Farm Animals.** (4) I. Introduction to anatomical and physiological aspects of reproduction in farm animals. Laboratories provide orientation and participation in techniques and procedures in artificial breeding. Pr.: A.S.I. 102 or Dy. and Pl. Sc. 102 or equiv. and junior standing. 025-705-1-0105

**026 712. Nutrition of the Fowl.** (3) II. Designed for advanced students. The nutritive requirements of the fowl are considered together with metabolism of nutrients, digestion, and excretion. Poultry feeds, the compilation of rations, and feeding practices are discussed. Three hours rec. a week. Pr.: Dy. and Pl. Sc. 102 and 104. 026-712-1-0106

**025 715. 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.: Biochem. 521, 522. 025-715-0-0105

**026 720. Avian Metabolism.** (3) I. Offered 1978 and alt. years. Special emphasis on the physiological processes in reproduction, digestion, absorption, circulation, respiration, excretion and internal secretions. Three hours rec. a week. Pr.: Dy. and Pl. Sc. 102 and 104. 026-720-0-0106

**026 746. Quantitative Genetics and Poultry Improvement.** (3) II. Offered 1979 and alt. years. Major concepts, experimental verification and applications of quantitative genetics to improvement by breeding. Special emphasis on evaluation of genetic gains, genotypic-environmental interactions, selection plateaus, heterosis, selection for combining ability and special techniques in relation to poultry breeding. Pr.: One semester each of genetics and statistics. 026-746-0-0106

**026 750. Poultry Seminar.** (1) I. Required of all students majoring in poultry science. Also required of graduate students. One hour rec. or conference a week. Pr.: Dy. and Pl. Sc. 102 and 104. 026-750-0-0106

### Graduate Credit

**025 810. Graduate Seminar in Dairy Science.** (1) I, II. A study of current literature in the field of dairy science. One hour rec. a week. 025-810-0-0105

**025 820. Rumen Metabolism.** (3) II. 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 recitations a week. Pr.: Dy. and Pl. Sc. 200; Biochem. 521 or 655, or consent of instructor. 025-820-1-0105

**025 886. 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. Pr.: Third year Veterinary Medicine or A.S.I. 005 700. 025-886-0-0105

**026 899. Research in Poultry Science.** (Var.) I, II, S. Investigations which may form the basis of a master's thesis. Conferences by appointment. Pr.: Consent of instructor. 026-899-4-0106

**025 899. Research in Dairy Science.** (Var.) I, II, S. Special investigation of dairy production or dairy foods processing which may be used as a basis for a master's thesis. Pr.: Consent of instructor. 025-899-4-0105

**025 905. Lipids in Food Systems.** (2) S. Offered 1979 and alt. years. Processing, analysis and physical and chemical characteristics of lipids with emphasis on their behavior and function in food systems. One hour rec. and three hours lab. a week. Pr.: Biochem. 521 and F&N 601 or Dy. and Pl. Sc. 715. 025-905-0-0105

**025 999. Research in Dairy Science.** (Var.) I, II, S. Special investigation of dairy production or dairy foods processing which may be used as a basis for a dissertation. Pr.: Consent of instructor. 025-999-4-0105

**026 999. Research in Poultry Science.** (Var.) I, II, S. Investigations which may form the basis of a doctor's thesis. Conferences by appointment. Pr.: Consent of instructor. 026-999-4-0106

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## ENTOMOLOGY

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B.S. in Agriculture under the Crop Protection curriculum (see page 58) which includes the entomology science option.

*Richard J. Sauer,\* Head of Department*

Professors Blocker,\* Elzinga,\* Gates, Harvey,\* Hopkins,\* Horber,\* Mills,\* Pitts\* and Sauer;\* Associate Professors Brooks, Hatchett,\* Thompson,\* and Wilde;\* Assistant Professors Boles,\* DePew, Eshbaugh, Kadoun,\* McGaughey,\* Mock,\* Poston,\* and Ramoska.\* Emeritus: Professors Wilbur\* and Smith.\*

Entomology is the study of insects and their near relatives. Applied entomology stresses their relations to plants and animals, including man. Courses



fall into two groups: (1) broad, general courses suitable for any student and (2) professional courses which provide training for research, teaching and administration in colleges, experiment stations, health services and agencies of the state and federal governments, industry, foundations and private practice.

Students majoring in other fields may have a special interest in entomology. Courses 300 or 312 and 313 and at least five additional entomology credits such as 305, 325 and 326 are recommended.

### Undergraduate Study

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 (page 58).

Students particularly interested in insects as a subject of special study, including insects in relation to plants, man 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 (page 58), the following:

#### Entomology Courses

030 312	General Entomology	2
030 313	General Entomology Lab.	1
030 660	External Insect Morphology	3
030 710	Insect Taxonomy	3
030 666	Insect Pest Management	3

#### Other Agriculture and Biology Courses

005 500	Genetics	3
215 198	Principles of Biology	4
215 201	Organismic Biology	5
215 555	Microbiology	4
215 530	Ecology	3
	Approved Electives	20

#### Physical Sciences and Mathematics

245 150	Plane Trigonometry	3
285 340	Biometrics I	3

#### One of the following:

221 190	Elementary Organic Chem. and	3
221 191	Elementary Organic Chem. Lab.	2
	OR	
221 531	Organic Chemistry I and	3
221 532	Organic Chemistry Lab.	2
	OR	
221 350	General Organic Chem. and	3
221 351	General Organic Chem. Lab.	2

#### One of the following:

211 510	General Plant Biochemistry	4
	OR	
211 521	General Biochemistry and	3
211 522	General Biochemistry Lab.	2
	OR	
211 201	Elementary Biochemistry and	3
211 202	Elementary Biochemistry Lab.	2

#### One of the following:

245 220	Analytical Geom. and Calc. I	4
	OR	
286 200	Fundamentals of Computer Programming and	2
286 201	FORTTRAN Language Laboratory	1

#### One of the following:

265 113	General Physics I and	4
265 114	General Physics II	4
	OR	
265 115	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, sound recording room, 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; host plant resistance to insects; taxonomy; toxicology; physiology; biochemistry; for biology, ecology and control of insects attacking man, animals, and stored products; and 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 and ornamental plants, fruits and 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

**030 300. Economic Entomology.** (3) I, 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. 030-300-1-0421

**030 305. Livestock Entomology.** (2) I, II. 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. 030-305-0-0421

**030 312. 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. 030-312-0-0421

**030 313. General Entomology Laboratory.** (1) I, II. Identification, food preferences, and habitat preferences of the common insects. Two hours a week. 030-313-0-0421

**030 325. Insects of Home, Lawn and Garden.** (2) I, II. An introduction to Entomology with special reference to insects and other pests of home, lawn and garden. Various methods of control, including non-chemical methods of keeping pest problems to a minimum. Primarily intended for students in horticulture and non-agriculture majors. Two hours lecture-demonstration a week. 030-325-0-0421

**030 326. Insects of Home, Lawn and Garden Laboratory.** (1) I, II. Laboratory exercises for recognition and control of many horticultural and household pests both for the home owner and advisers of home owners. Pr.: 030 325 or concurrent enrollment. Two hours lab. a week. 030-326-1-0421

### Undergraduate And Graduate Credit

**030 611. Insect Pest Diagnosis.** (1) I. Diagnosis of harmful insects and their damage, and of beneficial insects, which occur in the field, lawn and garden. Two hours combined lec. and lab. a week. Pr.: 030 312 and 030 313 or 030 300, concurrent enrollment with 050 810 required. 030-611-1-0421



**030 645. Federal and State Regulation of Pesticides.** (1) II. Laws regulating the use and development of pesticides, quarantines, and other legal aspects as they pertain to crop protection. One hour lec. a week. Pr.: Junior standing or consent of instructor. 030-645-0-0421

**030 655. Integrated Pest Management.** (3) II. Offered in cooperation with Agronomy and Plant Pathology. See course description, 050 655. 030-655-1-0421

**030 660. External Insect Morphology.** (3) I. 1978-79 and alt. years or on 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. 030-660-1-0421

**030 666. Insect Pest Management.** (3) I. Insecticides, types and methods of application, biological control, its usefulness and limitations, cultural control. Two hours lec. and three hours lab. a week. Pr.: Entom. 300 or 312 and 313. 030-666-1-0421

**030 705. Insects of Stored Products.** (3) II. Biology, ecology and behavior of stored-product insects and current practices involved in their control. Pr.: Entom. 300, or 312 and 313, or consent of instructor. Two hours lec. and three hours lab. a week. 030-705-1-0421

**030 710. 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. 030-710-1-0421

**030 721. Medical Entomology.** (2) I. Insects and other arthropods as parasites and disseminators of disease; life cycles, biology, and control of insect parasites of man and animals. Pr.: Entom. 300 or 312 and 313. 030-721-0-0421

**030 722. Medical Entomology Lab.** (1) I. Identification of arthropod pests and vectors, and current diagnostics in medical entomology. Pr.: Entom. 300 or 312 and 313. 030-722-1-0421

**030 730. Topics in General and Systematic Entomology.** (Var.) I, II. Offered 1977-78 and alt. years. Principles of taxonomy; advanced taxonomy; taxonomy of immature insects; arachnology; and biological literature. Pr.: Entom. 300 or 312 and 313 and consent of instructor. 030-730-1-0421

**030 740. Entomological Methods.** (1-3) Offered on demand. Methods, materials, and techniques used in entomological research. Pr.: Entom. 300 or 312 and 313 or equiv. 030-740-1-0421

**030 745. Insect Control by Host Plant Resistance.** (2) I. Offered 1978-79 and alt. 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. 030-745-0-0421

**030 757. Toxicology and Properties of Insecticides.** (3) I. Physical, chemical and biological properties of insecticides; demonstrations in the laboratory of symptoms and antidote actions in mammals; formulations and residue analysis. Two hours lec. and two hours lab. a week. Pr.: 221 350, General Organic Chemistry, or consent of instructor. 030-757-1-0421

**030 765. Internal Insect Morphology.** (3) II. Offered 1978-79 and alt. years. Internal anatomy of representative insects; plan and structure of internal systems. One hour lec. and six hours lab. a week. Pr.: Entom. 660. 030-765-1-0421

**030 775. Insect Physiology.** (3) I. Offered 1977-78 and alt. years. Processes of growth, maturation and reproduction; sensory perception, nervous and hormonal control systems, locomotion, biorhythms and diapause; nutritional requirements, digestion, circulation, respiration, water regulation and excretion. Two hours lec. and three hours lab a week. Pr.: Entom. 765 or consent of instructor. 030-775-1-0421

**030 780. Insects Attacking Field Crops, Grasslands and Livestock.** (3) II. Offered 1977-78 and alt. years. Includes representative insect pests of corn, sorghum, soybeans, alfalfa, wheat, grasslands, livestock, and stored grain. Pr.: Entom. 300 or 312 and 313. 030-780-1-0421

**030 782. Insects Attacking Horticulture Crops and Forests.** (3) I. Offered 1978-79 and alt. years. Includes representative insect pests of fruits, vegetables, turf, ornamental plants, forest and shade trees. Two hours lec. and three hours lab. a week. Pr.: Entom. 300 or 312 and 313, Entom. 666 desirable. 030-782-1-0421

**030 785. Insect Pathology.** (3) I. Offered 1977-78 and alt. years. A study of infectious and non-infectious diseases of insects. Emphasis on identification and diagnosis of major insect diseases. Commercial status of various pathogens and federal regulations concerning insect pathogenic microorganisms are discussed. Pr.: Biol. 555 and Entom. 312 and 313. Two hours lec. and two hours lab. a week. 030-785-1-0421

**030 795. Entomology Seminar.** (1) I, II, S. Pr.: Consult seminar committee. Required of all Ph.D. entomology graduate students once yearly. 030-795-0-0421

**030 799. Problems in Entomology.** (Var.) I, II, S. For non-thesis or non-dissertation studies. Work in various fields of entomology. Pr.: Consent of instructor. 030-799-3-0421

**030 810. Insect Ecology and Population Management.** (3) II. Offered 1978-79 and alt. years. Insect populations in natural ecosystems and agroecosystems; bioclimatic factors affecting population size and distribution; concepts of natural regulation and balance; population analysis and bioeconomics; concepts of population management. Two hours lec. and three hours lab. a week. Pr.: Stat. 703, 704 and 705. 030-810-1-0421

### Graduate Credit

**030 898. Report in Entomology (M.S.).** (Var.) I, II, S. Work in various fields of entomology. Pr.: Consent of instructor. 030-898-4-0421

**030 899. Research in Entomology (M.S.).** (Var.) I, II, S. For students majoring in entomology. Pr.: Knowledge in special area and consent of instructor. 030-899-4-0421

**030 930. Topics in Environmental and Physiological Entomology.** (Var.) II. Selected topics for advanced study in insect behavior, ecology, physiology and pesticides in the environment. Pr.: Consent of instructor. 030-930-3-0421

**030 999. Research in Entomology.** (Var.) I, II, S. Dissertation credit for students majoring in entomology. Pr.: Knowledge in special area and consent of instructor. 030-999-4-0421



## FOOD SCIENCE AND INDUSTRY

**B.S. in Food Science and Industry**, requires 127 sem. hrs.

Advisers: Greig, Horticulture and Forestry; Kropf, Animal Science and Industry; Seib, Grain Science and Industry; Cunningham, Dairy and Poultry Science.

This curriculum leads toward careers in the food industry. In addition to the general education provided, the student gains attitudes, knowledge and skills essential for an understanding of the principles of food science. It 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 each student to tailor his or her education to fit personal career goals.

Employment opportunities include production management, product and process research and development, public health and regulatory agency service, teaching, merchandising, advertising, technical service and sales, quality control supervision and positions in international food agencies.

Students will select one of three options: processing, business, or science. This is an interdepartmental curriculum involving the Departments of Animal Science and Industry, Dairy and Poultry Science, Grain Science and Industry, and Horticulture and Forestry. The science option involves the Department of Foods and Nutrition in the College of Home Economics and the Departments of Animal Science and Industry, Dairy and Poultry Science, Grain Science and Industry, and Horticulture and Forestry in the College of Agriculture. Students may enroll in either college for the science option of this curriculum, depending upon their interest. See College of Home Economics, page 269.

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 Dean of Agriculture or the Dean of Home Economics for assignment of an adviser.

### Core Curriculum—Processing and Business Options

#### Freshman (20-21 hrs.)

229 100	English Composition I	3
229 120	English Composition II	3
281 105	Oral Communication I	2
or 106	Oral Communication 1A	3
035 101	Ag. Orientation	1
245 100	College Algebra	3
225 110	Economics I	3
221 210*	Chemistry I	4
261 101	Concepts in Physical Education	1

#### Agriculture (12-14 hrs.)

035 301	Intro. Food Science & Technology	3
005 200 or		
025 200	Fundamentals of Nutrition	3
Plus any 2 of the following:		
015 200	Plant Science	4
005 102 or		
025 102	Principles of Animal Science	3
	AND	
005 103	Animal Science & Industry	1
	OR	
025 103	Dairy Science	1
	OR	
026 104	Poultry Science	1
030 300	Economic Entomology	3
045 100	Principles of Milling	3
010 100	Principles of Agric. Economics	3

#### Food Science (16-17 hrs.)

025 550	Dairy Bacteriology	4
	OR	
215 555	Microbiology	4
045 651	Food and Feed Plant Sanitation	4
	OR	
025 690	Practical Quality Control of Dairy & Food Products	3
010 514	Economics of Food Marketing	3
025 311	Introductory Food Chemistry	3
005 305	Fundamentals of Food Processing	3
(Course also numbered 025 305 and 045 305.)		

#### Biological Sciences (8-9 hrs.)

215 198	Principles of Biology	4
Plus one of the following:		
215 201	Organismic Biology	5
740 530	Anatomy & Physiology	4

#### Physical Sciences\*\* (13-16 hrs.)

221 230	Chemistry II	4
(Not required if 221 271 Chemical Analysis is taken)		
211 120	Introductory Organic and Biological Chemistry	5
	OR	
221	Organic Chemistry elec.	3
	AND	
211 201	Elementary Biochemistry	5
	OR	
211 521	General Biochemistry	3
211 522	General Biochemistry Lab.	2
Note: 211 521 and 211 522 may be substituted for Elementary Biochemistry.		
265 113	General Physics I	4
	OR	
265 115	Descriptive Physics	4

#### Mathematics (6-7 hrs.)

Any two courses from the following:		
245 150	Plane Trigonometry	3
245 220	Analytic Geom. & Calc. I	4
	OR	
245 500	Intro. to Anal. Proc.	3
286 200	Fundamentals of Computer Prog.	3
285 320	Elements of Statistics	3
	OR	
285 340	Biometrics I	3
	OR	
285 703	Statistical Methods for Natural Scientists	3

#### Social Sciences/Humanities (9 hrs.)

#### Communications (2-3 hrs.)

From College of Agriculture list of suggested Communications courses.

#### TOTAL CORE CURRICULUM: 86-96 hours

	MINIMUM	
	Processing	Business
Core courses	86	83
Options	24	27
Electives	17	17
	127	127

\*221 110 General Chemistry (5) must be taken by those electing the business option plus 9 hours minimum from the physical sciences.

\*\*9 credits minimum for business option.



## 1. Processing Option

A minimum of 18 hours from the following courses plus 6\* hours in other options.

005 250	Elements of Meats . . . . .	2
	AND	
005 261	Meat Processing . . . . .	2
005 720	Meat-Packing Plant Operations . . . . .	2-6
025 401	Fundamentals of Milk Processing . . . . .	3
005 777	Meat Technology . . . . .	4
025 501	Principles of Dairy Foods Processing . . . . .	3
025 505	Principles of Dairy Foods Proc. Lab. . . . .	1-3
026 700	Poultry Products Technology . . . . .	3
040 792	Handling and Processing Fruits and Vegetables . . . . .	3
045 120	Introductory Bakery Technology . . . . .	2
045 635	Baking Science I . . . . .	2
045 636	Baking Science I Lab. . . . .	2
045 637	Baking Science II . . . . .	2
045 638	Baking Science II Lab. . . . .	1
045 715	Fund. of Processing Grains for Food . . . . .	3
215 520	Microbiology of Foods . . . . .	4
506 555	Dairy Mechanics . . . . .	3
640 601	Food Science . . . . .	4
640 612	Principles of Food Product Development and Control . . . . .	3

## 2. Business Option

A minimum of 18 hours from the following courses which must include 305 260 and 305 270, plus 9 hours from processing option.

010 518	Econ Principles of Business Firms . . . . .	3
010 520	Grain Marketing . . . . .	3
010 521	Livestock and Meat Marketing . . . . .	3
225 120	Economics II . . . . .	3
305 260	Fundamentals of Accounting . . . . .	4
305 270	Managerial and Cost Controls . . . . .	3
305 271	Cost Accounting . . . . .	3
305 292	Business Law I . . . . .	3
305 392	Business Law II . . . . .	3
305 420	Management Concepts . . . . .	3
305 421	Production Management . . . . .	3
305 440	Marketing . . . . .	3
305 450	Business Finance . . . . .	3
305 531	Personnel and Wage Administration . . . . .	3
305 530	Labor Legislation . . . . .	3
305 540	Consumer Behavior . . . . .	3
305 541	Retailing . . . . .	3
305 542	Sales Management . . . . .	3

## 3. Science Option—Joint Program of Colleges of Agriculture and Home Economics

### Liberal-General (23 hours)

229 100	English Composition I . . . . .	3
229 120	English Composition II . . . . .	3
281 105	Oral Communication I . . . . .	2
245 100	College Algebra . . . . .	3
225 110	Economics I . . . . .	3
	Electives in Social Science or Humanities . . . . .	9

### Biological Science (8 hours)

215 198	Principles of Biology . . . . .	4
215 555	Microbiology . . . . .	4

### Agriculture or Home Economics Core (Choose either A or B.)

A. Agriculture (4-7 hours)		
035 101	Ag Orientation . . . . .	1

### Plus any of the following

015 200	Plant Science . . . . .	4
005 102	Principles of Animal Science . . . . .	3
	AND	
005 103	Animal Science & Industry . . . . .	1
	OR	
025 103	Dairy Science . . . . .	1
	OR	
026 104	Poultry Science . . . . .	1
045 100	Principles of Milling . . . . .	3

### B. Home Economics (5-7 hours) See pg. 269.

### Physical Sciences (37 hours)

221 210	Chemistry I . . . . .	4
221 230	Chemistry II . . . . .	4
221 271	Chemical Analysis . . . . .	4
221 350	Gen. Org. Chemistry . . . . .	3
221 351	Gen. Org. Chemistry Lab. . . . .	2
211 521	Gen. Biochemistry . . . . .	3
211 522	Gen. Biochemistry Lab. . . . .	2
265 113	Gen. Physics I . . . . .	4
265 114	Gen. Physics II . . . . .	4
245 150	Plane Trig. . . . .	3
245 220	Anal. Geom. & Calc. I . . . . .	4

### Professional Courses (23-24 hrs.)

035 301	Intro. Food Science & Technology . . . . .	3
640 602	Principles of Nutrition . . . . .	3
215 520	Microbiology of Foods . . . . .	4
640 601	Food Science . . . . .	4
025 311	Introductory Food Chemistry . . . . .	3
005 305	Fundamentals of Food Processing . . . . .	3
	(Course also numbered 025 305 & 045 305.)	
045 651	Food and Feed Plant Sanitation . . . . .	4
	OR	
025 690	Practical Quality Control of Dairy & Food Products . . . . .	3

### Professional Elective: Total 14-17 hrs. including (5-8 hrs.) of the following

005 250	Elements of Meats . . . . .	2
	AND	
005 261	Meat Processing . . . . .	2
005 777	Meat Technology . . . . .	4
005 720	Meat-Packing Plant Operation . . . . .	2-6
025 401	Fund. of Milk Proc. . . . .	3
045 715	Fund. of Processing Grains for Food . . . . .	3
025 501	Principles of Dairy Foods Processing . . . . .	3
025 505	Principles of Dairy Foods Processing Lab. . . . .	1-3
026 700	Poultry Products Technology . . . . .	3
040 792	Handling and Processing Fruits and Vegetables . . . . .	3
045 120	Intro. Bakery Technology . . . . .	2
045 635	Baking Science I . . . . .	2
045 636	Baking Science I Lab . . . . .	2

### Plus minimum 9 hours of the following

010 514	Economics of Food Marketing . . . . .	3
025 550	Dairy Bacteriology . . . . .	4
025 715	Chemistry of Foods . . . . .	3
045 300	Cereal and Feed Analysis . . . . .	3
045 602	Cereal Science . . . . .	3
045 661	Qualities of Feed & Food Ingredients . . . . .	3
045 700	Adv. Cereal Chem. . . . .	3
045 711	Prin. of Food Analysis . . . . .	3
215 201	Organismic Biol. . . . .	5
215 525	Human Physiology . . . . .	4
285 340	Biometrics I . . . . .	3
286 200	Fund. of Computer Programming . . . . .	3
506 555	Dairy Mechanics . . . . .	3
640 301	Trends in Food Products . . . . .	3
640 760	Fund. of Food Flavor Analysis . . . . .	3
640 710	Nutr. Needs Throughout Life Cycle . . . . .	3
640 790	Food Res. Techniques . . . . .	3
740 530	Anat. & Physiology . . . . .	4

### Unrestricted Electives (10-17 hrs.)

### Summary of Course Areas & Hours

Liberal-General . . . . .	23
Biological Sci. . . . .	8
Agriculture or Home Economics Core . . . . .	4-7
Physical Sciences . . . . .	37
Prof. courses . . . . .	23-24
Prof. electives . . . . .	14-17
Unrestricted electives . . . . .	11-18
	127

\*Could include 025 694 Food Plant Management (2).



## GENERAL AGRICULTURE

*Carroll V. Hess, \* Dean, College of Agriculture*  
*Frank R. Carpenter, \* Assistant Dean*  
*David J. Mugler, \* Assistant Dean*

### Undergraduate Credit

**035 101. 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. 035-101-0-0101

**035 290. Honors Program Orientation.** (1) I. Open to new students (freshmen and transfer students) who are likely candidates for admission to the Honors Program in Agriculture. Special meetings and seminars will be held to acquaint students with the objectives and functioning of the Honors Program in Agriculture. Optional for qualified students upon invitation by the Dean. 035-290-0-0101

**035 298. Honors Colloquium in Agriculture.** (1) I, II. Open to freshmen and sophomores in the Honors Program for the College of Agriculture. Discussions and lectures on topics of interest to agriculture students. Seminar attendance may be included. 035-298-2-0101

**035 301. Introductory Food Science and Technology.** (3) I, II, S. Introduce and survey relationships of food raw materials and their methods of handling, manufacturing, distribution and consumption. 035-301-0-0101

**035 398. Honors Colloquium in Agriculture.** (1) I, II. Open to juniors and seniors in the Honors Program for the College of Agriculture. Special seminars and visitations are arranged. Students are encouraged to enroll in research problems in their areas of interest. 035-398-2-0101

**035 410. Agricultural Student Magazine.** (1-3) I, II. Planning, interviewing, preparing stories, headlines, layouts, and editing, for the Kansas State Agriculturist published by students in the College of Agriculture. Pr.: 289 250 or 289 275. 035-410-3-0101

### Undergraduate And Graduate Credit

**035 505. 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 Midwestern-Great Plains agriculture relative to climate, crops, soils, livestock practices, marketing, and cultural attitudes toward agriculture. Pr.: Consent of instructor. 035-505-0-0101

**035 510. Internship In Farm Broadcasting.** (3) S. 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. 035-510-0-0101

**035 605. 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. 035-605-0-0101

**035 610. Problems In Agricultural Publications.** (1-3) II. Writing for trade and popular agricultural publications in area of individual student's competence, with emphasis on content of stories and principles involved in reader's understanding and accepting content expressed. Junior standing. 035-610-3-0101

**035 752. 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. 035-752-0-0101

**035 770. 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.: Journ. 285 or R-TV 330 and consent of supervising instructor. 035-770-3-0101

### Graduate Credit

**035 988. 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 equivalent. 035-988-0-0101

## GRAIN SCIENCE AND INDUSTRY

*Charles Deyoe, \* Acting Head of Department*

Professors Deyoe, \* Farrell, \* Finney, \* Hoover, \* Hosene, \* Johnson, \* Pfo, \* Ponte, Schoeff, \* Tsen, \* Ward, \* and Wilcox; Associate Professors Eustace, Marston, \* Robinson, \* Seib, \* and Wetzel; \* Assistant Professors Balding \* and Bates; \* Instructor Pedersen. Emeritus: Professors MacMasters and Shellenberger; Assistant Professor Miller.

### Undergraduate Study

The Department of Grain Science and Industry offers three curriculums. One leads to a Bachelor of Science degree in Bakery Science and Management; another to a Bachelor of Science degree in Feed Science and Management; and the third to a Bachelor of Science degree in Milling Science and Management. In each curriculum an option can be selected in administration, chemistry or operations. This department also participates in the Food Science & Industry curriculum, see page 64.

## BAKERY SCIENCE AND MANAGEMENT

B.S. in Bakery Science and Management; requires 127 hours.

### FRESHMAN

Fall Semester		Course	Sem. Hrs.
Gen. Ag.	035 101	Ag. Orientation . . . . .	1
Grain Science	045 100	Principles of Milling . . . . .	3
Chemistry	221 210	Chemistry I . . . . .	4
English	229 100	English Comp. I . . . . .	3
Mathematics	245 100	College Algebra . . . . .	3
Phys. Ed.	261 101	Concepts in Phys. Ed. . . . .	1
			15

### Spring Semester

Chemistry	221 230	Chemistry II . . . . .	4
Economics	225 110	Economics I . . . . .	3
English	229 120	English Comp. II . . . . .	3
Mathematics	245 150	Plane Trig. . . . .	3
Speech	281 105	Oral Communication I . . . . .	2
Mech. Engg.	560 212	Graphical Comm. I . . . . .	2
			17

### SOPHOMORE

#### Fall Semester

Grain Science	045 120	Intro. Bakery Technology . . . . .	2
Biology	215 198	Principles of Biology . . . . .	4
		Option A, B or C . . . . .	10
			16

#### Spring Semester

Biology	215 555	Microbiology . . . . .	4
		Hum. or Soc. Sci. Elec. . . . .	6
		Option A, B or C . . . . .	6
			16



**JUNIOR****Fall Semester**

Grain Science	045 635	Baking Science I	2
Grain Science	045 636	Baking Science I Lab	2
Biology	215 520	Microbiology of Foods	4
		Option A, B or C	8
			16

**Spring Semester**

Grain Science	045 637	Baking Science II	2
Grain Science	045 638	Baking Science II Lab	1
Grain Science	045 602	Cereal Science	3
		Option A, B or C	9
			15

**SENIOR****Fall Semester**

Hum. or Soc. Sci. Elec.	3
Option A, B or C	13
	16

**Spring Semester**

Grain Science	045 634	Bakery Technology	3
Grain Science	045 651	Food and Feed Plant Sanit.	4
		Option A, B or C	9
			16

**1. Administration Option (A)**

Grain Science	045 300	Cereal and Feed Analysis	3
Biochemistry	211 120	Intro. Org. & Biol. Chem	5
Economics	225 120	Economics II	3
Com. Science	286 200	Fund. Computer Prog	3
Physics	265 113	General Physics I	4
Statistics	285 320	Elements of Statistics	3
Mathematics	245 500	Intro. Analytic Processes	3
Bus. Ad.	305 260	Fund. of Accounting	4
Bus. Ad.	305 292	Business Law I	3
Bus. Ad.	305 440	Marketing	3
Bus. Ad.	305 450	Business Finance	3
		Electives	9

And nine (9) hours from the following

Economics	225 530	Money and Banking	3
Bus. Ad.	305 270	Managerial and Cost Cont	3
Bus. Ad.	305 271	Cost Accounting	3
Bus. Ad.	305 420	Management Concepts	3
Bus. Ad.	305 461	Taxation I	3
Bus. Ad.	305 531	Personnel and Wage Admin	3
Bus. Ad.	305 530	Labor Legislation	3
Bus. Ad.	305 540	Consumer Behavior	3
Bus. Ad.	305 542	Sales Management	3
Bus. Ad.	305 551	Investment	3
Industrial Engg.	550 501	Industrial Management	3

**2. Chemistry Option (B)**

Grain Science	045 300	Cereal and Feed Analysis	3
Grain Science	045 625	Flour and Dough Testing	3
Biochemistry	211 521	General Biochemistry	3
Biochemistry	211 522	General Biochemistry Lab	2
Chemistry	221 271	Chemical Analysis	4
Chemistry	221 531	Organic Chemistry I	3
Chemistry	221 532	Organic Chemistry I Lab	2
Chemistry	221 550	Organic Chemistry II	3
Chemistry	221 551	Organic Chemistry II Lab	2
Chemistry	221 500	Desc. Physical Chemistry	3
Mathematics	245 220	Anal. Geom. & Calc. I	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Physics	265 213	Engg. Physics I	5
Physics	265 214	Engg. Physics II	5
		Electives	9

**3. Operations Option (C)**

Biochemistry	211 120	Intro. Org. & Biol. Chemistry	5
Mathematics	245 220	Anal. Geom. & Calc. I	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Mathematics	245 222	Anal. Geom. & Calc. III	4
Physics	265 213	Engg. Physics I	5
Physics	265 214	Engg. Physics II	5
Civil Engg.	525 333	Statics	3
Civil Engg.	525 331	Strength of Matls. A	3
Elect. Engg.	530 519	Elec. Cir. Control	4
Industrial Engg.	550 501	Industrial Management	3
Mechanical Engg.	560 217	Graphical Communications II	3
Mechanical Engg.	560 513	Thermodynamics I	3
		Electives	9

**FEED SCIENCE AND MANAGEMENT**

B.S. in Feed Science and Management; requires 127 hours

**FRESHMAN****Fall Semester**

Course	Sem. Hrs.
Gen. Agr	035 101
Grain Science	045 100
Chemistry	221 210
English	229 100
Mathematics	245 100
Phys. Ed.	261 101
Ag Orientation	1
Principles of Milling	3
Chemistry I	4
English Composition I	3
College Algebra	3
Concepts in Phys. Ed	1
	15

**Spring Semester**

Chemistry	221 230	Chemistry II	4
English	229 120	English Comp. II	3
Mathematics	245 150	Plane Trig	3
Speech	281 105	Oral Communication I	2
Mech. Engg.	560 212	Graphical Communications	2
		Option A, B, or C	3
			17

**SOPHOMORE****Fall Semester**

Grain Science	045 110	Flow Sheets	2
Biology	215 198	Principles of Biology	4
Economics	225 110	Economics I	3
		Option A, B, or C	7
			16

**Spring Semester**

Dairy Science	025 200	Fundamentals of Nutrition	3
		Hum. or Soc. Sci. Elec.	6
		Option A, B, or C	7
			16

**JUNIOR****Fall Semester**

Grain Science	045 510	Feed Technology I	4
		Hum. or Soc. Sci. Elec	3
		Option A, B, or C	9
			16

**Spring Semester**

Grain Science	045 661	Qualities of Feed and Food Ingredients	3
		Option A, B, or C	12
			15

**SENIOR****Fall Semester**

Option A, B, or C	16
	16

**Spring Semester**

Grain Science	045 651	Food and Feed Plant Sanit	4
		Option A, B, or C	12
			16

**1. Administration Option (A)**

Ag Econ	010 520	Grain Marketing	3
Grain Science	045 300	Cereal and Feed Analysis	3
Grain Science	045 680	Feed Tech. II	4
Biochemistry	211 120	Intro. Org. & Bio. Chem	5
Economics	225 120	Economics II	3
Mathematics	245 500	Intro. Analytic Processes	3
Physics	265 113	General Physics I	4
Physics	265 114	General Physics II	4
Statistics	285 320	Elements of Statistics	3
Computer Science	286 200	Fundamentals of Computer Programming	3
Bus. Ad.	305 260	Fundamentals of Accounting	4
Bus. Ad.	305 292	Business Law I	3
Bus. Ad.	305 450	Business Finance	3
		Electives	9



And twelve (12) hours from the following:

Bus. Ad.	305 270	Managerial and Cost Controls	3
Bus. Ad.	305 271	Cost Accounting	3
Bus. Ad.	305 420	Management Concepts	3
Bus. Ad.	305 461	Taxation I	3
Bus. Ad.	305 531	Personnel and Wage Admin.	3
Bus. Ad.	305 530	Labor Legislation	3
Bus. Ad.	305 540	Consumer Behavior	3
Bus. Ad.	305 542	Sales Management	3
Bus. Ad.	305 551	Investment	3
Industrial Engg	550 501	Industrial Management	3
Economics	225 530	Money and Banking	3

## 2. Chemistry Option (B)

Grain Science	045 300	Cereal and Feed Analysis	3
Biochemistry	211 521	General Biochemistry	3
Biochemistry	211 522	General Biochemistry Lab.	2
Biology	215 201	Organismic Biology	5
Chemistry	221 271	Chemical Analysis	4
Chemistry	221 500	Desc. Phys. Chem.	3
Chemistry	221 531	Organic Chemistry I	3
Chemistry	221 532	Organic Chemistry I Lab.	2
Chemistry	221 550	Organic Chemistry II	3
Chemistry	221 551	Organic Chemistry II Lab.	2
Mathematics	245 220	Anal. Geom. & Calc. I	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Mathematics	245 222	Anal. Geom. & Calc. III	4
Physics	265 213	Engg. Physics I	5
Physics	265 214	Engg. Physics II	5
Statistics	285 703	Statistical Methods for Natural Scientists	3
		Electives	9

## 3. Operations Option (C)

Grain Science	045 640	Advanced Flow Sheets	2
Grain Science	045 680	Feed Technology II	4
Grain Science	045 685	Ad. Flour & Feed Technology	3
Grain Science	045 655	Flour & Feed Mill Construction	3
Biochemistry	211 120	Intro. Org. & Biol. Chemistry	5
Computer Science	286 200	Fund. of Computer Programming	3
Mathematics	245 220	Anal. Geom. & Calc. I	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Mathematics	245 222	Anal. Geom. & Calc. III	4
Mathematics	245 240	Ser. & Diff. Equa.	4
Physics	265 213	Engg. Physics I	5
Physics	265 214	Engg. Physics II	5
Civil Engg.	525 331	Strength of Mats. A	3
Civil Engg.	525 333	Statics	3
Elect Engg.	530 519	Elec. Cir. Control	4
Statistics	285 320	Elements of Statistics	3
		Electives	4

## MILLING SCIENCE AND MANAGEMENT

B.S. in Milling Science and Management; requires 127 hours

### FRESHMAN

Fall Semester			Course	Sem. Hrs.
General Ag.	035	101	Ag Orientation	1
Grain Science	045	100	Principles of Milling	3
Chemistry	221	210	Chemistry I	4
English	229	100	English Composition I	3
Mathematics	245	100	College Algebra	3
Phys. Ed.	261	101	Concepts in Phys. Ed	1
				<hr/> 15

Spring Semester				
Chemistry	221	230	Chemistry II . . . . .	4
English	229	120	English Composition II . . . . .	3
Mathematics	245	150	Plane Trig. . . . .	3
Speech	281	105	Oral Comm. I . . . . .	2
Mech Engg.	560	212	Graphical Comm. I . . . . .	2
			Option A, B, or C . . . . .	3
				17

### SOPHOMORE

Fall Semester			
Grain Science	045 110	Flow Sheets	2
Biology	215 198	Principles of Biology	4
Economics	225 110	Economics I	3
		Option A, B, or C	7
			<hr/> 16

<b>Spring Semester</b>			
Biology	215 555	Microbiology . . . . .	4
		Hum. or Soc. Sci. Elec. . . . .	6
		Option A, B, or C . . . . .	6
			<hr/> 16

### JUNIOR

Fall Semester				
Grain Science	045	500	Milling Tech. I . . . . .	4
Agronomy	015	340	Market Grading Cereals . . . . .	2
			Hum. or Soc. Sci. Elec. . . . .	3
			Option A, B, or C . . . . .	7
				<hr/> 16

<b>Spring Semester</b>			
Grain Science	045 602	Cereal Science . . . . .	3
		Option A, B, or C . . . . .	12
			<hr/> 15

### SENIOR

Fall Semester			
Grain Science	045 635	Baking Science I . . . . .	2
Grain Science	045 636	Baking Science I Lab. . . . .	2
		Option A, B, or C . . . . .	12
			<hr/> 16

Spring Semester			
Grain Science	045 651	Food and Feed Plant	
		Sanitation . . . . .	4
		Option A, B, or C . . . . .	12
			<hr/> 16

## 1. Administration Option (A)

Ag. Economics	010 520	Grain Marketing	3
Grain Science	045 300	Cereal and Feed Analysis	3
Biochemistry	211 120	Intro. Org. & Biol. Chemistry	5
Economics	225 120	Economics II	3
Mathematics	245 500	Intro. Anal. Proc.	3
Computer Science	286 200	Fund. Computer Program.	3
Physics	265 113	General Physics I	4
Physics	265 114	General Physics II	4
Statistics	285 320	Elements of Statistics	3
Bus. Ad.	305 260	Fund. of Accounting	4
Bus. Ad.	305 292	Business Law I	3
Bus. Ad.	305 450	Business Finance	3
		Electives	6

And nine (9) hours from the following:

Bus. Ad.	305 270	Managerial and Cost Controls	3
Bus. Ad.	305 271	Cost Accounting	3
Bus. Ad.	305 420	Management Concepts	3
Bus. Ad.	305 461	Taxation I	3
Bus. Ad.	305 530	Labor Legislation	3
Bus. Ad.	305 540	Consumer Behavior	3
Bus. Ad.	305 542	Sales Management	3
Bus. Ad.	305 551	Investment	3
Bus. Ad.	305 531	Personnel and Wage Admin.	3
Industrial Engg.	550 501	Industrial Management	3
Economics	225 530	Money and Banking	3

## 2. Chemistry Option (B)

Grain Science	045 300	Cereal and Feed Analysis	3
Grain Science	045 625	Flour and Dough Testing	3
Biochemistry	211 521	General Biochemistry	3
Biochemistry	211 522	General Biochem. Lab.	2
Chemistry	221 271	Chemical Analysis	4
Chemistry	221 500	Desc. Phys. Chemistry	3
Chemistry	221 531	Organic Chemistry I	3
Chemistry	221 532	Organic Chemistry I Lab.	2
Chemistry	221 550	Organic Chemistry II	3
Chemistry	221 551	Organic Chemistry II Lab.	2
Mathematics	245 220	Anal. Geom. & Calc. I	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Physics	265 213	Engg. Physics I	5
Physics	265 214	Engg. Physics II	5
		Electives	10

## 3. Operations Option (C)

Grain Science	045 640	Advanced Flow Sheets	2
Grain Science	045 670	Milling Technology II	4
Grain Science	045 685	Advanced Flour and Feed Technology	3
Grain Science	045 655	Flour & Feed Mill Construction	3
Biochemistry	211 120	Intro. Org. & Biol. Chem.	5
Mathematics	245 220	Anal. Geom. & Calc. I	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Mathematics	245 222	Anal. Geom. & Calc. III	4
Physics	265 213	Engg. Physics I	5
Physics	265 214	Engg. Physics II	5
Civil Engg.	525 331	Strength of Mats. A	3
Civil Engg.	525 333	Statics	3
Elect Engg.	530 519	Elec. Cir. Control	4
		Electives	7



## 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: 1. mathematics, including college algebra; 2. analytical chemistry; 3. organic chemistry; 4. a course in physics; 5. a course in biological science. When the committee believes it necessary, students will be required to take additional undergraduate courses to prepare them more completely for their program.

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 such as business administration, plant management, quality control, nutrition, sales and services. Those students graduating with advanced degrees are especially qualified for positions in administration, teaching, research and production of a wide variety of foods.

## Undergraduate Credit

**045 100. Principles of Milling.** (3) I, II. Introduction to flour and feed milling processes. Two hours lec. and three hours lab. a week. 045-100-1-0199

**045 110. Flow Sheets.** (2) I, II. The construction and assembling of a flow sheet. Six hours lab. a week. Pr.: Gr. Sc. 100, M.E. 212. 045-110-1-0199

**045 120. Introductory Bakery Technology.** (2) I. 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. 045-120-1-0197

**045 300. 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.: Chem. 250 and Biochem. 120. 045-300-1-0198

**045 305. 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. 045-305-0-0198

## Undergraduate And Graduate Credit in Minor Field

**045 500. Milling Technology I.** (4) I. Principles and practices of wheat flour milling with full scale equipment including grain storage, blending, cleaning, conditioning plant, and a modern pneumatic 200 hundred weight flour mill, with instrumentation and air conditioning, etc. Two hours lec. and six hours lab. a week. Pr.: Gr. Sc. 100 and 110. 045-500-1-1099

**045 510. Feed Technology I.** (4) I. Introduction to the engineering aspects 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.: Dy. Sc. 200 and Gr. Sc. 110. 045-510-1-0198

**045 520. 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 A.S.I. 320. 045-520-1-0198

## Undergraduate And Graduate Credit

**045 602. Cereal Science.** (3) II. The characteristics of cereals, legumes and their products. Three hours lec. a week. Pr.: Biochem. 120. 045-602-0-0198

**045 625. Flour and Dough Testing.** (3) I. Physical and chemical methods used in evaluating wheat flour and dough. One hour lec. and six hours lab. a week. Pr.: Gr. Sc. 602. 045-625-1-0197

**045 634. Bakery Technology.** (3) II. Physical and engineering principles involved in baking processes. Study of materials handling, fluid flow, and heat transfer as related to the bakery operation. The layouts of facilities to produce baked goods are studied, and the students prepare their own bakery layout. Current problems of the baking industry are discussed. Three hours lec. a week. Pr.: Math. 110, Physics 113, and Gr. Sc. 638. 045-634-0-0197

**045 635. 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.: Biochem. 120. 045-635-0-0197

**045 636. Baking Science I Laboratory.** (2) I, II Laboratory exercises in theory and production of yeast leavened baked products. Six hours lab. a week. Pr.: Gr. Sc. 635 or concurrent enrollment. 045-636-1-0197

**045 637. 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.: Gr. Sc. 635. 045-637-0-0197

**045 638. Baking Science II Laboratory.** (1) II. A laboratory course to accompany Gr. Sc. 637. Three hours lab. a week. Pr.: Gr. Sc. 637 or concurrent enrollment. 045-638-1-0197

**045 640. Advanced Flow Sheets.** (2) II. Offered on sufficient demand. Designing flow diagrams for flour mills, corn mills, or feed mills. Six hours lab. a week. Pr.: Gr. Sc. 500 or 510. 045-640-1-0199

**045 651. 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. 045-651-1-0198

**045 655. 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.: Gr. Sc. 500 or 510. 045-655-1-0199

**045 661. Qualities of Feed and Food Ingredients.** (3) II. 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.: Biochem. 120. 045-661-0-0198

**045 670. Milling Technology II.** (4) II. 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. The processes for milling other grains such as corn, oats, sorghum, rice and rye are studied in theory and by practice on small scale laboratory milling units. Two hours lec. and six hours lab. a week. Pr.: Gr. Sc. 500. 045-670-1-0199



**045 680. 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.: Gr. Sc. 510, Phys. 114 or 214, and one course each in statistics and computer programming. 045-680-1-0198

**045 685. Advanced Flour and Feed Technology.** (3) II. Offered on sufficient demand. Study of fluid flow and heat transfer in relation to grain processing. Introduction to distillation and extraction processes involved in grain processing. Two hours lec. and three hours lab. a week. Pr.: Gr. Sc. 670 or 680. 045-685-1-0199

**045 700. 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.: Biochem. 521 and Gr. Sc. 602. 045-700-0-0198

**045 710. 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.: Gr. Sc. 602 or 661. 045-710-0-0199

**045 711. 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.: Chem. 271 or Gr. Sc. 300 and Biochem. 120. 045-711-0-0198

**045 715. 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. 045-715-1-0198

**045 790. Grain Science Problem.** (Var.) I, II, S. Pr.: Consent of staff. 045-790-3-0196

### Graduate Credit

**045 801. 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.: Biochem. 521 and 522. 045-801-0-0196

**045 899. Research in Grain Science.** (Var.) I, II, S. Research may be used as basis for the M.S. thesis. Pr.: Consent of staff. 045-899-4-0196

**045 900. 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. 045-900-2-0196

**045 999. Research in Grain Science.** (Var.) I, II, S. Research may be used as basis for Ph.D. dissertation. Pr.: Consent of staff. 045-999-4-0196

## HORTICULTURE AND FORESTRY

*R. W. Campbell, Head of Department*

Professors Campbell,\* Greig,\* Keen,\* and Morrison;\* Associate Professors Clayberg,\* Geyer,\* Mahaffey,\* Marr,\* Mattson,\* Miles,\* Odom,\* and Pair; Assistant Professors Abmeyer, R.J. Campbell, Carrow,\* Deneke,\* Hadle, Leuthold, Long,\* Schueneman, Still,\* van der Hoeven, Winzer, and Wootton; Emeritus: Professors Amstein, Flinger and Pickett.

### Undergraduate Study

The Department of Horticulture and Forestry offers two four-year curriculums (horticulture and horticulture therapy), and two two-year programs (retail floriculture and pre-forestry). The Department also helps administer and advises students in three interdepartmental programs. These are the crop protection curriculum, page 58, the food science and industry curriculum, page 64, and the parks and recreation area management option of the natural resource management curriculum, page 76.

### HORTICULTURE (4-yr. curriculum)

*B.S. degree in Agriculture; requires 127 sem. hrs.*

Horticulture is a science and an art involving plants grown for intensive food production, aesthetic value, environmental improvement or social-therapeutic effects. Students, in consultation with faculty advisers, may select courses of study in one of four options: horticulture science, horticulture industries, urban horticulture and horticulture communications.

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 that give emphasis necessary for career goals.

### General Education Requirements

English Composition I	3
English Composition II	3
Oral Communication	2
Ag. Orientation	1
College Alg *	3
Economics I	3
Chemistry I or General Chemistry	4-5
Gen. Botany or Principles of Biology	4
Concepts in Physical Education	1
Humanities and/or Social Science	9
Communications electives	3
Fund Accounting	4

\* Students in the science option take calculus.

### Horticulture and Agriculture Requirements

Greenhouse Management	3
Vegetable Crop Ecology	3
Fruit Production	3
Plant Science	4
Soils	4
Elective in Entomology	3
Plant Pathology	3

#### 1. 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. Job opportunities exist for teaching or research with colleges or universities, government, industries (agricultural chemicals, production, food science, processing, equipment companies, etc.) and international agriculture. Students electing this option take the general education requirements and the horticulture and agriculture requirements and the following additional requirements:



Animal Sci. & Ind.	005 500	Genetics	3
Biology	215	Biology Elective	3
Chemistry	221 230	Chemistry II	4
Physics	265 115	Descriptive Physics	4
Chemistry	221 190	Elem. Organic Chem	3
Mathematics	245 210	Tech. Calculus	5
Computer Sci.	266	Computer Sci. Elec.	3
Statistics	285 340	Biometrics I	3
Biochem.	211 510	Gen. Plant Biochem.	4
Biology	215 600	Plant Physiology	4
Horticulture	040	Horticulture Elec.	15
		Free Electives	16

## 2. Horticultural Industries Option

The horticultural industries option is for students interested in the production of horticultural crops and the related businesses. It includes careers in horticultural enterprises such as retailing horticultural products, food inspection services, wholesale buyers, saleswork and extension activities. It also includes crop production endeavors such as nursery production, orchard management, vegetable production or greenhouse production. Students receive a solid background in horticulture with emphasis on crop production and additional business training. Requirements in addition to general education, and horticulture and agriculture requirements are as follows:

Horticulture	040 400	Plant Propagation	3
Horticulture	040	Horticulture Elec.	18
Chemistry	221 190	Elem. Organic Chem	3
Biology	215	Biology Elec.	3
Business Admin.	305	Business Elec.	9
		Physical Sci. Elec.	3
		Math. Stat. Elec.	3
Computer Sci.	266	Computer Sci. Elec.	3
		Free Elec.	18-19

## 3. Urban Horticulture and Forestry Option

The urban horticulture and forestry option is for students concerned about improving the quality of man's environment with plant materials. Students obtain a background in horticulture with additional training in landscape development, municipal forest management or public communications. Students will also elect political science and social science courses to better understand community and city government policies. Graduates will provide landscape services for municipal or public grounds and recreational areas; serve as city foresters; provide landscape contracting for residential, public and industrial grounds; provide public service information for radio, TV, magazines, newspapers, advertisers, etc; or conduct public relations work for industries, government, or other organizations. The following course requirements are necessary in addition to the previously listed general requirements and horticulture and agriculture requirements:

Bus. Ad.	305 260	Biol. Sc. Elec.	3
Landscape Arch.	110 200	Phys. Sc. Elec.	3-5
Hort. & For.	040 400	Business Elec.	3
Hort. & For.	040 680	Landscape Design	3
Hort. & For.	040 281	Plant Propagation	3
		Plant Protection	3
		Free Electives	15-20
		Professional Electives	17-18
		(to be selected from list below)	
		Hort. Elec.	9
		(comm. option only)	
		Land Hort.	3
		(comm. option only)	

## PROFESSIONAL ELECTIVES

(Select a minimum of 17 hours within one of the following three professional areas)

### 1. Landscape Horticulture

Hort. & For.	040 361	Herbaceous Plant Matis	3
Hort. & For.	040 372	Woody Plant Matis	4
Hort. & For.	040 450	Landscape Development	3
Hort. & For.	040 551	Landscape Contracting	3
Hort. & For.	040 610	Turf Management	2
Hort. & For.	040 611	Turfgrass Mgmt. Lab	1
Hort. & For.	040 620	Arboriculture	3
Architecture	105 301	Apprec. of Arch.	3
Ag. Engg.	506 558	Conservation Surveying and Planning	3
		OR	
Civil Engg.	525 212	Elementary Surveying	
		Engineering	3
Architecture	104 210	Design Graphics I	2
		OR	
Mech. Engg.	560 212	Graphical Communications, Analysis & Design I	2

### 2. Landscape Forestry

Hort. & For.	040 620	Arboriculture	3
Hort. & For.	040 795	Municipal Forestry	2

And 12 hours from following list.

Hort. & For.	040 361	Herbaceous Plant Matis	3
Hort. & For.	040 372	Woody Plant Matis	4
Hort. & For.	040 330	Dendrology I	2
Hort. & For.	040 610	Turf Management	2
Hort. & For.	040 611	Turfgrass Mgmt. Lab	1
Reg. and Comm.	109 315	Intro. to Planning	3
Ag. Engg.	506 558	Conservation Surveying and Planning	3
		OR	
Civil Engg.	525 212	Elementary Surveying	
		Engineering	3
Hort. & For.	040 560	Vegetable Crop Ecology	3
Hort. & For.	040 520	Fruit Production	3

### 3. Communications

Art	209 100	Design I	2
Art	209 205	Graphic Design Tech	2
Speech	281 726	Persuasion	3
Journ.	289 320	Prin. Advert.	3
Journ.	289 310	Photojournalism	3
Journ.	289 250	Ag. Journ.	3
Journ.	289 630	Public Relations	3
Bus. Adm.	305 543	Sales Communication	3
Speech	281 220	Oral Comm. II	2
Agri.	030 410	Ag. Student Mag.	1-2
Journalism	289 275	Reporting I	3
Education	410 752	Prin. Teach. Adults Ext.	3
Hort. & For.	040 635	Methods Env. Interp.	3

## HORTICULTURAL THERAPY (4-yr. curriculum)

Adviser—Mattson

B.S. in Agriculture; requires 127 sem. hrs.

The first horticultural therapy undergraduate training program in the United States was developed in 1971 as a cooperative agreement between Kansas State University and the Menninger Foundation, Topeka, Kansas. Courses are required in general education, horticulture and agriculture, and humanities and/or social sciences. Specialization electives may be selected in geriatrics, corrections, mental health, rehabilitation, or special education courses. Horticultural therapy graduates are employed in psychiatric, rehabilitation, and veterans administration hospitals, correctional institutions, geriatric and retirement centers, botanical gardens, schools, and community-based agencies. Clinical internships are required during the senior year at approved psychiatric hospitals, rehabilitation centers, veterans administration hospitals, correctional agencies, geriatric and retirement centers, or other community-based agencies. The requirements of the curriculum are as follows:

**General Education Requirements**

English Composition I	3
English Composition II	3
Oral Communication	2
Agricultural Orientation	1
College Algebra	3
Economics I	3
General Chemistry	5
General Botany	4
Concepts in Physical Education	1
Communications Elective	3

**Horticulture and Agriculture Requirements**

Horticulture Elective	3
Herbaceous Plant Materials	3
Woody Plant Materials	4
Home Floral Design	3
Plant Propagation	3
Horticultural Therapy Activities	2
Greenhouse Management	3
Fruit Production	3
Vegetable Crop Ecology	3
Landscape Horticulture	3
Plant Science	4
Soils	4
Plant Pathology	3
Insects of Home, Lawn, and Garden	3

**Humanities and/or Social Science Requirements**

General Psychology	3
Introduction to Sociology	3
Group Behavior	3
Abnormal Psychology	3
Educational Psychology I	3
Design I	2
Specialization Electives	15

**Internship Requirement**

Horticultural Problem	3
Greenhouse Clinical Practices	6
Garden and Landscape Therapy	6

**Electives**

Free electives	9
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**PRE-FORESTRY (2-yr. program)**

Hours earned in this program can be transferred to most other colleges offering a degree in forestry. The required program follows:

**FRESHMAN****Fall Semester**

Biology	215 210	General Botany	4
English	229 100	English Composition I	3
Speech	281 105	Oral Communication I	2
Mathematics	245 100	College Algebra	3*
Hort. & For.	040 281	Forestry Cons.	2
		Elective	1-2
			15-16

**Spring Semester**

Chemistry	221 110	General Chemistry	5
		OR	
	221 210	Chemistry I	4
English	229 120	English Composition II	3
Mathematics	245 150	Plane Trig	3*
Hort. & For.	040 330	Dendrology I	2
Hort. & For.	040 210	Forestry Graphics	2
Phys. Ed.	261 101	Concepts in Phys. Ed.	1
			15-16

**SOPHOMORE****Fall Semester**

Agronomy	015 305	Soils	4
Geology	234 100	Geology I	3
Hort. & For.	040 340	Dendrology II	2
Hort. & For.	040 310	Forestry Instruments	1
Statistics	285 340	Biometrics I	3
Hort. & For.	040 320	Forestry Seminar	1
		Elective	2-3
			16-17

**Spring Semester**

Physics	265 115	Descriptive Physics	4
Civil Engg.	525 212	Elem. Surveying Engg.	3
Computer Sci.	286 200	Fund. of Comp. Prog. and	
Computer Sci.	286 201	FORTRAN Lang. Lab.	3
Economics	225 110	Economics I	3
		Electives	2
			15

**RETAIL FLORICULTURE (2-yr. program)**

Adviser—Odom

This is a two-year technical program. It combines a year of supervised practical training with a full year of University course work in preparation for employment in a retail flower shop. The first year of instruction is at Kansas State University where the course sequence is completed during the fall, spring, and summer sessions. The second year, the student serves an apprenticeship at a selected retail florist business. Every effort is made to select a florist shop in a city of the student's choice. The apprentice will be an employee of the flower shop during this year of training and will receive a salary sufficient to meet normal living expenses.

**Fall Semester**

Horticulture	040 132	Floral Arrangement	3
Biology	215 210	General Botany	4
Psychology	273 110	General Psychology	3
Horticulture	040 150	Home Horticulture	2
Horticulture	040 151	Home Horticulture Lab.	1
Art	209 100	Design I	2
			15

**Spring Semester**

Horticulture	040 142	Adv. Floral Arrangement	3
Horticulture	040 220	Plant Science	4
Landscape Arch.	110 250	General Landscape Design	3
Clothing & Textiles	611 101	Design for Contemporary	
		Living	3
Business Admin.	305 202	Small Business Oper.	3
			16

**Summer Term**

Business Admin.	305 260	Fundamentals of Accounting	4
English	229 100	English Composition I	3
			7

**Graduate Study**

Both the Master of Science and Doctor of Philosophy degrees are offered. Graduate study leading to the degree Master of Science may be pursued in floriculture, fruit and nut crops, vegetable crops and ornamental horticulture including arboriculture, turfgrass and urban horticulture.

Major work leading to the degree Doctor of Philosophy is offered in all fields listed above. Areas of proficiency include plant breeding and genetics, horticulture, plant environmental relationships, horticultural crop marketing and weed control. A B.S. degree from a recognized college or university whose undergraduate program is substantially

\*Students with proper mathematics background are encouraged to substitute Calculus for these courses.



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

**040 132. Commercial Floral Arrangement I.** (3) I. Floral arrangement for commercial flower shop. Fundamentals of floral design are emphasized. Two hours rec. and three hours lab. a week. For majors only. 040-132-1-0109

**040 142. Commercial Floral Arrangement II.** (3) II. Stylized floral design and related shop management for the commercial flower shop, including corsages, wedding decorations, funeral pieces and party and banquet decorations. Two hours rec. and three hours lab. a week. For majors only. 040-142-1-0109

**040 150. Home Horticulture.** (2) I, II. An introduction to the basic concepts and practices of horticulture. Emphasis is on the culture, use and relationship of horticulture plants in the garden, yard, and home. Two hours rec. a week. Not open to Jr. and Sr. in Horticulture. No prerequisites. 040-150-0-0108

**040 151. Home Horticulture Laboratory.** (1) I, II. The applications of horticultural practices with emphasis on the establishment, maintenance, and use of horticulture plants around the home. Three hours lab. per week. Pr.: 040 150 or concurrent enrollment. 040-151-1-0108

**040 200. Plant Science.** (4) I, II. Study of the principles of the production of economic plants, including morphology, taxonomy, physiology, ecology, propagation, preservation, storage, and utilization. Three hours lec. and one two-hour lab. a week. Taught in cooperation with the Department of Agronomy. 040-200-1-0108

**040 210. 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. 040-210-1-0114

**040 281. Forest Conservation.** (2) I. An introduction to American forestry. Forestry heritage in the U.S., importance of forests in soil and water conservation, multiple use concepts, management practices, utilization and policy. Two hours rec. a week. No prerequisites. 040-281-0-0114

**040 299. 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. 040-299-1-0109

**040 305. Plants, Man and Environment.** (2) I, II. 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. Non-major. No prerequisites. 040-305-0-0109

**040 311. Forestry Instruments.** (2) I. Introduction to the use of instruments and applied measurements used in forestry and related resources. One hour lec. and two hours lab. a week. No prerequisites. 040-311-1-0114

**040 316. Home Floral Design.** (3) I, II. Floral design for the home. Fundamentals of floral design are emphasized. Two hours rec. and three hours lab. a week. For non-majors. 040-316-1-0109

**040 321. Forestry Resource Topics.** (1) I. Student presentation of ideas, practices and concepts in forestry or related areas. One hour rec. a week. 040-320-0-0114

**040 325. 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. Non-major. No prerequisites. 040-325-0-0109

**040 330. 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. 215 210 or equiv. 040-330-1-0114

**040 333. Gardening for Food.** (2) II. An introductory course on how to plant, culture, harvest and store fruits and vegetables from the home standpoint. Two hours rec. per week. Non-major. No prerequisites. 040-333-0-0108

**040 340. 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. 215 210 or equiv. 040-340-1-0114

**040 350. 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 & Rec. Mgmt. 040-350-3-0115

**040 360. Horticulture Therapy Activities.** (2) I, II. Supervised training using plants as an activity therapy with geriatric, mentally retarded, or handicapped individuals. Pr.: Sophomore standing or consent of instructor. 040-360-2-0109

**040 361. Herbaceous Plant Materials.** (3) I. Annual and perennial flowers, ornamental and turf grasses, and tropical plants for ornamental planting. Pr.: 215 210 or equiv. 040-361-1-0109

**040 370. Natural Resources and Man.** (3) I, S. A survey of the "web of life" concept of man's role in the ecosystem, in relation to the use of renewable and non-renewable natural resources. The impact of society, economics, politics and philosophy will be examined to determine utilization of natural resources. Three hours rec. a week. No prerequisites. 040-370-0-0115

**040 372. Woody Plant Materials.** (4) I. Deciduous and evergreen trees, shrubs and vines for landscape use. Field trips required. Pr.: Biol. 198, Biol. 210, or Hort. 200. Two hours lec., two hours lab., and one hour rec. per week. 040-372-1-0109

**040 400. 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.: Biol. 210 or equiv. 040-400-1-0109

**040 440. 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. No prerequisites. 040-440-0-0115

**040 450. Landscape Development.** (3) I. The location and arrangement of plants and other permanent features of the landscape around homes and other similar areas. Three hours lab. and one hour rec. per week. Pr.: Hort. 372. 040-450-1-0109

### Undergraduate And Graduate Credit In Minor Field

**040 505. Growing Media and Substrates.** (2) II. Physical, chemical, biological properties and management of growing media and modified soils used for intensive horticultural plant production. Two hours lecture per week. Pr.: Agron. 015-305. 040-505-0-0109



**040 508. Landscape Horticulture.** (3) I. Fundamental principles of producing, planting, and maintaining ornamental plantings of trees, shrubs, perennials, and turf in the nursery, home grounds, parks, and similar areas. Two hours rec. and three hours lab. a week. Pr.: Biol. 210 or Plant Science 200. 040-508-1-0109

**040 520. 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 three hours lab. a week. Pr.: Hort. 200 or equiv. 040-520-1-0108

**040 551. Landscape Contracting.** (3) II. The use, interpretation and development of planting plans (including contracting, construction, and specifications) as applied to landscape horticulture. Pr.: Hort. 450 or consent of instructor. 040-551-1-0109

**040 560. 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 per week. Pr.: Hort. 200. 040-560-1-0108

**040 570. Greenhouse Management.** (3) I, II Greenhouse construction, environmental control, crop scheduling and management. Two hours rec. and three hours lab. a week. Pr.: Hort. 200. 040-570-1-0109

**040 575. Nursery Management.** (3) II. A study of the various practices and methods of operating a commercial nursery for the production of ornamental wood plants used for landscaping purposes. Two hours rec. and three hours lab. a week. Pr.: Biol. 210, Hort. 200 and Agron. 305. 040-605-1-0109

**040 580. Park Operations.** (3) II. Required field trips at the expense of the student. Planning, execution and supervision of field maintenance and operations; also capital budgeting, job planning, personnel practices, equipment operation and maintenance. Two hours lec. and two hours lab. Pr.: Hort. 370 and 440. 040-580-1-0115

#### Undergraduate And Graduate Credit

**040 611. Turfgrass Management Laboratory.** (1) I. Exercises in identification and application of physical and biological principles in the management of swards for use and beauty. Pr. or conc.: Hort & For. 612. 040-611-1-0109

**040 612. Turf Management.** (3) I. Methods and principles of establishing and maintaining special purpose turf. Three hours rec. per week. Pr. Hort. 200, Agron. 305 or consent of instructor. 040-612-0-0109.

**040 620. Arboriculture.** (3) II. Principles and practices of maintaining shade and ornamental trees under urban environments. Two hours rec. and three hours lab. a week. Pr.: Hort. & For. 200, Agron. 305 or consent of instructor. 040-620-1-0109

**040 625. Floriculture.** (3) II. The principles and commercial practices for producing greenhouse florist crops. The relationship is stressed between a plant's physiological response and its greenhouse environment. Three hours rec. a week. Pr.: Hort. & For. 200. 040-625-0-0109

**040 635. 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. per week. Field trips required. Pr.: Hort. & For. 370 and 440. 040-635-1-0115

**040 638. 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 area interest. For juniors and seniors in Horticulture only. Pr.: Hort. & For. 150 and 200, plus one other core curriculum Horticulture course. 040-638-2-0108

**040 640. Horticultural Problems.** (Var.) I, II, S. Problems and reports in floriculture, olericulture, ornamental horticulture, and pomology. Pr.: Consent of instructor. 040-640-3-0109

**040 641. Forestry Problems.** (Var.) I, II, S. Work is offered in various fields of forestry. Pr.: Consent of instructor. 040-641-3-0114

**040 642. 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. 040-642-3-0115

**040 645. Park Management Seminar.** (1) I. Various guest speakers and exercises designed to offer the student opportunities to articulate and interact in structured small group situations, discussing Park and Recreational Area Management topics. 040-645-0-0115

**040 660. 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.: Hort. & For. 440 and junior standing 040-660-0-0115

**040 661. Greenhouse Clinical Practices.** (3-6) I, II, S. Supervised training in the application of greenhouse practices and the use of plants and flowers in the treatment of institutional patients. Pr.: Consent of instructor. 040-661-2-0109

**040 662. Garden and Landscape Therapy.** (3-6) I, II, S. Training in supervision of patients in flower and vegetable gardening as a therapy. The use of landscape to better the trainees' understanding of how institutional landscape maintenance can be used in therapy. Pr.: Consent of instructor. 040-662-2-0109

**040 680. Plant Protection.** (3) II. A discussion of the equipment, procedures, and techniques used in controlling pests on crops. Emphasis placed on types, theory, operation, and maintenance of application equipment. Two hours rec. and three hours lab. a week. Pr.: Entom. 300 or Plant Path. 501 or equiv. 040-680-1-0108

**040 699. 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.: Hort. & For. 440 and 580. 040-699-0-0115

**040 700. Vegetable Crop Physiology.** (3) I. Offered 1978-79 and alt. 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. and For. 200. 040-700-0-0108

**040 706. Turfgrass Science.** (3) II. A study of current literature and research reports on grasses used for fine turf. Written and oral reports. Three hours rec. per week. Pr.: Hort. & For. 612 or consent of instructor. 040-706-0-0109

**040 730. Fruit Science.** (3) II. Spring '79 and alt. years. 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. & For. 520. 040-730-1-0108



## NATURAL RESOURCE MANAGEMENT

B.S. degree in Agriculture; requires 127 sem. hrs.

Advisers: Bidwell, Agronomy; Keen, Horticulture and Forestry; Mahaffey, Horticulture and Forestry; Owensby, Agronomy.

This curriculum is designed for the individual who wishes to interpret and apply ecological principles in the solution of environmental problems involving renewable natural resources. It contains courses in the social sciences and humanities which help make students sensitive to environmental surroundings, courses in the physical and biological sciences which help them understand and solve environmental problems, and courses in communications which make it easy to interpret, convey and employ solutions.

The three options, (A) soil and water conservation, (B) range management and (C) park and recreation areas management, are administered by a committee of faculty from the Departments of Agronomy, Agricultural Economics, Agricultural Engineering, and Horticulture and Forestry. These committee members serve as advisers to students in the different options. Persons interested in the curriculum should contact the College of Agriculture dean's office for additional information and selection of an adviser. Required courses for the curriculum and the three options are as follows.

### 1. Soil and Water Conservation Option

**General Requirements for Option A:** Soil and Water Conservation (These students are advised through the Department of Agronomy.)

#### FRESHMAN

Fall Semester		Spring Semester	
Ag Orientation	1	English Composition II	3
Chemistry I	4	Plane Trigonometry	3
English Composition I	3	Oral Communication I	2
College Algebra	3	Gen. Botany or Prin. Biol.	4
Prin. of Pol. Sci.		Chemistry II	4
or State & Local Govt.	3		
Concepts in Phys. Ed.	1		
	15		16

#### SOPHOMORE

Fall Semester		Spring Semester	
Economics I	3	Soils	4
Geology I	3	Prin. Ag. Econ.	3
Plant Sci. or Crop Sci.	4	Option & Electives	8-9
General Physics I	4		
	14		15-16

#### JUNIOR

Fall Semester		Spring Semester	
Forest Cons. or Range Mgmt.	2-3	Humanities or Soc. Sci.*	3
Intro. to Sociology	3	Ecology	4
Math. or Statistics	3-4	Economic Entomology	3
Humanities or Soc. Sci.*	3	Option & Electives	6
Option & Electives	3-4		
	15 or 17		16

#### SENIOR

Fall Semester		Spring Semester	
Intro. to Planning	3	Option & Electives	16
Option & Electives	13		
	16		16

\*To be selected from the list of suggested humanities and social science electives, page 45.

**040 740. Horticultural Plant Breeding.** (3) II. Breeding methods and their application to the economic improvement of flowers, fruits, shrubs, trees, turfgrasses, and vegetables. Pr.: AS&I 500 or equiv. 040-740-0-0108

**040 792. Handling and Processing Fruits and Vegetables.** (3) I. Fall '77 and alt. years. Field trips required. Principles of harvesting, grading, handling, nutritive value and processing fruits and vegetable crops. Pr.: Biol. 198 or equiv. and a course in organic chemistry or biochemistry. 040-792-0-0108

**040 795. Municipal Forestry.** (2) I. A study of management problems of publicly owned shade trees. Financing, public relations, personnel, organization, regulations, and planning in the effective department. Field trip required. Pr.: Senior standing and Hort. & For. 620 or concurrent enrollment or consent of instructor. 040-795-0-0114

#### Graduate Credit

**040 846. 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. per week. Pr.: One statistics course or consent of instructor. 040-846-1-0109

**040 898. Master's Report.** (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, forestry, or parks and recreation area management, for preparation of master's report. Pr.: Consent of instructor. 040-898-4-0108

**040 899. Research—M.S.** (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, forestry, or parks and recreation area management for preparation of master's thesis. Pr.: Consent of instructor. 040-899-4-0108

**040 910. 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 Dept. of Agronomy. See 015 910.) 040-910-0-0108

**040 920. Advanced Pomology.** (1-3) II. Spring '78 and alt. years. Morphological and physiological changes occurring in fruit plants. Pr.: Consent of instructor. 040-920-0-0108

**040 921. Horticultural Crop Nutrition.** (2) I. Fall '77 and alt. 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. & For. 200, Agron. 305 and Biol. 600 or equiv. 040-921-0-0108

**040 930. 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 Dept. of Agronomy, 015 930.) 040-930-0-0108

**040 951. Horticulture and Forestry Graduate Seminar.** (1) I, II. A discussion of investigational works in the various branches of horticulture and forestry. 040-951-0-0108

**040 955. Controlled Plant Environment.** (3) II. Spring '79 and alt. years. Study of the greenhouse and plant growth chamber as tools for plant science research. Three hours rec. per week. Pr.: Consent of instructor. 040-955-0-0109

**040 961. Dormancy and Regeneration.** (2) I. Fall '78 and alt. years. Physiological and anatomical bases for dormancy, rest and regeneration in seeds, buds and stems. Manipulation and use in research. Pr.: Hort. & For. 400 or consent of instructor. 040-961-0-0109

**040 999. Research in Horticulture, Ph.D.** (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, and ornamental horticulture. Data collected may form basis for a thesis or dissertation. Pr.: Consent of instructor. 040-999-4-0108



## Special Option Courses

General Organic Chemistry or Elementary Biochemistry	5
Organismic Biology	5
Microbiology	4
Soil Conservation	3
Env. Chemistry Lab.	1

## Select courses from four of the following areas:

Crop and Soil Management or	
Mgmt. of irrigated Soils	2-3
Soil as a Natural Resource	3
Soil-Plant Relationships or	
Chemical Properties of Soils	3
Crop Ecology or Turf Management	3
Physical Environment of Crops & Soils	
or Conservation Survey & Plan.	3
Option Electives	23
	49
Total	127

## 2. Range Management Option

General Requirements for Option B: Range Management. (These students are advised through the Department of Agronomy.)

## FRESHMAN

Fall Semester	Spring Semester
Ag Orientation	English Composition II
Chemistry I	Plane Trigonometry
English Composition I	Oral Communication I
College Algebra	Gen. Botany or Prin. Biol.
Prin. of Pol. Sci.	Chemistry II
or State & Local Govt.	
Concepts in Phys. Ed.	
15	16

## SOPHOMORE

Fall Semester	Spring Semester
Economics I	Soils
Geology I	Prin. Ag. Econ.
Plant Sci. or Crop Sci.	Option & Electives
Gen. Physics I or	
Descriptive Physics	
14	15-16

## JUNIOR

Fall Semester	Spring Semester
Forest Cons. or	Humanities or Soc. Sci.*
Range Mgmt.	Ecology
Intro. to Sociology	Economic Entomology
Math. or Statistics	Options & Electives
Humanities or Soc. Sci.*	
Option & Electives	
15-17	16

## SENIOR

Fall Semester	Spring Semester
Intro. to Planning	Option & Electives
Option & Electives	
13	16
16	

## Special Option Courses:

Principles of Animal Science	3
Organismic Biology	5
Gen. Organic Chemistry	3
Range Management II	3
Field Course, Range Management	2
Ident. Range, Pasture Plants	2
Range Mgmt. Problems	3
Soil as a Natural Resource	3
Beef Science	3
Higher Plants	4
Electives	18
Option & Electives	49
Total	127

\*To be selected from a list of suggested humanities and social science electives, page 45.

## 3. Park and Recreation Areas Management Option

General Requirements for Option C: Park and Recreation Areas Management. (These students are advised through the Department of Horticulture and Forestry.)

## FRESHMAN

Fall Semester	Spring Semester
Ag Orientation	English Composition II
General Chemistry	Plane Trigonometry
English Composition I	Oral Communication I
College Algebra	Gen. Botany or Prin. Biol.
Prin. of Pol. Sci. or	Option & Electives
State & Local Govt.	
Concepts in Phys. Ed.	
1	3
16	15

## SOPHOMORE

Fall Semester	Spring Semester
Economics I	Soils
Geology I	Intro. to Sociology
Plant Science	Oendrology I & II, Woody Plt.
General Physics I or	Matis., or Higher Plts.
Descriptive Physics	Option & Electives
4	3-4
14	15-16

## JUNIOR

Fall Semester	Spring Semester
For. Cons. or Range Mgmt.	Humanities or Soc. Sci.*
Natural Res. Econ.	Ecology
Math. or Statistics	Insects of Home, Lawn
	Garden
Humanities or Soc. Sci.*	Option & Electives
Option & Electives	
3-4	6
14-17	15

## SENIOR

Fall Semester	Spring Semester
Intro. to Planning	Recreation Program
Option & Electives	Option & Electives
13	13
16	16

## Special Option Courses:

Natural Resources and Man	3
Use of Natural Resources for Leisure	3
Methods of Envir. Interpretation	3
Park Administration & Mgmt.	3
Park Operations	3
Park & Rec. Areas Field Studies	2
Park Management Seminar	1
Turf Management	2
Arboriculture	3
	26

## Select 9 hours from the following:

Travel, Tourism & Park Management	3
Landscape Design	3
Landscape Horticulture	3
Nursery Management	3
Plant Pathology	3
Plant Protection	3
Soil Interp. for Land Use Planning	3
	9
General Electives	13
Option & Electives	48
Total	127

\*To be selected from a list of suggested humanities and social science electives, page 45.

## PLANT PATHOLOGY

B.S. in Agriculture under the Crop Protection Curriculum which includes a Plant Pathology Science Option (See page 58)

J.F. Shepard, \* Head of Department

Professors Dickerson,\* Edmunds,\* Hansing,\* Shepard,\* and Willis,\* Associate Professors Browder,\* Johnson,\* Niblett,\* Schwenk,\* and Stuteville,\* Assistant Professors Claflin,\* Eversmeyer,\* Sauer,\* and Tillman,\* Adjunct Associate Professor Kramer,\* Emeritus: Professor 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 for many types of agencies, teaching, extension sales and commercial service. Industry, government, educational institutions and private foundations employ plant pathologists on a world-wide basis.

### 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, see page 58. 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 page 58).

Major Courses		Semester Hours
215 210	General Botany .....	4
015 200	Plant Science .....	4
050 501	Plant Pathology .....	3
215 640	Introductory Mycology .....	4
050 715	Plant Pathogens .....	4
	Electives in the Botanical Sciences .....	9
Supporting Courses		
215 555	Microbiology .....	4
005 500	Genetics .....	3
221 230	Chemistry II .....	4
221 350	General Organic Chemistry .....	3
221 351	General Organic Chemistry Lab. ....	2
015 305	Soils .....	4
245 150	Plane Trigonometry .....	3
285 340	Biometrics I .....	3
265 113	General Physics I .....	4
One of the following:		
265 193	Descriptive Meteorology .....	3
265 114	General Physics II .....	4
One of the following:		
211 510	General Plant Biochemistry .....	4
211 521	Gen. Biochem Lec. .... and	3
211 522	Gen. Biochem Lab. ....	2
211 655	Biochem. I Lec. .... and	3
211 656	Biochem I Lab. ....	2
One of the following:		
003 300	Economic Entomology .....	3
030 312	Gen. Entomology .....	2
030 313	Gen. Entomology Lab. ....	1
One or more of the following:		
245 220	Analytical Geometry and Calculus I .....	4
	OR	
286 200	Fundamentals of Computer Programming .....	3
One or more of the following:		
005 102	Principles of Animal Sci. ....	3
005 103	Animal Science & Industry .....	1
010 100	Principles of Agri. Econ. ....	3
506 300	Engg. in Agric. ....	4
	Plus	
	An Elective in Accounting or Bus. Admin. ....	3

### 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 epidemiology, disease physiology, nematology, virology, host-parasite relationships, ecology of disease development, biochemistry of pathogenicity, disease resistance and chemical control. Research is conducted on diseases of grain crops, forage crops, fruits, vegetables, ornamentals, turf and stored grain.

Departmental facilities include physiological laboratories, environmental chambers, greenhouses and experimental field plots. 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 Credit

**050 210. Introduction to Plant Pest Control.** (2) I. A survey of losses due to crop pests and how that affects the world food supply, kinds of abiotic and biotic pests, methods and systems for control of pests, pesticide uses, and state and federal regulations governing the use of pesticides. Two hours rec. a week. No prerequisites. 050-210-0-0404

**050 420. Plant Nematology.** (2) II. An introductory course on the plant parasitic nematodes, their biology and the basis for controls. Three hours combined rec. and lab. a week. Pr.: Biol. 198 or equiv. 050-420-1-3-0404

### Undergraduate And Graduate Credit In Minor Field

**050 501. Plant Pathology.** (3) I, II. An introductory course on the nature, cause, and control of crop diseases. One hour lec. and two hours lab. a week. Pr.: Biol. 198, 210 or equiv. 050-501-1-5-0404

### Undergraduate And Graduate Credit

**050 610. Plant Disease Diagnosis.** (1) I. Practical experience in diagnosing plant diseases in fields, lawns and gardens. Two hours combined rec. and lab. a week. Pr.: Plant Path. 501 and concurrent enrollment in 030 611 required. 050-610-1-2-0404

**050 615. Diseases of Field Crops.** (3) II. Diseases of cereals, forage and fiber crops; their causes, symptoms, life histories, epidemiology and control. Two hours rec. and two hours lab. a week. Pr.: Plant Path. 501. 050-615-1-5-0404

**050 625. Diseases of Horticultural Crops.** (3) I. Diseases of vegetables, fruit and ornamental plants; their causes, symptoms, life histories and control. Two hours rec. and two hours lab. a week. Pr.: Plant Path. 501. 050-625-1-5-0404

**050 635. Properties of Pesticides.** (2) I. A discussion of the nature, mode of action, and fate of agricultural pesticides used on crops. Two hours rec. a week. Pr.: Biochem. 120 or equiv. 050-635-0-0404



**050 651. 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 hours 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. 230, Entom. 312 and 313, Plant Path. 420 and 501. 050-651-0-0404

**050 655. Integrated Pest Management.** (3) II. The systematics of all facets of pest management presented on a crop basis. Cultural, biological, chemical and legal methods of pest management are employed in developing models for integrated controls. Three hours lec. a week. Pr.: Senior standing in Crop Protection Curriculum or consent of instructor. Offered in cooperation with Agronomy and Entomology. 050-655-0-0404

**050 715. Plant Pathogens.** (4) I. A study of the principles and techniques of plant pathology with emphasis on crop diseases caused by bacteria, fungi, nematodes and viruses. Two hours lec. and four hours lab. a week. Staff-taught. Pr.: Biol. 198 or 210. 050-715-1-3-0404

**050 716. Plant Disease Development.** (2) II. Detailed study of host:pathogen interactions (physiologic, genetic, environmental, epidemiological) using selected host:pathogen models. One lec. and one two-hour lab. a week. Staff-taught. Pr.: Plant Path. 715. 050-716-1-3-0404

**050 725. Topics in Nematology.** (1) II. The morphology, taxonomy and biology of, and techniques used in the study of non-plant parasitic nematodes. Three hours of combined rec. and lab. a week. Pr.: 050 420 or concurrent enrollment. 050-725-1-3-0404

**050 730. General Virology.** (3) II. (Same as Biology 730.) The theoretical and experimental bases of virology, with special emphasis on the role of the virus as a controlling force in cellular biology; principles of host-virus interactions; introduction to use of plants and mammalian cell cultures as the host for virus propagation. Pr.: Twelve hours of biological sciences, including Biol. 450 or equiv. and Biochem. 521 or equiv. Consent of instructor. (Taught in cooperation with the Division of Biology.) 050-730-0-0404

**050 750. Problems in Plant Pathology.** (1-3) I, II, S. Work is offered in general plant pathology, plant virology, plant nematology, disease physiology, and epidemiology. Pr.: Background of courses needed for the problem undertaken. 050-750-3-0404

#### Graduate Credit

**050 860. Host Plant Resistance to Disease.** (2) II. Offered in 1978-79 and alt. 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 per week. Pr.: Plant Path. 501 and a basic course in genetics. 050-860-0-0404

**050 870. Seminar in Plant Pathology.** (1) I, II. Reports in the field of plant pathology. Pr.: Consent of instructor. 050-870-0-0404

**050 899. 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. 050-899-4-0404

**050 900. Plant Virology.** (3) I. Offered 1978-79 and alt. years. A study of the virus diseases of plants with emphasis on the chemical, physical, and biological properties of the causal agents. Two hours rec. and three hours lab. a week. Pr.: Plant Path. 715 or 730, Biochem. 521 or equiv., and consent of instructor. 050-900-1-4-0404

**050 910. Physiology of Plant Disease.** (3) II. Offered 1978-79 and alt. years. A discussion of changes in the physiology and biochemistry of the host and the 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. Two hours rec. and three hours lab. a week. Pr.: Biol. 600 and a course in biochemistry, or consent of instructor. 050-910-1-4-0404

**050 920. Topics in Plant Pathology.** (Var.) I, II, S. Discussions and lectures on important areas and contributions in the field of phytopathology. Pr.: Graduate standing. 050-920-0-0404

**050 999. 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. 050-999-4-0404







# College of Architecture and Design

*Bernd Foerster, Dean*

*William R. Jahnke, Assistant Dean*

The College of Architecture and Design provides the opportunity for professional study in 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 (FIDR). The landscape architecture curriculum is accredited by the American Society of Landscape Architects (ASLA). The planning curriculum is recognized by the American Institute of Planners in cooperation with the Association of Collegiate Schools of Planning.

The College of Architecture and Design consists of five administrative departments: Pre-Design Professions, Architecture, Interior Architecture, Landscape Architecture and Regional and Community Planning.

Bachelor's degrees are offered in each of the following areas:

Architecture (curriculum on page 81)

Interior Architecture (curriculum on page 81)

Landscape Architecture (curriculum on page 81)

## 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 a number of students. Early development of such academic plans will facilitate coordination of courses and permit completion of degree requirements in a minimum number of semesters. Interested students should consult the assistant dean.

## Graduate Programs

The College of Architecture and Design offers graduate study leading to the Master of Architecture, Master of Landscape Architecture or Master of Regional and Community Planning degrees. Additional information on the graduate programs is included under Graduate School, page 30.

## Transfer Students

It is advised that students enter the college at the freshman level. Transfer credits for professional courses will be accepted by the Pre-Design Professions department if they are earned in environmental design programs accredited by NAAB, ASLA or FIDER. Students wishing to transfer credits from programs not accredited by one of these agencies will be afforded an opportunity to be evaluated or examined for each applicable course. A portfolio of the student's work and/or an interview may be required.

In order to complete the program in the least amount of time, it may be necessary for transfer students to attend summer school before their first fall semester in the college.

## Summer School

Entering freshmen and transfer students will find that some courses may be taken during the summer session. Such courses are especially advantageous for transfer students and those who wish to remove deficiencies. Detailed information on specific courses is contained in the Summer School Catalog, which may be obtained from the Director of Admissions, Kansas State University, Manhattan, KS 66506.

## Student Projects

All programs within the College of Architecture and Design involve extensive project work. Students are cautioned to budget sufficient funds to cover the cost of materials and supplies, many of which are expendable. Material costs will be higher than those published for non-studio curricula.

Student projects, assignments, presentations and models may be retained by the various departments. Students are advised to assemble a photographic file of their work for their portfolio.

## 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.

## Pre-Design Professions Program

The curricula in architecture, interior architecture and landscape architecture start in the beginning of the third year, and students are not admitted prior to successful completion of the pre-design professions curriculum. This two-year program provides common background and skills, and enables students to select their field on the basis of understanding gained in the college. Admission to the professional programs is determined every spring by the faculty in each department. Selection criteria include evidence of motivation, aptitude and scholarship.

## Pre-Design Professions—100PDP

Total of 65 credit hours

Total of 65 credit hours		FIRST YEAR			
First Semester		Second Semester			
104 200	Env. Des. Ed. & Univ. . . . .	1	104 201	Survey Des. Prots. . . . .	1
104 210	Des. Graphics I . . . . .	3	104 211	Des. Graphics II . . . . .	3
229 100	English Comp. I . . . . .	3	229 120	English Comp. II . . . . .	3
	Limited Electives . . . . .	8		Limited Electives . . . . .	10
261 001	Concepts P.E. . . . .	1			
281	Oral Communications . . . . .	2			
		18			17
		SECOND YEAR			
Third Semester		Fourth Semester			
104 250	Hist. Des. Envr. I . . . . .	3	104 251	Hist. Des. Envr. II . . . . .	3
104 260	Envlr. Des. Studio I . . . . .	4	104 261	Envlr. Des. Studio II . . . . .	4
104 271	Elem. & Iss. of Env. Des. . . . .	2	104 280	Landscape Ecology . . . . .	2
104 290	Basic Constr. Tech. I . . . . .	3	104 291	Basic Constr. Tech. II . . . . .	3
	Limited Electives . . . . .	3		Limited Electives . . . . .	3
		15			15

A minimum of 65 hours is required in Pre-Design Professions.

## Professional Curriculum in Architecture—115AR

Fifth Semester			Sixth Semester		
105 401	Arch. Des. Studio I	5	105 402	Arch. Des. Studio II	5
105 413	Envir. Syst. Arch. I	4	105 520	Envir. Syst. Arch. II	3
105 450	Struct. Syst. Arch. I	3	105 451	Struct. Syst. Arch. II	3
			105 433	Arch. Constr. I	3
	Electives*	6		Electives*	3
		18			17

Seventh Semester			Eighth Semester		
105 603	Arch. Des. Studio III	5	105 604	Arch. Des. Studio IV	5
105 521	Envir. Syst. Arch. III	3		Electives*	10
					15
105 434	Arch. Construction II	3			
109 315	Intro. to Planning	3	OR		
	Electives*	3	**105 504	Arch. Internship	15
		17			15
Ninth Semester			Tenth Semester		
105 801	Arch. Des. Studio V	5	105 802	Arch. Des. Studio VI	5
105 756	Topics Pro. Prac. I	2	105 757	Topics Pro. Pract. II	2
105 800	Arch. Des. Program	2			
	Electives*	8		Electives*	10
		17			17

\*Students must successfully complete at least 18 professional support elective credits and as many as 22 free elective credits.

\*\*Architecture Internship may be elected in either the eighth or ninth semester in lieu of 10 professional support elective credits and either Arch. Des. Studio IV or Arch. Des. Studio V.

## Interior Architecture Program—150ARI

Fifth Semester			Sixth Semester		
107 401	Int. Arch. Des. Studio I	5	107 402	Int. Arch. Des. Studio II	5
107 409	Finishing	3	107 420	Theory of Furn. Des.	2
107 413	Env. Systems in Arch. I	4	105 520	Envir. Syst. Arch. II	3
107 415	Hist. Int. Arch.	2		Art Electives	4
	Electives	3		Electives	3
		17			17
Seventh Semester			Eighth Semester		
107 603	Int. Arch. Des. Studio III	5	107 604	Int. Arch. Des. Studio IV	5
107 407	Design Workshop I	3	107 608	Design Workshop II	3
105 433	Arch. Construction I	3	160 260	Textiles	3
105 521	Envir. Syst. Arch. III	3		Electives	6
	Electives	3			
		17			17
Ninth Semester			Tenth Semester		
107 801	Int. Arch. Des. Studio V	5	107 802	Int. Arch. Des. Studio VI	5
107 710	Design Workshop III	4	107 783	Contempr. Furn. Des.	4
105 720	Sem. Env. Behavior	3	107 820	Int. Arch. Seminar	3
107 753	Contract Des. Pract. I	2	107 754	Contract Des. Pract. II	2
	Electives	3		Electives	2
		17			16

## Landscape Architecture Program—180LAR

Fifth Semester			Sixth Semester		
110 431	Landsc. Arch. Des. Studio I	4	110 432	Landsc. Arch. Des. Studio II	4
110 436	Landsc. Construction I	3	110 437	Landsc. Construction II	3
040 372	Woody Plant Materials**	4	110 204	L.A. Delineation Tech.	2
525 212	Elem. Surveying Engr.*	3	109 315	Intro. Planning	3
	Science Elective	3		Science Elective***	3
		17			15
Seventh Semester			Eighth Semester		
110 641	Landsc. Arch. Des. Studio III	4	110 642	Landsc. Arch. Des. Studio IV	4
110 647	Landsc. Construction III	3	040 508	Landsc. Horticulture	3
110 434	Planting Design I	3	110 435	Planting Design II	3
110 501	Landsc. Arch. Seminar	1	110 510	Landsc. Arch. Seminar	1
110 756	Des. Parks & Rec. Areas	3	525 718	Photo Interpretation	3
	Art Elective	2	110 644	Community Site Planning	3
		16			17

(SUMMER INTERNSHIP\*\*\*\*)

Ninth Semester			Tenth Semester		
110 801	Landsc. Arch. Design V	5	110 802	Landsc. Arch. Design VI	5
110 643	Planting Design III	3	110 753	Professional Practice	2
110 501	Landsc. Arch. Seminar	1	110 501	Landsc. Arch. Seminar	1
	Business Elective	3		Business Elective	3
	General Elective	3		General Elective	4
110 645	Professional Intern.****	2	110 433	History & Theory L.A.	3
		17			18

\*Surveying is taught in Civil Engineering and Plane Trigonometry (245 150), or equivalent, is a prerequisite.

\*\*Woody Plant Materials is taught in Horticulture and Forestry and the prerequisite is one of these three courses: Princ. of Biology, 215 198; General Botany, 215 210; or Hort./Agronomy, Plant Science, 040 200.

\*\*\*A special course in Agronomy, Soil Interpretations for Land-use Planning, 105 675, is available for Landscape Architects and Planners.

\*\*\*\*Internship in a professional office is completed during the summer and the student is enrolled and credited in the next fall semester.



## PRE-DESIGN PROFESSIONS

*Ifan Payne, Head of Department*

Professors Ealy,\* Foerster,\* and Krider;\* Associate Professors Clark, Martin, Payne and Wendt; Assistant Professors Beckwith, Castro, Chelz, Friedberg,\* Law, Lippenberger, Longstreth, Marshall, Melnick, Quinn, Spurgeon, Van Oudenallen, and Weisman;\* Instructors McDonald, and Tilson; Emeritus: Professor Fischer.

For curriculum see page 81.

**104 200. Environmental Design Education and the University.** (1) I. Introduction to environmental design education; discovery of the resources of the department, college, and university. One hour lec. per week. 104-200-0-0201

**104 201. Survey of the Design Professions.** (1) II. Illustrates the challenges and career opportunities of the design professions; identification of attitudes and aptitudes required of environmental designers. One hour lec. per week. 104-201-0-0201

**104 210 and 104 211. Design Graphics I and II.** Intensive skill development in graphic communication: utilizing media to visualize and record physical design information, including the methodologies of orthographic, oblique, and perspective systems. Exercises in freehand, instrumental diagrammatic, computer, numerical, and presentation modes. Six hours lab. per week.

**104 210. Design Graphics I.** (3) I, II, S. 104 210-1-0201

**104 211. Design Graphics II.** (3) I, II, S. Pr.: 104 210. 104-211-1-0201

**104 260 and 104 261. Environmental Design Studio I and II.** Visualization and representation of spatial concepts; approaches to physical design; exercises and experiments involving space organization, form, color, texture, materials, structure, and climate; interaction of functional, material, social, and aesthetic needs. Ten hours studio and lec. per week.

**104 260. E.D.S.I.** (4) I, II, S. Pr.: 104 211. 104-260-1-0201

**104 261. E.D.S.II.** (4) I, II, S. Pr.: 104 260. 104-261-1-0201

**104 271. Elements and Issues of Environmental Design.** (2) I. Principles of environmental design; attitudes toward the physical surroundings; identification of issues confronting environmental designers; exposure to and reinforcement of the design vocabulary. Two hours lec. per week. Pr.: Second year classification. 104-271-0-0201

**104 280. Landscape Ecology.** (2) II. An understanding of the relationship of people to their natural environment, and the role of the physical planner in that relationship. Two hours lec. per week. 104-280-0-0201

**104 290 and 104 291. Basic Construction Technology I and II.** 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. Principles of mechanics and strength of materials; types of loads and methods of load transfer; conceptual approach to structures; interrelation of structural systems; economic considerations and design criteria. Three hours lec. per week.

**104 290 B.C.T.I.** (3) I, II, Pr.: 104 211. 104-290-0-0201

**104 291 B.C.T.II.** (3) I, II, Pr.: 104 290. 104-291-0-0201

**104 250 and 104 251. 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 lectures per week.

**104 250 H.D.E.I.** (3) I, Pr.: None. 104-250-0-0201

**104 251 H.D.E.II.** (3) II, Pr.: None. 104-251-0-0201

**104 299. 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 Dept. Head. 104-299-4-0201

**104 370. 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.: 104 208 and two hours drawing credit. 104-370-0-0201

**104 380. Visual Thinking.** (2) Intersession. An analysis of man's recognition, visualization, and recording of environmental experiences. Experimental exercises in sensory stimulation and response recording. 104-380-0-0201

**104 510. Man and His Surroundings.** (3) II, S. Man as builder-modifier; 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 lecture-discussion per week. Not for students in architecture, interior architecture and landscape architecture. 104-510-0-0201

**104 520. 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/Arch. and Design majors by permission of the Dept. Head only. 104-520-0-0201

**104 699. 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. 104-699-4-0201

## ARCHITECTURE

*Eugene Kremer,\* Head of Department*

Professors Chang,\* Foerster,\* Helntzelman,\* Jahnke,\* and Krider;\* Associate Professors Bryant, Burnham, Christensen,\* Clark, DeVilbiss, Ernst,\* Hall,\* Kremer,\* Reid,\* Sanner,\* Selfridge,\* Slack, Stotesbury,\* and Weisenburger;\* Assistant Professors Castro, Desmarais, Friedberg,\* Mross, Longstreth, Quinn, Shepard, Van Oudenallen, Welsman,\* Wendt, and Windley;\* Instructors Locker and Snead; Emeritus: Professors Chadwick, Fischer and Welgel.

For curriculum see page 81.

The Bachelor of Architecture professional program consists of a three-year course of study following the two-year pre-design professions 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 Professional Architectural Licensing Exam, without the need to take a qualifying examination in most states.

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 profession which are rapidly supplanted by new social, political, and technological developments.



The design studio experience forms the core of the program, where concepts earlier introduced through courses in human needs, history, construction technology, structures, and environmental control systems are synthesized. An elective thirty-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.

Emphasis areas in the Master of Architecture curriculum accommodate students with four-year baccalaureate degrees or graduates of five- or six-year accredited programs in architecture. Applicants are considered upon the merits of their academic backgrounds and proposed programs of study.

## Courses in Architecture

### Undergraduate Credit

**105 301. 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. 105-301-0-0202

**105 401 and 105 402. 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 per week.

**105 401. A.D.S. I.** (5) I. Pr.: Admission to the Professional Program and 104 261. 105-401-1-0202

**105 402. A.D.S. II.** (5) II, S. Pr.: 105 401. 105-402-1-0202

**105 413. 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. 105-413-0-0202

**105 433 and 105 434. Architectural Construction I and II.** (3) Assemblage and components of construction systems; materials; building economics; specifications. Written and graphic construction communication. Seven and one-half hours lab. per week.

**105 433. Arch. Constr. I.** (3) I, II. Pr.: 104 291. 105-433-1-0202

**105 434. Arch. Constr. II.** (3) II, S. Pr.: 105 433. 105-434-1-0202

**105 450. Structural Systems In Architecture I.** (3) 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. per week. Pr.: Admission to a professional program in the College and 104 290, 104 291. 105-450-1-0202

**105 451. Structural Systems In Architecture II.** (3) Continuation of the study of major sub-systems begun in 105 450, 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. per week. Pr.: 105 450. 105-451-1-0202

**105 460. Mosaic.** (2) I, II. Design and execution of mosaic compositions in glass, stone and other materials; study of historic and modern examples of mosaic and related media, with particular reference to their architectural uses and techniques. May be taken for a total of six (6) credits. Six hours lab. a week. Pr.: Sophomore classification and six credits in Art or approval of instructor. 105-460-1-0202

**105 475. 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. 105-475-3-0202

**105 504. Architectural Internship.** (15) I, II. 30 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.: 105 434, 105 603, and approval of the Department Head. 105-504-2-0202

### Undergraduate And Graduate Credit In Minor Field

**105 514 and 105 515. Environmental Systems In Architecture II and III.** (3) and (3). 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. per week.

**105 514. E.S.A. II.** (3). Pr.: 105 413. 105-514-0-0202

**105 515. E.S.A. III.** (3). Pr.: 105 413. 105-515-0-0202

**105 566. 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. 105-566-3-0202

**105 601. 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. per week. Pr.: 104 261 or approval of instructor. 105-601-0-0202

**105 603. Architectural Design Studio III.** (5) I. Problem analysis and program development, generation of alternate solutions, selection and refinement of the building design. Fifteen hours studio per week. Pr.: 105 502. 105-603-1-0202

**105 604. 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 per week. Pr.: 105 603. 105-604-1-0202

**105 655. 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. 105-655-2-0202

### Undergraduate Or Graduate Credit

**105 703. Environmental Aesthetics.** (3) II. Problems involving aesthetics in areas related to student's major field. Three hours per week. Pr.: Senior standing in Architecture, Landscape Architecture, Interior Architecture, Architectural Structures, Urban Design. 105-703-0-0202

**105 704. Environmental Seminar.** (Var.) I, II. Environmental systems related to human perception, reactions and behavior. Pr.: Senior standing. 105-704-3-0202



**105 730. 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 per week. Pr.: Senior or graduate standing. 105-730-0-0202.

**105 752. 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 105 450 and 105 451. Pr.: 105 450, 105 451. 105-752-varies-0202

**105 756 and 105 757. 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. per week.

**105 756. Topics I.(2)** I, II. Pr.: Fourth year standing. 105-756-0-0202

**105 757. Topics II.(2)** I, II. Pr.: Fourth year standing. 105-757-0-0202

**105 765. 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. 105-765-3-0202

**105 800. Architectural Design Programming.** (2) I, II, S. Independent development of the program for 105 802, Architectural Design VI, under the direction of a faculty committee. Must be taken in residence and may be concurrent with 105 604 or 105 801. Pr.: 105 603 and approval of the faculty committee. 105-800-3-0202

**105 801. Architectural Design Studio V.** (5) I, II. Integration of the physiological, psychological, and sociological parameters in the design of Man'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 per week. Pr.: 105 604. 105-801-1-0202

**105 802. Architectural Design Studio VI.** (5) I, II. Terminal Project: Analysis, programming, and development of a selected project approved by the faculty. Complete integration of function, space definition systems, and environmental technology. Fifteen hours studio per week. Pr.: 105 800 and 105 801. 105-802-1-0202

**105 710. 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. 105-710-0-0202

**105 715. Theory of Design.** (3) I. Analysis of theories and philosophies in the design professions including those in related societal and technological fields. Pr.: 105 603 or 107 603 or 110 641. 105-715-0-0202

**105 720. Seminar In Environmental 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 man-built environment. Three hours lecture-seminar per week. Pr.: Senior standing or permission of instructor. 105-720-0-0202

**105 725. 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 per week. Pr.: Senior standing. 105-725-0-0202

## Graduate Credit

**105 810. Research in Architecture.** (Var.) I, II, S. Study in architecture and related fields leading to thesis or non-thesis project. Pr.: Approval of instructor. 105-810-4-0202

**105 830. Advanced Architectural Design.** (Var.) I, II, S. Studies related to a comprehensive program in architecture. Pr.: 105 802. 105-830-3-0202

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## INTERIOR ARCHITECTURE

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*Jack C. Durgan, Head of Department*

Professor Durgan; Associate Professor McGraw;\* Assistant Professors Haycock and Murphy; Instructor Wells.

The Bachelor of Interior Architecture professional program consists of a three-year course of study following the two-year pre-design professions program.

The curriculum in interior architecture is structured for students who plan a professional career in space planning in the areas of 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 related to these particular areas. 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.

Graduates are generally employed by professional architectural offices, space planning and interior design firms, and corporate organizations.

## Graduate Work

The degree Master of Architecture is available to students holding a four-year bachelor's degree or a five- or six-year architectural degree who wish to concentrate in interior architecture.

## Courses in Interior Architecture

### Undergraduate Credit

**107 406. Problems In Interior Architecture.** (Var.) I, II, S. Study of specific interior architectural problems under direct supervision of a member of the departmental staff. Pr.: Approval of instructor. 107-406-0-0203

**107 409. Finishing.** (2) II. Methods of finishing various materials in interiors. Six hours lab. a week. Pr.: 104 261. 107-409-0-0203

**107 414. General Design Workshop.** (3) S. Design, construction and finishing of contemporary furniture and accessories. Pr.: Open to all students in the University with junior standing. 107-414-1-0203

**107 415. History of Interior Architecture.** (2) I. History of the design of architectural interiors and its related components. Special emphasis upon the developments of the 20th century. Pr.: Admission to professional program in architecture, interior architecture, or landscape architecture. Two hours lec. 107-415-0-0203

**107 420. 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. 107-420-0-0203



### Undergraduate Credit And Graduate Credit

**107 401, 402, 603, 604, 801, and 802. 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.**

**107 401. Interior Architectural Design Studio I.** (5) I, II, S. Pr.: Admission to professional program and 104 261. 107-401-1-0203

**107 402. Interior Architectural Design Studio II.** (5) II, S. Pr.: 107 401. 107-402-1-0203

**107 603. Interior Architectural Design Studio III.** (5) I, S. Pr.: 107 402. 107-603-1-0203

**107 604. Interior Architectural Design Studio IV.** (5) II, S. Pr.: 107 603. 107-604-1-0203

**107 801. Interior Architectural Design Studio V.** (5) I, S. Pr.: 107 604. 107-801-1-0203

**107 802. Interior Architectural Design Studio VI.** (5) II, S. Pr.: 107 801. 107-802-1-0203

**107 407, 408, and 710. 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.

**107 407. Design Workshop I.** (3) I, S. Pr.: Admission to a professional program and consent of instructor. 107-407-1-0203

**107 408. Design Workshop II.** (3) II, S. Pr.: 107 407. 107-408-1-0203

**107 710. Design Workshop III.** (4) I, S. Pr.: 107 408 or graduate standing. 107-710-1-0203

**107 753. Contract Design Practice I.** (2) I. Introduction to business practice, specification and contract document procedures, purchasing and professional responsibilities. Pr.: 107 604 or graduate standing. 107-753-0-0203

**107 754. Contract Design Practice II.** (2) II. Evaluation, selection and specification of interior architectural materials, surfaces and finishes. Pr.: 107 753. 107-754-0-0203

**107 783. Contemporary Furniture Design.** (4) II, S. Experimentation in the design of spatial component systems, utilizing advanced techniques in construction methods and materials. Pr.: 107 710 or graduate standing. 107-783-1-0203

### Graduate Credit

**107 820. Interior Architecture Seminar.** (3) II, S. Readings and discussions of contemporary thought and movements within the field of Interior Architecture with special emphasis on the societal factors which produce and affect change. Pr.: 107 801 or graduate standing. 107-820-0-0203

**107 821. Advanced Interior Architectural Design.** (4) I, II, S. Advanced study of interior space planning and interior component design. Pr.: Professional design degree. 107-821-0-0203

**107 830. Problems in Interior Architecture.** (Var.) I, II, S. Study of specific interior architectural problems under direct supervision of a member of the departmental staff. Pr.: Professional design degree and approval of instructor. 107-830-3-0203

**107 840. Advanced Design Workshop.** (3) S. Advanced instruction in the design, construction and finishing of contemporary furniture and accessories. Pr.: Graduate standing. 107-840-1-0203

## LANDSCAPE ARCHITECTURE

*Robert P. Ealy,\* Head of Department*

Professor Ealy;\* Associate Professors Barnes,\* Day,\* Oblinger,\* and Page;\* Assistant Professors Austin,\* Haldeman,\* Lin,\* and Melnick; Instructor Edison; Assistant Instructor Law. Emeritus: Professor Quinlan.

The Bachelor of Landscape Architecture professional program consists of a three-year course of study following the two-year pre-design professions program.

The curriculum is designed to prepare students for the field of 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 American Society of Landscape Architects.

### Graduate Study

Individual graduate programs in the Master of Landscape Architecture curriculum can accommodate students with a Bachelor's degree in many fields of study. Applicants are considered on the merits of their academic background and proposed program of study.

## Courses in Landscape Architecture

### Undergraduate Credit

**110 204. Landscape Architectural Delineation Techniques.** (2) 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.: 104 210, 211, 260, and 261. 110-204-1-0204

**110 250. 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 per week. A general service course for non-Architecture and Design majors. 110-250-1-0204

**110 431 and 110 432. Landscape Architectural Design Studio I & 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.

**110 431. L.A.D. I.** (4) I. Two hours lec. and six hours design studio per week. Pr.: Admission to the Professional Program and 104 261, 280. 110-431-1-0204

**110 432. L.A.D. II.** (4) II. Two hours lec. and six hours design studio per week. Pr.: 110 431. 110-432-1-0204

**110 433. History and Theory of Landscape Design.** (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 L.A. Program. 110-433-0-0204

**110 434. Planting Design I.** (3) I. Use of plants as design elements in landscape architectural developments. Plant characteristics of value to the landscape architect. Plant adaptation and ecological considerations. Three hours lec. per week. Field trips required. Pr.: 040 372, 104 280. 110-434-1-0204



**110 435. Planting Design II.** (3) II. Preparation of planting plans and their use as working drawings; specification writing; contractor relationships and maintenance procedures. Eight hours studio per week. Pr.: 110-434. 110-435-1-0204

**110 436. 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.: 104 280, 290, 291. Conc. with 525 212. 110-436-1-0204

**110 437. Landscape Construction II.** (3) II. Cont. of L.A. 436. To include site layout, road alignment, construction detailing and cost estimating. Two hours lec. and six hours studio a week. Pr.: L.A. 436. 110-437-1-0204

**110 440. Problems in Landscape Design.** (Var.) I, II, S. Assigned problems and reports in the area of landscape architecture. Pr.: Junior standing. 110-440-3-0204

### Undergraduate And Graduate Credit In Minor Field

**110 501. Landscape Architecture Seminar.** (1) 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. 110-501-2-0204

**110 641 and 110 642. Landscape Architectural Design Studio III & 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.

**110 641. L.A.D. III.** (4) I. Twelve hours design studio per week. Pr.: 110 432 and 110 436. 110-641-1-0204

**110 642. L.A.D. IV.** (4) II. Twelve hours design studio per week. Pr.: 110 641 and 110 437. 110-642-1-0204

**110 643. Planting Design III.** (3) I. A continuation of Planting Design II at a more comprehensive scale. Pr.: 110 435. 110-643-1-0204

**110 645. 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.: 110 432, 110 437. 110-645-2-0204

**110 647. Landscape Construction III.** (3) I. Cont. of L.A. 437 to include utilities routing, area lighting, irrigation systems and construction specification writing. Two hours lec. and six hours studio a week. Pr.: L.A. 437. 110-647-1-0204

### Advanced Undergraduate And Graduate Credit

**110 741. Problems In Landscape Architecture.** (Var.) I, II, S. Specific problems and/or reports in the area of landscape architecture. Pr.: Advanced undergraduate standing or graduate standing. 110-741-3-0204

**110 744. Community Site Planning.** (3) II. Growth and development of cities and towns; land subdivision. Eight hours lab. a week. Pr.: Planning 315 or consent of instructor. 110-744-1-0204

**110 750. 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. 110-750-0-0204

**110 753. 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. 110-753-0-0204

**110 755. Site Analysis and Planning.** (3) II. An ecological approach to analysis of the earth's surface as a base plane for the projects of the architect, landscape architect and planner. Six hours studio a week. Pr.: 104 280, C.E. 212 or consent of instructor. 110-755-1-0204

**110 756. 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. 110-756-0-0204

**110 757. Design for Special Populations.** (3) II. Design of exterior environments to accommodate the handicapped and disadvantaged individual. Pr.: Advanced undergraduate or graduate standing. 110-757-0-0204

**110 758. 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. 110-758-1-0204

**110 759. Landscape Resource Evaluation.** (3) I, II, S. 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. 110-759-0-0204

**110 801 and 110 802. Landscape Architectural Design Studio V & 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.

**110 801. L.A.D. V.** (5) I. Fifteen hours design studio per week. Pr.: 110 642 and 110 647. 110-801-1-0204

**110 802. L.A.D. VI.** (5) II. Terminal project. Individual studies approved by departmental faculty. Fifteen hours design studio per week. Pr.: 110 801 and 110 643. 110-802-1-0204

### Graduate Credit Only

**110 860. Advanced Planting Design.** (1-4) I, II, S. Special studies and designs in advanced planting design. Pr.: 110 643. 110-860-4-0204

**110 870. Advanced Landscape Architecture.** (1-4) I, II, S. Special studies and designs in advanced landscape architecture. Pr.: L.A. 802. 110-870-4-0204

**110 880. Advanced Landscape Construction.** (1-4) I, II, S. Specialized study of large-scale landscape planning involving landscape construction and grading. Pr.: L.A. 647. 110-880-4-0204

**110 899. 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. 110-899-4-0204



## REGIONAL AND COMMUNITY PLANNING

Vernon P. Deines,\* Head of Department

Professors Deines\* and Foerster;\* Associate Professors Barnes,\* Bereuter, Ernst,\* McGraw,\* Reid,\* Selfridge,\* and Weisenburger;\* Assistant Professors Keithley,\* Keller,\* and Nanetti.

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 on an interdepartmental basis in cooperation with the Departments of Architecture, Civil Engineering, Economics, Geography, Landscape Architecture, Political Science and Sociology and the Colleges of Agriculture, Business Administration, Education and Home Economics.

Applicants with undergraduate degrees in administration, agriculture, architecture, business, construction science, economics, ecology, education, engineering, geology, geography, government, home economics, landscape architecture, 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.

Undergraduate students may elect to take planning courses either in preparation for graduate study or in fulfillment of undergraduate minors, options and electives.

The following list indicates suggested undergraduate study in Planning:

- Introduction to Planning
- Planning and Development Codes
- Community Development Workshop
- City Planning I
- Regional Planning I
- Housing and Renewal
- Planning Theory
- Economics I, Economics II and Urban and Regional Economics
- Man, Space and the Environment and Urban Geography
- Introduction to Sociology and Urban Sociology
- Principles of Political Science and Urban Politics
- A course in Statistics
- A course in Data Processing

The following list indicates a suggested undergraduate option in Urban Design and Planning for students in the design and construction professions:

- Introduction to Planning
- Planning and Development Codes
- Community Development Workshop
- City Planning I
- Urban Design I
- Housing and Renewal
- Urban Visual Analysis
- Institutional Planning and Development
- Economics I, Economics II and Urban and Regional Economics
- Man, Space and the Environment and Urban Geography
- Introduction to Sociology and Urban Sociology
- Urban Transportation Analysis I
- Site Analysis and Planning

- Environmental Aesthetics
- Principles of Political Science and Urban Politics
- A course in Statistics
- A course in Data Processing

Graduate students also may work towards the traditional one-year Professional Master's Degree, Master of Arts or Master of Science degree with a minor in Urban design or planning. Select a minor from the following courses:

- Planning Principles
- Housing and Renewal
- Urban Visual Analysis
- Institutional Planning and Development
- Planning Theory
- City Planning I and II
- Urban Design I and II
- Regional Planning I and II
- Seminar in Planning
- Planning Administration and Implementation
- Advanced Planning Theory
- Topics in Planning

### Courses in Regional and Community Planning

#### Undergraduate Credit

**109 315. 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. 109-315-0-0206

#### Undergraduate And Graduate Credit

**109 610. Community Development Workshop.** (Var.) I, II, S. Application of interdisciplinary and interprofessional team techniques to the organization, planning, design, development and evaluation of community development projects on specific topics with real clients and actual locations. Pr.: Introduction to Planning or equivalent course and approval of the instructor. 109-610-2-0206

**109 620. Planning and Development Codes.** (3) I, II. Introduction to federal, state and local legislation and interpretation of codes related to planning, design and construction. Pr.: Plan. 315 or equivalent and junior standing. 109-620-0-0206

#### Undergraduate And Graduate Credit

**109 700. Planning Analysis.** (3) I, II. Introduction to quantitative methods in planning to measure change in the socio-economic-political-physical environment and to analyze the interrelations that guide formulation of comprehensive planning. Pr.: Plan. 315 or equivalent. 109-700-1-0206

**109 705. Planning Communications.** (Var.) I. Study and application of communication concepts and media utilized in regional and community planning to convey information regarding the spatial and aspatial aspects of the environment. Pr.: Senior standing and approval of instructor. 109-705-1-0206

**109 710. 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 or equiv. 109-710-1-0206



**109 715. 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. 109-715-0-0206

**109 720. 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 or equivalent and nine other credit hours in planning and/or administration courses. 109-720-0-0206

**109 725. 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. 109-725-0-0206

**109 735. City Planning I.** (3) I, S. 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. 109-735-1-0206

**109 745. Urban Design I.** (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, 715 or 725. 109-745-1-0206

**109 750. Housing and Renewal.** (3) II. Review and evaluation of federal, state and local policies and programs of urban renewal and housing. Pr.: Plan. 715 or 725. 109-750-0-0206

**109 755. Regional Planning I.** (3) II. 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 725. 109-755-1-0206

**109 760. Social Planning.** (3) I, II. Examination of Federal legislation, policies and programs for impact upon local social systems. Introduction to policy and program development on selected social issues within a comprehensive planning process. Pr.: Plan. 715 or equivalent. 109-760-0-0206

**109 770. Land Use Planning.** (3) I, II. Examination of legal history and modern judicial methods for land use regulation within constitutional limits. Introduction to zoning, subdivision and other police power controls within a comprehensive planning process. Pr.: Plan. 715 or equivalent. 109-770-0-0206

#### Graduate Credit

**109 800. Research Methods in Planning.** (3) I, II. Considerations in the selection, collection, analysis and interpretation of data. Introduction to modeling, information systems, planning studies, forecast techniques, and computer programs. Pr.: Plan. 715 or equivalent and one course each in graphics, statistics, and computer programming. 109-800-1-0206

**109 805. Internship in Planning.** (0) I, II, S. Assignment to a planning staff for a period of at least 10 weeks; supervision by a professional planner with periodic reports of activities to planning faculty. Pr.: Completion of two semesters of graduate study in planning. 109-805-2-0206

**109 810. 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 concurrent enrollment. 109-810-2-0206

**109 815. Seminar in Planning.** (Var.) 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 in planning or urban design. 109-815-0-0206

**109 820. Planning Administration and Implementation.** (3) I, II. Considerations for the planning director in the administration of the planning function and the implementation of the planning process. Pr.: Completion of one semester of graduate study in planning. 109-820-0-0206

**109 825. 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. 109-825-0-0206

**109 835. City Planning II.** (3) I. Synthesis of city growth and change in relation to planning theory and socio-economic-political determinants. Criteria and methodology for city analysis and planning are reviewed and applied to the elements of the contemporary city. Pr.: Plan. 735 or equiv. 109-835-1-0206

**109 845. Urban Design II.** (3) II. Synthesis of urban form and space in relation to aesthetic theories and values and socio-economic-political determinants. Criteria and methodology for urban design and planning are reviewed and applied to contemporary urban form and space. Pr.: Plan. 745 or equiv. 109-845-1-0206

**109 855. Regional Planning II.** (3) I. Synthesis of regional growth and change in relation to planning theory and socio-economic-political determinants. Criteria and methodology for regional analysis and planning are reviewed and applied to the elements of the contemporary region. Pr.: Plan. 755 or equiv. 109-855-1-0206

**109 880. 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. 109-880-0-0206

**109 890. 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. 109-890-4-0206

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## CENTER FOR COMMUNITY AND REGIONAL PLANNING

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*Vernon P. Daines, Director*

The Center for Community and Regional Planning has a three-fold function: the creation of public understanding of comprehensive planning and development; the supply of basic information about new techniques and programs in planning and development; and the conduct of research on planning and development problems and methods. These functions of the center are closely related to the graduate program in community and regional planning.







# College of Arts and Sciences

*William L. Stamey, Dean*

*William E. Carpenter, Associate Dean*

*Sara S. Chapman, Assistant Dean*

*John M. Lilley, Assistant Dean*

*Marjorie Cleland, Assistant to the Dean*

The College of Arts and Sciences through its 24 departments and one division offers programs of study which enable students to acquire a broad preparation for life in a democratic society, to obtain a sound basis for professional training, or to receive training in the specific skills required for their chosen field of endeavor. Although vocational preparation is not its primary objective, the College of Arts and Sciences does provide education that is intensely "practical." In this rapidly-changing American society the best "job insurance" is not narrow training in specific skills but broad training in general capabilities.

The courses offered in the College of Arts and Sciences provide students an opportunity to develop skills in communication, to appreciate the heritage of the past, to understand the laws of nature, to participate in the arts, and to maintain healthy bodies. Courses in specific subject matter provide the professional training for scientists, research workers, teachers, technicians, and writers.

The College of Arts and Sciences participates in the intercollegiate program in woman's studies, see page 40.

## Honors Program

Students who enter the College of Arts and Sciences with a potential for unusual scholastic attainment will be invited to participate in the honors program. This selection is based on the performance of students in high school and an evaluation of their ability in comparison with all entering students at Kansas State. The evaluation is determined by a study of performances on entrance tests which are administered to each student. Students participating in the honors program will have the requirements of their curriculums adjusted to their individual abilities and thus will be offered the opportunity of obtaining a more individualized program of study in consultation with an honors program adviser. Students previously enrolled in the College of Arts and Sciences who have demonstrated outstanding scholastic achievement may also be invited to participate in the honors program.

## Independent Study

The College of Arts and Sciences offers all students an opportunity to undertake independent

study and thereby to strengthen their capacity for independent judgment. These programs provide for independent reading in areas of general interest.

## Available Majors

A list of the areas in which students in the College of Arts and Sciences may major, together with the degrees offered, is given in the table below. The specific requirements for a degree in the various curriculums are indicated on subsequent pages.

### Degrees And Majors

The degrees within the College of Arts and Sciences are: Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Music, Bachelor of Science, and Bachelor of Science in Music. In addition to these degrees, the Associate of Arts and the Associate in Science degrees with unspecified majors are offered. The majors for the college with degree choices are:

Anthropology, BA or BS	Music
Art, BA or BFA	Music, BA
Biochemistry, BA or BS	Applied Music, BM
Biology, BA or BS	Music Education, BS in
General Biology	Music Education
Microbiology	Philosophy, BA
Fisheries & Wildlife Biology	Physical Education, BA or BS
Chemistry, BA or BS	Physics, BA or BS
General Chemistry	Political Science, BA or BS
Chemical Science	Pre-Dentistry, BA or BS
Computer Science, BA or BS	Pre-Law, BA or BS
Dance, BA or BS	Pre-Medicine, BA or BS
Economics, BA or BS	Pre-Nursing (non-degree)
English, BA	Pre-Optometry (non-degree)
General or Area Studies	Pre-Pharmacy (non-degree)
Humanities, BA	Pre-Physical Therapy
Life Science, BA or BS	(non-degree)
Physical Science, BA or BS	Pre-Veterinary Medicine
Social Science, BA or BS	(non-degree) <sup>1</sup>
Geography, BA or BS	Psychology, BA or BS
Geology, BA or BS	Recreation, BA or BS
Health, BA or BS	Social Work, BA or BS
History, BA or BS	Sociology, BA or BS
Journalism & Mass	General Sociology
Communications, BA or BS	Correctional
Journalism & Mass	Administration
Communications (Print)	Speech, BA or BS
Radio-Television	General Speech
Mathematics, BA or BS	Speech
Medical Technology, BS	Pathology-Audiology
Modern Languages, BA	Statistics, BA or BS

<sup>1</sup> 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.



**Teacher Certification.** Students working toward a B.A. or B.S. degree may, if they wish teacher certification for secondary schools, fulfill requirements for a major in most departments in the College of Arts and Sciences and teacher certification requirements in the College of Education. In either instance, the student will have an adviser in both colleges.

## General Education Requirements

In each of the curriculums there are requirements in general education that are to be fulfilled by courses chosen by students in consultation with their advisers. The aim of these requirements is to provide breadth in students' programs through some study in each of the major areas of knowledge outside the field of specialization. Introductory and intermediate level courses are available for this purpose in departments in the areas of natural sciences, social sciences, and humanities.

Only courses of two or more credit hours can fulfill general requirements. No more than three courses in history can be used to fulfill the requirements for humanities or social sciences. Credit for Intermediate Algebra may not be applied toward a degree.

## Transfer Students

General requirements for transfer to Kansas State University appear on page 6. Where specific departmental requirements exist, they may be found within the department section.

## Bachelor of Arts Degree

120 hours required for graduation

### I. General Requirements

- A. English Composition I and II
- B. Oral Communication I (or Oral Communication II, Argumentation and Debate, or Public Speaking as recommended by Department of Speech).
- C. Modern Languages  
Two years in one language (or equivalent competence)
- D. Mathematics—One course
- E. Humanities—Three courses, including one course above the introductory level (500 level) or above in Art, Dance, English, History, Modern Languages, Music, Philosophy, and Speech.
- F. Social Science—Three courses, including one course above the introductory level (500 level or above) in Anthropology, Economics, Geography (excluding Geography 220 and 440), History, Political Science, Psychology, Sociology, Journalism and Mass Communications.
- G. Natural Science—Four courses, including one laboratory course and one course above the introductory level (a course which has a prerequisite in the same department in which it

is located) in Biology, Biochemistry, Chemistry, Computer Science, Geography (courses 220 and 440 only), Geology, Mathematics, Physics, or Statistics.

H. Physical Education—Concepts of Physical Education is required of freshmen.

**II. Major Requirements:** Remaining hours in major and additional tool and related courses and electives.

Pre-professional programs are administered by the appropriate department or, where not applicable, by the office of the Dean of Arts and Sciences.

## Bachelor of Science Degree

120 hours required for graduation

### I. General Requirements

- A. English Composition I and II
- B. Oral Communication I (or Oral Communication II, Argumentation and Debate, or Public Speaking as recommended by Department of Speech).
- C. Humanities and Social Sciences—Seven courses, taken from at least two departments, including one course in philosophy and two advanced level courses (500 level or above or second year of a foreign language) in Anthropology, Art, Dance, Economics, English, Geography (excluding Geography 220 and 440), History, Modern Languages, Music, Philosophy, Political Science, Psychology, Sociology, Speech, Journalism and Mass Communications.
- D. Natural Science—Four courses, including one laboratory course and one course above the introductory level (a course which has a prerequisite in the same department in which it is located) in Biology, Biochemistry, Chemistry, Computer Science, Geography (courses 220 and 440 only), Geology, Mathematics, Physics, or Statistics.
- E. Physical Education—Concepts of Physical Education is required of freshmen.

**II. Major Requirements:** Remaining hours in major and additional tool and related courses and electives.

Pre-professional programs are administered by the appropriate department or, where not applicable, by the office of the Dean of Arts and Sciences.

## Bachelor of Fine Arts

120 hours required for graduation

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 or artist-teachers. 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. The BFA in art is a four-year 120-hour program with majors possible in painting, sculpture,



ceramics, graphic design, and printmaking. The degree requirements are as follows:

**I. General Education (45 hours)**

- A. communications: English Composition, 2 courses; and Oral Communication I, 1 course.
- B. social science (2 courses)
- C. humanities (3 courses)
- D. philosophy or mathematics (1 course)
- E. natural sciences (2 courses, one with a lab)
- F. general electives (11-19 hours)
- G. Physical Education: Concepts, 1 hour

**II. Art Courses (75 hours)**

- A. core (39 hours)
- B. major (20 hours)
- C. art electives and related courses (16 hours)

## Bachelor of Music Degree

128 hours required for graduation

Majors offered in this curriculum are: applied instruments, voice, theory, and composition. An applied minor also is required.

**I. General Requirements (42 hours)**

- A. English Composition I and II
- B. Oral Communication I or Ia
- C. physical education: Concepts
- D. Physics for Musicians
- E. General Psychology
- F. non-music courses, 9 to 19 hours
- G. modern language, 8 to 20 hours

**II. The remaining hours to be taken in major, additional tool and related courses, as well as electives in music. For specific music requirements, see catalog statement for the Department of Music, page 156.**

## Bachelor of Science In Music Education Degree

128 hours required for graduation

The Bachelor of Science in music education is intended for those who plan to teach vocal or instrumental music on the elementary and secondary levels of the public schools. It also prepares one for graduate work in the field of music education.

**I. General Education**

- A. English Composition I and II
- B. Oral Communication I or Ia
- C. literature or language—6 hours
- D. social science—12 hours (including General Psychology)
- E. natural science—12 hours (including Physics for Musicians and at least one biological science)
- F. humanities electives as needed for degree and certification

**II. Professional Education**

- A. Educational Psychology I and II, 6 hours
- B. music education professional semester (includes student teaching, and other required courses from the College of Education.)

**III. Physical Education: Concepts of Physical Education, 1 semester**

**IV. The remaining hours to be taken in major, additional tool and related courses and electives:**

Music 175, 176, 214, 215, 406, 407, 416, 503, 504, 505 (comprehensive musicianship courses); Music 232, 233, 234, 235 (applied music); Music 412, 413, 512 (music education); vocal music majors include Music 513 (music education); instrumental majors include two of the following (depending on specific major), Music 427, 428, 429 (applied music) and Music 514 (music education). Vocal majors are required to have four hours of applied keyboard and four hours of singers diction as a minor. Instrumental majors complete four additional hours of applied music, of which two hours of voice class are required, as well as a minimum of two hours in piano class. Both vocal and instrumental majors are required to pass piano proficiency before admission to student teaching. Participation in at least one major musical organization in the major applied area is required during each semester until graduation. A maximum of eight semester hours for this participation is allowed toward degree requirement. Recital attendance is required each semester of the program.

## Associate of Arts Degree

Sixty hours including the following general requirements:

- A. English Composition I and II
- B. Oral Communication I (or Oral Communication II, Argumentation and Debate, or Public Speaking as recommended by Department of Speech). One course
- C. modern languages. Two years in one language (or equivalent competence)
- D. mathematics. One course (credit for Intermediate Algebra may not apply toward a degree.)
- E. humanities (Art, Dance, English, History, Modern Languages, Music, Philosophy and Speech). Three courses. No more than three courses in history to fulfill E and F
- F. social sciences (Anthropology, Economics; Geography, excluding Geography 150 and 151; History; Political Science; Psychology; Sociology; Social Work; Journalism and Mass Communications). Three courses, including one course above the introductory level. No more than three courses in history to fulfill E and F
- G. natural science (Biochemistry; Biology; Chemistry; Computer Science; Geography, courses 150 and 151 only; Geology; Mathematics; Physics or Statistics). Four courses including one laboratory course above the introductory level (a course which has a prerequisite in the same department in which it is located)
- H. physical education: Concepts of Physical Education

## Associate in Science

Sixty hours including the following general requirements:

- A. English Composition I and II
- B. Oral Communication I (or Oral Communication II, Argumentation and Debate, or Public Speaking as recommended by Department of Speech).



- C. humanities and social sciences (Anthropology, Art, Economics, English, Geography [excluding Geography 220 and 221], History, Modern Languages, Music, Philosophy, Political Science, Psychology, Sociology, Social Work, Speech, Journalism and Mass Communications). Seven courses, taken from at least two departments including one course in philosophy
- D. natural science (Biology, Biochemistry, Chemistry, Computer Science, Geography [courses 220 and 221 only], Geology, Mathematics, Physics, or Statistics.) Four courses, including one laboratory and one course above the introductory level (a course which has a prerequisite in the same department in which it is located)
- E. physical education: Concepts of Physical Education

## Pre-Professional Programs

**A. Medical Technology Curriculum:** In addition to the general requirements of the College of Arts and Sciences, the following courses must be taken: College Algebra, Trigonometry, Chemistry I and II, General Organic Chemistry, General Biochemistry, Chemical Analysis, Descriptive Physics, Principles of Biology, Microbiology, Human Physiology, Genetics, Bacteriology of Human Diseases, Immunology, Human Parasitology, and Introduction to Medical Technology. Upon acceptance into and completion of a clinical program in medical technology, the student will receive a B.S. degree and will be eligible for professional certification. Students should consult with the medical technology adviser in the office of the Dean of Arts and Sciences.

**B. Pre-Dentistry Curriculum:** Students who wish to enter a dental school at the end of the junior year or after graduation should fulfill general requirements for the B.A. degree (page 91) or the B.S. degree (page 91) except the natural sciences requirements. The following courses are to be used to satisfy the natural sciences and major requirements: Chemistry I and II, General Organic Chemistry and Laboratory or Organic Chemistry I and II, College Algebra, Plane Trigonometry, General Physics I and II, Principles of Biology and Organismic Biology, and eight hours of biology courses (excluding Problems and Practicum) above the 400 level. (One year's work [30 hours] will be granted toward the degree for completion of the first year at dental school for students who enter dental school at the end of their junior year.) Students should consult with the pre-dentistry adviser in the office of the Dean of Arts and Sciences.

**C. Pre-Law Curriculum:** While the Association of American Law Schools considers the suggestion of particular courses for a pre-law curriculum unwise, it does provide certain guidelines for the attainment of general qualities needed for legal education: 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 the above capacities is

a highly individualized process vigorously pursued in a variety of disciplines and degrees. Students should consult with the pre-law adviser in the office of the Dean of Arts and Sciences.

**D. Pre-Medicine Curriculum:** Fulfill General Requirements for the B.A. (page 91) or B.S. degree (page 91) except the natural sciences requirements. The following courses are to be used to satisfy the natural sciences and major requirements: Calculus, Plane Trigonometry, General Physics I and II, Chemistry I and II, Chemical Analysis, Organic Chemistry I and II, Organic Chemistry Laboratory I and II, Principles of Biology, Genetics, and Embryology or equivalent. For additional information consult the premedical adviser in the office of the Dean of Arts and Sciences.

**E. Pre-Nursing Program:** Students can enter the pre-nursing curriculum and 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 credits), as prescribed by the university granting the degree, are required. For students transferring to a diploma program, 28-30 credits usually are required. The pre-nursing adviser will assist students in selecting appropriate courses, advising them regarding the different kinds of nursing education.

**F. Pre-Optometry Curriculum:** Students wishing to enter a school of optometry at the end of the junior year should fulfill the general requirements for the Bachelor of Science or Bachelor of Arts degree and the required courses for admission to a school of optometry. Students should consult with the pre-optometry adviser in the office of the Dean of Arts and Sciences.

**G. Pre-Pharmacy Curriculum:** Students wishing to be eligible to enter a school of pharmacy must complete a minimum of 64 hours including the following courses: English Composition I and II, Chemistry I and II, Organic Chemistry I and II, College Algebra, Plane Trigonometry, Analytical Geometry and Calculus, Principles of Biology, Organismic Biology, Structure and Function of Human Body, Microbiology, Descriptive Physics, or General Physics I and II and humanities and/or social sciences. Students should consult with the pre-pharmacy adviser in the office of the Dean of Arts and Sciences.

**H. Pre-Physical Therapy Curriculum.** To be eligible for a physical therapy degree program students should complete the following course requirements. English Composition I and II, and one additional English course, Oral Communications, General Psychology and one additional psychology course, 6 hours of humanities, College Algebra and Trigonometry, Chemistry I and II, General Physics I and II, Principles of Biology, Structure and Function of Human Body, Bacteriology and Man, Introduction to Physical Therapy and enough electives to make a total of 65 credit hours. Students should consult with the pre-physical therapy adviser in the office of the Dean of Arts and Sciences.



**I. Pre-Veterinary Curriculum:**<sup>1</sup> Sixty-four semester hours are required for application to enter the College of Veterinary Medicine. Pre-veterinary students will fulfill general requirements for the B.S. degree including English Composition I and II, Oral Communication, 12 hours of social sciences and humanities. For the natural science requirements the following courses should be used: College Algebra and Plane Trigonometry, Chemistry I and II, General Organic Chemistry and Laboratory, Chemical Analysis, General Physics I and II, Principles of Biology, Genetics or Heredity and Evolution. Animal science course requirements may be satisfied by completing Principles of Animal Science as well as Animal Science and Industry, Dairy Science, and Poultry Science laboratories. Upon satisfactory completion of these courses and those of the first two years in veterinary medicine, the student will be eligible for a Bachelor of Science degree through the College of Arts and Sciences. Students should consult the pre-veterinary advisers in the office of the Dean of Arts and Sciences.

**SUGGESTED SCHEDULE OF  
PRE-VETERINARY MEDICINE REQUIREMENTS**

**Fall Semester**

English Composition I	3
College Algebra	3
Chemistry I	4
social science elective or Principles of Animal Science	3
Oral Communication I	2
Concepts in Phys. Ed	1
	<hr/> 16

**Spring Semester**

English Composition II	3
Chemistry II	4
Principles of Biology	4
Plane Trigonometry	3
social science elective or Principles of Animal Science	3
	<hr/> 18

**Fall Semester**

Chemical Analysis	4
Heredity and Evolution or Genetics	2
General Physics I	3
social science elective or Principles of Animal Science	4
Animal Husbandry	3
Dairy or Poultry Science	1
	<hr/> 15 or 16

**Spring Semester**

General Physics II	4
humanities electives	6
Dairy or Poultry Science	1
General Organic Chemistry	5
	<hr/> 16

64 semester hours required for admission to College  
of Veterinary Medicine

<sup>1</sup> Pre-veterinary requirements may be completed in the College of Agriculture.

## Interdisciplinary Programs

### General or Area Studies

For those students who, for a number of very good reasons, have not chosen a particular field of study and do not want to choose one as an undergraduate, the general or area studies program is a direction to consider.

Despite the pressure to choose one particular field over all others, there is growing recognition

that the important problems of our world are not single-discipline problems. There is, also, a growing acceptance of the idea that those students who are broadly/trained, who have a knowledge of a culture other than their own, who think clearly and logically, who express themselves clearly and persuasively both in written and oral forms, are highly employable. Those same students also are readily acceptable in a number of distinguished graduate programs, some of which seem on the surface to be unrelated to the undergraduate work; for example, humanities training for a Master's in business administration, or physical science training for law school.

There is, however, some need for students to focus their thoughts and develop their talents in one of four broad areas. Those areas are listed and defined below along with the requirements which must be fulfilled for the B.A. or B.S. degrees.

**Life Science** is a branch of science such as biology, anthropology, or sociology which deals with living organisms and life processes. The courses required are Bacteriology and Man, General Entomology, Principles of Biology, Organismic Biology, and at least three different courses from the fields of biology, microbiology, entomology or psychology, two of which must be above the introductory level. Thirty hours in life sciences is required.

**Humanities** are the branches of learning primarily having a cultural character. The requirements for this study are 15 hours in two humanities departments (art, dance, English, history, modern languages, music, philosophy, speech) with at least one upper level course in each of two departments; and nine hours of the general requirements for the bachelor of arts degree must be in a third humanities department. Thirty hours is required for this program, and the B.S. degree only is offered.

**Physical science** is a natural science such as physics and chemistry which deals primarily with non-living materials. The courses required are Chemistry I and II, Geology I or Oceanography and Geology I Lab, Plane Trigonometry and General Physics I and II. In addition, at least three courses must be taken from two or more of the following fields: chemistry, computer science, geology, mathematics and physics. At least two of these three courses must be above the introductory level, and 24 hours must be completed in this area.

**Social science** is a science dealing with a particular phase or aspect of human society such as economics or political science. The requirements are one course in each of four of the following areas: anthropology, economics, geography, sociology, history, political science and psychology. In addition, at least six courses must be taken from two or more of the following fields: anthropology, economics, geography, political science, history, psychology and sociology. At least four courses must be above the introductory level, and 30 hours is required.

## Honors Program

The honors program is a special program for the intellectually able and motivated student. It is designed to challenge such students in a wide range



of academic areas, and to allow them to do a fair portion of their undergraduate work with other honors students. Above all, the honors program allows students to do deeper and broader work in a number of courses which are designated as honors courses. It also affords them opportunities to meet with distinguished guests on the campus and with Kansas State faculty in informal settings and to participate in various field experiences in connection with their course work in the honors program.

Admission to the honors program may be gained toward the end of the freshman year. It requires completion of a non-credit seminar, "Introduction to Honors Work in the College of Arts and Sciences" and achievement of a grade point average of 3.5 in course work completed as a full-time student during the first semester of the freshman year. Students who satisfy these requirements may meet individually with the director of the honors program and petition to join. Once admitted, students must maintain an overall grade point average of 3.3.

Students accepted into the honors program are expected to take four honors-level courses in any departments where such courses are offered. These are either honors sections or honors sub-sections of regular course offerings in those departments. Other requirements of the program are: two sophomore-level seminars to be selected from a group offered during each semester of the regular academic year, one in social sciences or humanities and one in mathematics or natural sciences; an interdisciplinary colloquium during the junior year; and an independent study during the senior year under the supervision of a faculty member of the student's choice. The senior study culminates in a senior honors thesis or other documentation or performance, which is filed with the director for examination by other students and faculty, as needed. Honors students are encouraged to complete a four-course sequence in a modern language other than English.

As students move through the honors program, their work becomes increasingly challenging and rewarding. The program offers stimulating and personalized academic experience for highly motivated students throughout the College of Arts and Sciences. For more information, please contact the director of the honors program, College of Arts and Sciences, Kansas State University, Manhattan, Kansas 66506.

## Linguistics

The Departments of English, Modern Languages and Speech cooperate in an interdepartmental linguistics program that offers cross-listed courses of study leading to the B.A. and M.A. degrees. Students identify themselves with the department most suiting their academic background and interests. The program's offerings also provide an opportunity for students in any discipline to gain an appreciation of the rich structure of human languages and an understanding of linguistics as it may relate to education, psychology, foreign language study, philosophy, literature, speech pathology, audiology, and so forth.

Undergraduates in either modern languages or

speech may work toward a B.A. degree with emphasis in linguistics. Graduates in English, modern languages or speech may choose linguistics for emphasis in their M.A. degree. For both undergraduates and graduates, the program's core courses attempt to provide a solid foundation in modern theoretical linguistics, in particular the linguistics of the "Chomskyan revolution." The student would be wise, however, to pursue (with adviser's approval) as many non-core linguistics-related courses as possible in the various departments that offer them, so as to avoid too narrow a view of the field. (See course listings in anthropology, computer science, English, general speech, modern languages, philosophy, psychology, and speech pathology and audiology.)

General admission requirements for undergraduates will be found beginning on page 90. Students seeking graduate admission should hold a bachelor's degree and have at least 12 semester hours, or equivalent, beyond the introductory level in a single foreign language (or in English, for non-native speakers of English). Graduates write either a report (two credit hours) or a thesis (six credit hours), with course work bringing the total to at least 30 credit hours.

For further information about undergraduate or graduate study in linguistics, including a list of available courses, contact the participating departments or James L. Armagost, Leasure Hall 110, phone 532-6880.

## South Asia Language And Area Studies

The South Asia center is an interdisciplinary language and area center focusing the course offerings of several departments on this important world area with whose development Kansas State University programs have been concerned for more than a decade. South Asia, as a linguistic and cultural area, includes Afghanistan, Bangladesh, Pakistan, India, Nepal, Sri Lanka, Bhutan, and the Maldives Republic.

The KSU South Asia program was recognized in 1967 as a National Defense Education Act Language and Area Studies Center. More recently, the center has received a grant from the National Endowment for the Humanities to conduct a project developing South Asian Studies in elementary and secondary schools of Colorado, Kansas, Nebraska and Oklahoma.

The basic South Asia courses at KSU are the Introduction to South Asian Civilizations I and II, taught jointly by South Asian faculty from the Departments of History; Political Science; Sociology, Anthropology, and Social Work; and Economics. These courses may be taken by any undergraduate and credit may be received in any one of the participating departments. Advanced courses in South Asia and related subjects are taught in all of these departments. 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 demand, in other South Asian languages and in



Arabic. These languages may be used to satisfy requirements for the Bachelor of Arts and higher degrees.

### South Asia Courses:

#### Language Courses:

- 253 171. Hindi/Urdu I
- 253 172. Hindi/Urdu II
- 253 273. Hindi/Urdu III
- 253 274. Hindi/Urdu IV

#### Civilization Courses:

- xxx 505. South Asia Civilization I
  - xxx 506. South Asia Civilization II
- (Cross-listed in the five participating disciplines: Anthropology, Economics, History, Political Science, and Sociology.)

#### Area Courses:

##### Agricultural Economics

- 010 615. International Agricultural Development

##### Anthropology

- 278 645. Cultures of South Asia

##### Economics

- 225 636. Comparative Economic System
- 225 682. Development Economics
- 225 699. Seminar in Economics: South Asia

##### History

- 241 701. South Asian History I
- 241 702. South Asian History II
- 241 707. Topics in Non-Western History

##### Modern Languages

- 253 509. Religious Literature of South Asia
- 253 582. Languages in South Asia

##### Political Science

- 269 723. South Asian Political System
- 269 752. International Politics of South Asia

##### Sociology

- 277 742. South Asian Social System

#### 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.

#### Summer Institute

The NEH-sponsored project to develop South Asian studies in the elementary and secondary school systems of the states of Kansas, Nebraska, Colorado and Oklahoma is a nationally significant experiment in educational diffusion. It combines the area expertise of South Asian specialists with the classroom experience of practicing teachers to produce units on South Asia which are introduced into the teachers' own courses. The core of the

project is a three-week summer institute at Kansas State University in which teachers learn about South Asia and prepare their teaching units, using resources, materials, and advice from the center. During the academic year, the center supports the implementation of the teaching units by evaluating and supplying audio-visual and other materials. Teachers are eligible to earn a maximum of six hours of graduate credit for the summer institute as well as some scholarship money to defray costs. Interested teachers and school administrators are invited to write or telephone the center for additional information.

For further information on South Asian studies contact the director, South Asia Center, Kansas State University, Manhattan, KS 66506 or telephone 913-532-5738.

## Summer Independent Reading Program

Each summer the College of Arts and Sciences offers an opportunity for students to independently read six books 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 physical and biological sciences; the books chosen are all intelligible to the non-specialist, are usually current paperbacks, and are frequently controversial.

In the fall, having completed the books, students meet in three small two-hour seminars to discuss the books. Each seminar is moderated by a carefully selected faculty member. Following this, a written examination is given for each pair of books and the course then appears on the student's transcript of courses for the fall term. The course may be taken on a "credit-no credit" basis.

Students wishing to take the course should enroll in Arts and Sciences 200-199 during the spring pre-enrollment 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 adviser in the Dean's office.

## Departments & Course Offerings

### AEROSPACE STUDIES (AIR FORCE ROTC)

Professor Clarke; Associate Professor Grenier; Assistant Professor Dameron; Instructors Hubbard, Tomory and Wagner.

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 their university program they are commissioned second lieutenants, and either:

1. Enter Into Air Force-sponsored graduate study at full pay while serving as Air Force officers, or
2. Are deferred for graduate study, to enter active service after completion for a specified period, or
3. Enter directly upon normal active service for a specified period, taking flying training or performing managerial, research or development tasks, or,
4. Enter the active or Inactive Air Force Reserve.



Any student, graduate or undergraduate, who is a U.S. citizen may become a cadet. The duration of the program varies between two and four years, depending upon an applicant's previous experience and the availability of different options.

Students electing the four-year program normally will start the General Military Course (GMC) during their freshman or sophomore year. This program consists of one credit hour each semester, will count toward all bachelor's degrees awarded by KSU, and in no way obligates students to a military commitment. Students in the GMC are issued uniforms and all texts and other equipment needed for their AFROTC courses.

Included in the course is the opportunity for each cadet to travel via military aircraft to various Air Force installations. KSU cadets have viewed space launches in Florida, seen the Air Force museum in Ohio, been instructed on navigator training in California, and witnessed pilot training in Arizona. These are but a few of the trips regularly scheduled to provide a personal look at the Air Force and the many challenges it presents.

The Professional Officers Course (POC) 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. Outstanding cadets, including freshmen and sophomores, may apply for an Air force ROTC college scholarship and, if selected, will have their tuition, fees, and book allowance for all courses taken at Kansas State University paid for by the USAF, and will receive \$100 monthly.

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, physically capable, possess leadership potential, and make application before December 15th of their senior year. Financial benefits are the same as mentioned in the preceding paragraph.

POC cadets practice their leadership and management skills in a cadet group. All POC cadets who are in a four-year program attend four weeks of field training, which is given in the summer at an Air Force base, prior to entering the POC. During training, they are paid approximately \$300, and receive travel pay to and from their training base.

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, Air Force physical, and completion of six weeks summer field training. Applicants must contact the Department of Aerospace Studies during the spring semester prior to fall semester entry. A limited number of scholarships are available for two-year students who are still undergraduates.

For those cadets who plan to become Air Force pilots, AFROTC offers the Flight Instruction Program (FIP). This is taken within 12 months of graduation, is free, and may lead to a private pilot's license. A one-semester one-credit-hour course provides ground instruction in flight theory and prac-

tice for those cadets who plan to become Air Force pilots or navigators. Cadets who have a private pilot's license are not eligible to receive free flight instruction.

## General Military Courses

### Undergraduate Credit

**205 113. 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. 205-113-0-1803

**205 114. Aerospace Studies 1B.** (1) II. U.S. strategic offensive and defensive forces; their mission, function; effect and employment of nuclear weapons. One hour of class plus one hour of leadership training a week. 205-114-0-1803

**205 210. Aerospace Studies 2A.** (1) I. This course examines 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 those elements that provide significant examples of the impact of air power on strategic thought. One hour of class plus one hour of leadership training a week. 205-210-0-1803

**205 211. Aerospace Studies 2B.** (1) II. This course examines 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. 205-211-0-1803

## Professional Officers Courses

### Undergraduate Credit

**205 310. 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. 205-310-0-1803

**205 311. The Professional Officer 3B.** (3) II. Continuation of AS 390. Three hours of class plus one hour of leadership training a week. 205-311-0-1803

**205 380. Weather and Navigation.** (1) I. Introduction to weather and navigation. Equivalent to that required for a private pilot's license. Required of AFROTC cadets enrolled in category 1P or 1N during their final year of Aerospace Studies. Pr.: 205-210 or 205-211. Prerequisite may be taken prior to or concurrently with Wea/Nav. Special student status authorized when approved by Department Head. 205-380-2-1803

**205 381. 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. 205-381-3-1803

**205 399. 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. 205-399-3-1803

**205 400. 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 national defense structure; and the impact of technological and international developments upon strategic preparedness and the overall defense policy-making process. Three hours of class plus one hour of leadership training a week. 205-400-0-1803



**205 401. 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. 205-401-0-1803

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## ART

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*Jerrold Maddox,\* Head of Department*

Professors Garzio,\* Larmer,\* and Maddox,\* Associate Professors Rex Replogle,\* Tomasch,\* and Vogt,\* Assistant Professor Culley, Love, Marks, Munce,\* Noblett, O'Shea,\* Pujol,\* Schmidt, Sturr,\* Swiler, Winegardner, and Woodward; Instructors Clore, Dollar, Kren, and Renata Replogle; Assistant Instructor Hagan; Emeritus: Professor Barfoot; Associate Professors Harris and Hill; Assistant Professor Geiger.

### Undergraduate Study

**Bachelor of Art.** The B.A. degree in art consists of three parts: (1) the general education as outlined under the humanities curriculum, (2) a core of beginning art courses to provide prerequisites and a broad range of art experience for the art major, and (3) 16 hours concentration of related subjects which should provide a minimal basis for establishing professional competence. Some of the concentration possibilities will be in one of the following media: painting, printmaking, ceramics, sculpture, drawing, art history, metalsmithing and jewelry, and graphic design. Bachelor of Art Degree requires a minimum of 48 semester hours in art.

**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 or artist-teachers. 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. The B.F.A. in art is a four-year 120-hour program with majors possible in painting, sculpture, ceramics, graphic design, printmaking, drawing and metalsmithing-jewelry. The degree requirements are as follows:

#### I. General Education (45 hours)

- (1) communications: English composition (2 courses) and Oral Communication I (1 course)
- (2) social science (2 courses)
- (3) humanities (3 courses)
- (4) philosophy or mathematics (1 course)
- (5) natural sciences (2 courses, one with lab)
- (6) general electives (11-19 hours)
- (7) physical education: Concepts in Physical Education

#### II. Art Courses (75 hours)

- (1) core (39 hours)
- (2) major (20 hours)
- (3) art electives and related courses (16 hours)

**Art Education.** Students may satisfy requirements to teach art in public schools by any of three programs: (1) B.A. and teacher certification, (2) B.F.A. and teacher certification or (3) 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.

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.

### 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 Arts is offered in the Department of Art in the fields of drawing, painting, sculpture, ceramics, crafts, and prints.

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 degree Master of Arts include a minimum of 30 semester hours, approximately two-thirds of which will be in the field of concentration. The candidate will be encouraged to take supporting courses in the study of art history.

The candidate will take an oral examination based in part on the academic thesis or studio report submitted. The studio project for the thesis or report will consist of a significant creative effort in the candidate's chosen major medium, and must be publicly exhibited.

## Courses in Art

### Undergraduate Credit

**209 095. Art Assembly.** (0) I, II. Required for all art and art education majors each semester. By appt. 209-095-2-0831

**209 096. Art Education Seminar.** (0) I, II. Required each semester for all students majoring in art who plan to participate in the teaching block; an introduction to the attitudes of professional growth in art that will create a relationship between their fine arts training and their teaching experience. 209-096-2-0831

**209 100. Design I.** (2) I, II, S. Introduction to and laboratory practice in the principles and elements of design. Four hours lab. 209-100-1-1002

**209 170. Art for Elementary Schools.** (3) I, II, S. Art methods, materials, and philosophy of children's art at different grade levels. 209-170-1-0-0831

**209 190. 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 hours lab. 209-190-1-0-1002

**209 195. Survey of Art History I.** (3) I, S. Historical development of art from Pre-History through the Middle Ages. 209-195-0-1003



**209 196. Survey of Art History II.** (3) I, II, S. Historical development of art from the Renaissance through the nineteenth century. 209-196-0-1003

**209 200. 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. 209-200-1-0-1002

**209 205. 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. 209-205-1-0-1002

**209 210. Drawing II.** (2) I, II, S. Cont. of Drawing I, with strong emphasis on creative expression. Four hours lab. Pr.: Art 100, 190. 209-210-1-0-1002

**209 215. 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. 209-215-1-0-1002

**209 220. 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. 209-220-1-0-1002

**209 225. 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. 209-225-1-0-1002

**209 230. 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. 209-230-1-0-1002

**209 235. Printmaking I.** (2) I, II, S. Introduction to the intaglio, relief, lithographic and serigraphic printmaking techniques and tools; includes exploratory experience in each medium. Four hours lab. Pr.: Art 100, 190. 209-235-1-0-1002

**209 240. Drawing III.** (3) I, II. Cont. of Drawing II, emphasizing exploration in mixed media. Six hours lab. May be taken for two semesters. Pr.: Art 210. 209-240-1-0-1002

**209 245. Oil Painting I.** (2) I, II, S. Introduction to painting with oil and plastic mediums; stretching and grounding canvas. Problems include both studio and outdoor experiences. Four hours lab. Pr.: Art 200, 210. 209-245-1-0-1002

**209 250. 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. 209-250-1-0-1002

**209 255. 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. 209-255-1-0-1002

**209 260. Design in the Crafts.** (2) I, II, S. Crafts work in various media, with emphasis on contemporary design. Four hours lab. May be taken for credit two semesters. Pr.: Art 100. 209-260-1-0-1002

**209 265. Ceramics I.** (2) I, II, S. Introduction to basic hand building techniques and wheel throwing; 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 or consent of instructor. 209-265-1-0-1002

**209 270. 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 215. 209-270-1-0-1002

**209 290. 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. 209-290-1-0-1002

**209 299. Honors Seminar in Art.** (1) I, II, S. Selected topics in art. May be taken for credit more than once. Pr.: For students in the Honors Program only. 209-299-0-1002

**209 420. History of South Asian Art.** (3) I, II. A survey of the history of art in the South Asian sub-continent from its prehistoric origins to the height of the Mughal period in the 18th 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, Ceylon, Afghanistan, Indonesia and Indochina. 209-420-0-1003

**209 430. Independent Study—Ceramics.** (1-5) I, II, S. Work offered in ceramics after competency has been achieved. Personal development is emphasized. 209-430-3-1002

**209 435. Independent Study—Crafts.** (1-5) I, II, S. Work offered in crafts after competency has been achieved. Personal development is emphasized. 209-435-3-1002

**209 440. Independent Study—Drawing.** (1-5) I, II, S. Work offered in drawing after competency has been achieved. Personal development is emphasized. 209-440-3-1002

**209 445. Independent Study—Graphic Design.** (1-5) I, II, S. Work offered in graphic design after competency has been achieved. Personal development is emphasized. 209-445-3-1002

**209 450. Independent Study—Metalsmithing and Jewelry.** (1-5) I, II, S. Work offered in metalsmithing and jewelry after competency has been achieved. Personal development is emphasized. 209-450-3-1002

**209 455. Independent Study—Painting.** (1-5) I, II, S. Work offered in painting after competency has been achieved. Personal development is emphasized. 209-455-3-1002

**209 460. Independent Study—Printmaking.** (1-5) I, II, S. Work offered in printmaking after competency has been achieved. Personal development is emphasized. 209-460-3-1002

**209 465. Independent Study—Sculpture.** (1-5) I, II, S. Work offered in sculpture after competency has been achieved. Personal development is emphasized. 209-465-3-1002

**209 470. Independent Study—Water Color.** (1-5) I, II, S. Work offered in water color after competency has been achieved. Personal development is emphasized. 209-470-3-1002

### Undergraduate And Graduate Credit In Minor Field

**209 505. Greek Art History.** (3) I, II, S. Study of the art of classical Greece, from its Aegean origins through the Hellenistic period. Pr.: Art 195, 196. 209-505-0-1003

**209 510. Italian Renaissance Art History.** (3) I, II. Italian art of the 15th and 16th centuries, with a brief discussion of the 14th century origins of Renaissance art. Pr.: Art 195, 196. 209-510-0-1003

**209 515. Northern Renaissance Art History.** (3) I, II. A study of the art of Northern Europe in the 14th, 15th and 16th centuries, including the International Style, and painting of Flanders, Germany, and France. Pr.: Art 195, 196. 209-515-0-1003

**209 520. Southern Baroque Art History.** (3) I, II, S. The development of the Baroque period in Italy, Spain and France, from its beginnings in the 17th century to Tiepolo and the Rococo style of the 18th century. Pr.: Art 195, 196. 209-520-0-1003

**209 525. Northern Baroque Art History.** (3). The development of the Baroque in Holland and Flanders. Pr.: Art 195, 196. 209-525-0-1003



**209 530. The Development of American Art.** (3) I, II, S. A study of American art from the Colonial period to the beginnings of Abstract Expressionism in the early 1940s, with major emphasis on the late 19th and early 20th century developments. Pr.: Art 195, 196. 209-530-0-1003

**209 535. History of Modern Sculpture.** (3) I, II, S. An in-depth study of the various directions taken by modern sculptors since the time of Rodin. Pr.: Art 195, 196. 209-535-0-1003

**209 540. Nineteenth Century Art History.** (3) I, II. Painting, sculpture, and architecture of the late 18th and 19th centuries, with emphasis on the art of France. Pr.: Art 196. 209-540-0-1003

**209 545. Twentieth Century Art History I.** (3) I. Origins and development of twentieth century art from 1890 to 1914. Pr.: Art 195, 196. 209-545-0-1003

**209 550. Twentieth Century Art History II.** (3) II. Origins and development of twentieth century art from 1914 to the present. Pr.: Art 195, 196, 545. 209-550-0-1003

**209 555. Ceramic Kilns.** (2) II. A study of the principles in designing, and the construction and operation of up-draft, down-draft and cross-draft kilns, single and multiple chamber varieties, using various kinds of fuels. Pr.: Art 265 or consent of the instructor. 209-555-1-0-1002

**209 560. Art for Exceptional Children.** (3) I, II. A study of the knowledge and methods of utilizing art concepts and art activities by the elementary teacher to develop and enhance the learning experiences of exceptional children, including the disadvantaged, physically handicapped, mentally retarded and emotionally disturbed. Six hours lab. Pr.: Elementary Education or Art major and Psychology 110. Same as Educ. 315. 209-560-1-0-0831

**209 565. Ceramics II.** (3) I, II. Advanced work on potter's wheel combined with hand-built forms. Consideration of simple kiln design, firing techniques and procedures using various fuel burning kilns. Six hours lab. May be taken for three semesters. Pr.: Art 265. 209-565-1-0-1002

**209 570. Painting II.** (3) I, II, S. Continuation of Painting I. Emphasis on development of personal attitudes in formal structural relationships of line, color, and shape. Nine hours lab. Pr.: Art 245. 209-570-1-0-1002

**209 575. 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. 209-575-1-0-1002

### Undergraduate And Graduate Credit

**209 576. Metalsmithing Techniques.** (3) I, II, S. A variety of techniques will be explored by the intermediate student. 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. 209-576-1-0-1002

**209 600. 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. 209-600-1-0-1002

**209 605. Metals Workshop.** (3-5). A number of metalsmithing techniques will be explored by the upper division student. The emphasis will be placed on experimental problems and possibilities. The development of an individual point of view will predominate throughout the course. May be repeated twice. Pr.: Art 576 or consent of instructor. 209-605-1-0-1002

**209 610. 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. 209-610-1-0-1002

**209 615. 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. 209-615-1-0-1002

**209 620. Water Color II.** (3) I, II, S. Cont. of Water Color I. Emphasis on individual expression within limitations of medium. Six hours lab. May be taken for two semesters. Pr.: Art 220. 209-620-1-0-1002

**209 580. Sculpture II.** (3) I, II, S. Emphasis on personal 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. 209-580-1-0-1002

**209 625. 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. 209-625-3-1002

**209 635. Printmaking II.** (3) I, II, S. Advanced work in block-prints, serigraphy, lithography, and intaglio. Six hours lab. May be taken for four semesters. Pr.: Art 235. 209-635-1-0-1002

**209 640. Etching and Drypoint.** (3) I, II. Individual expression in intaglio techniques or printmaking; includes etching, engraving, aquatint, and drypoint. Six hours lab. May be taken for four semesters. Pr.: Art 235. 209-640-1-0-1002

**209 650. Painting III.** (3-5) I, II, S. Continuation of Painting II. Emphasis on individual directions in painting to attain further professionalism. Primarily for undergraduate painting majors. May be taken for four semesters. Pr.: Art 570 and consent of instructor. 209-650-1-0-1002

**209 660. 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. 209-660-1-0-1002

**209 665. Ceramics III.** (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 265. 209-665-1-0-1002

**209 670. Ceramics IV.** (2) I, II. Individual exploration and further development of ceramic design and glaze technology; advanced kiln design and construction. Four hours lab. May be taken for three semesters. Pr.: Art 565, 665. 209-670-1-0-1002

**209 675. History of Ceramics.** (2) 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 100 or 265. 209-675-0-1003

**209 685. Problems in Design.** (Var.) I, II, S. Advanced work in design-related subjects. Pr.: Full sequence of courses related to problem subject matter. 209-685-3-1002

**209 690. Techniques in Teaching Art.** (Var.) II, S. Lectures and class discussion of methods, consideration of suitable laboratory equipment, use of illustrative material, and preparation of courses of study. Pr.: Art 200, consent of instructor; 12 credit hours in Art. 209-690-0-0831

**209 695. Topics in Art History.** (Var.) I, II, S. Independent exploration in selected problems in art history. Pr.: Twelve hours art history. 209-695-3-1003

### Graduate Credit

**209 830. Graduate Sculpture Studies.** (Var.) I, II, S. Advanced creative work involving appropriate sculptural media and related techniques. Emphasis placed on content of work. May be taken for a total of 18 credit hours. Pr.: Consent of instructor. 209-830-3-1002



**209 835. Graduate Drawing Studies.** (Var.) I, II, S. Advanced study with emphasis on original investigation leading to professional competence in drawing. May be taken for total of 20 hours. Pr.: Consent of instructor. 209-835-3-1002

**209 845. Graduate Painting Studies.** (Var.) I, II, S. Advanced study with emphasis on original investigation leading to professional competence in painting. May be taken for a total of 18 credit hours. Pr.: Consent of instructor. 209-845-3-1002

**209 855. Graduate Printmaking Studies.** (Var.) I, II. Advanced creative work in any of the printmaking areas. Emphasis on original investigation into technical aspects as well as content in prints media. May be taken for a total of 20 credit hours. Pr.: Consent of instructor. 209-855-3-1002

**209 865. Graduate Ceramics Studies.** (Var.) I, II. Further study of glaze experimentation; resolutions of advanced form and decoration problems established by instructor. May be taken for a total of 18 credit hours. Pr.: Art 670 or consent of instructor. 209-865-3-1002

**209 885. Graduate Independent Study.** (1-5) I, II, S. Advanced individual work offered in studio areas of ceramics, graphic design, drawing, painting, printmaking and sculpture. 209-885-3-1002

**209 899. Research in Art.** (Var.) I, II, S. Research which may form the basis for the master's thesis or report. Pr.: Graduate standing. 209-899-4-1002

## BIOCHEMISTRY

*David J. Cox,\* Head of Department*

Professors Burkhard,\* Clegg,\* Cox,\* Hedgcoth,\* Mitchell,\* Nordin,\* Parrish,\* and Ruliffson;\* Associate Professors Cunningham,\* Klopfenstein,\* and Mueller;\* Assistant Professors Davis,\* Kramer,\* Reeck,\* and Roche.\*

Biochemistry bridges the disciplines of biology and chemistry. A sound foundation in both disciplines, as well as appropriate courses in calculus and physics, is 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.

Biochemistry offers many opportunities in teaching, research, industry, and public service. Biochemistry also serves as a foundation for specialization in areas such as agriculture, food science, health, medicine and nutrition.

### 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 is designed to provide a liberal education with sufficient emphasis on science for students who wish to prepare for certain professional schools. The B.S. degree is designed to prepare 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 (page 91) plus the following: Biochemistry Orientation (1 hour), Biochemistry Seminar (undergraduate, 0 hour), Chemistry I & II (8 hours), Chemical Analysis (4 hours), Organic Chemistry I & II (6 hours), Organic Chemistry I & II Laboratory (4 hours), Biochemistry I

& II (6 hours), General Biochemistry Laboratory (2 hours), Analytical Geometry and Calculus I & II (8 hours), General Physics I & II (8 hours), Principles of Biology (4 hours), Organismic Biology (4 hours), and biological science electives (4 hours). These science courses satisfy the mathematics and natural sciences requirements shown in the general requirements for the B.A. degree. The modern language requirement for the B.A. degree must be satisfied by either German, French or Russian for a biochemistry major.

The requirements for the B.S. degree with a major in biochemistry include the general requirements of the College of Arts and Sciences (page 91) plus the following: Biochemistry Orientation (1 hour), Biochemistry Seminar (undergraduate, 0 hour), Chemistry I & II (8 hours), Chemical Analysis (4 hours), Organic Chemistry I & II (6 hours), Organic Chemistry I & II Laboratory (4 hours), Biochemistry I & II (6 hours), Biochemistry I & II Laboratory (4 hours), Physical Chemistry I & II (6 hours), Physical Chemistry II Laboratory (2 hours), upper division biochemistry or chemistry elective (3 hours, 1 hour of which must be Problems in Biochemistry), Analytical Geometry and Calculus I, II & III (12 hours), Engineering Physics I & II (10 hours) or General Physics I & II (8 hours), Principles of Biology (4 hours), Organismic Biology (4 hours), biological science electives (8 hours), and one year of either German, French or Russian. The science courses in this list satisfy the natural science requirements shown in the general requirements for the B.S. degree. The year of German, French or Russian satisfies two of the required seven humanities & social science courses shown in the general requirements.

### Transfer Students

Community college students who plan to transfer into either of the biochemistry curriculums 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 analytical geometry and calculus, and 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 their 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 analytical 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 biochemistry, page 36, for further details.

The Department of Biochemistry also participates in interdepartmental programs in animal science leading to the Master of Science and Doctor of Philosophy degrees with majors in animal nutrition,



and in food science leading to the Master of Science and Doctor of Philosophy degrees with majors in food science. See animal sciences, page 35, and food science, page 37, for further details.

## Courses in Biochemistry

### Undergraduate Credit

**211 100. Biochemistry Orientation.** (1) I. Discussion of biochemistry as a discipline in the life sciences. 211-100-0-0414

**211 110. 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 interests, biochemical evolution, food additives, heavy metals, drugs, and certain control chemicals, e.g., pesticides. Intended for non-science majors. 211-110-0-0414

**211 120. Introductory Organic and Biological Chemistry.** (5) I, II. For students in home economics, nursing, and other areas desiring an integrated organic and biochemistry course to provide an understanding of carbohydrates, proteins, lipids and of digestive and metabolic systems. Three hours lec. and six hours lab. a week. Pr.: Chem. 110. 210-120-1-0414

**211 201. Elementary Biochemistry.** (3) I, II. An elementary treatment of the chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids. Pr.: Chem. 190. 211-201-0-0414

**211 202. Elementary Biochemistry Laboratory.** (2) I, II. A laboratory course to accompany Biochem. 201. Six hours lab. a week. Pr. or conc.: Biochem. 201. 211-202-1-0414

**211 290. Biochemistry Seminar.** (0-3) I, II. Lectures, discussions, and activities of biochemical interest. 211-290-0-0414

### Undergraduate And Graduate Credit In Minor Field

**211 510. General Plant Biochemistry.** (4) I. Occurrence, properties, functions and metabolism of the organic compounds of plants. Three hours lec. and three hours lab. a week. Pr.: Chem. 190 or 350. 211-510-1-0414

**211 521. 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 Biochem. 201. Pr.: Chem. 350. 211-521-0-0414

**211 522. 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.: Chemical analysis, Chem. 351 and Biochem. 521 or conc. enrollment, or Biochem. 665 or conc. enrollment. 211-522-1-0414

### Undergraduate And Graduate Credit

**211 655. 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. Biochem. 655 and 665 are for students interested in a two-semester comprehensive coverage of biochemistry. For a one-semester course, enroll in Biochem. 521. Pr.: \*Chemical analysis, one year of organic chemistry, differential and integral calculus. 211-655-0-0414

**211 656. Biochemistry I Laboratory.** (2) I. An intensive laboratory course to accompany Biochem. 655. Biochem. 656 and 666 are sequential courses for students interested in a two-semester comprehensive coverage of experiments in biochemistry. For a one-semester laboratory course, enroll in Biochem. 522. Six hours lab. a week. Pr.: \*Biochem. 655 or conc. enrollment. 211-656-1-0414

**211 665. Biochemistry II.** (3) II. Cont. of Biochem. 655; lipid chemistry and metabolism, amino acid metabolism, nutrition, nucleic acid chemistry and metabolism, integration of biochemical pathways and metabolic control mechanisms. Pr.: \*Biochem. 655. 211-665-0-0414

**211 666. Biochemistry II Laboratory.** (2) II. A cont. of Biochem. 656. Six hours lab. a week. Pr.: \*Biochem. 656 and 665 or conc. enrollment. 211-666-1-0414

**211 670. Principles of Animal Nutrition.** (3) II. The nutrients, nutrient requirements, functions and utilization of nutrients; nutrient balances; methods for animal nutrition studies and evaluation of feeds. Pr.: \*Biochem. 655 and 656. 211-670-0-0414

**211 700. Plant Biochemistry.** (2) I. Offered 1977-78 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, cell wall biosynthesis, and production of materials of economic interest. Pr.: \*Biochem. 510 or 521 or 665. 211-700-0-0414

**211 701. Plant Biochemistry Laboratory.** (1) Offered on sufficient demand. Practical experience in techniques necessary in dealing with plant materials for the isolation of active enzymes and analysis of constituents. Pr.: \*Biochem. 700 or concurrent enrollment, and one of the following: Biochem. 510 or 522 or 656. 211-701-1-0414

**211 790. 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, Biochem. 655, 656, 665 and 666. 211-790-1-0414

**211 799. 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. 211-799-3-0414

### Graduate Credit

**211 806. Biochemistry Seminar.** (0-1) I, II. Seminar for graduate students in biochemistry. 211-806-0-0414

**211 810. Biochemistry of Toxic Materials.** (2) I. Offered 1977-78 and alt. years. The chemistry of drugs, anti-metabolites, metals and agricultural chemicals; their absorption, distribution, mode of action and effect on biochemical systems, metabolism and detoxication. Pr.: \*Biochem. 665. 211-810-0-0414

**211 820. Vitamins.** (2) II. Offered 1977-78 and alt. years or on demand. A survey of the avitaminoses, chemical properties, biochemical roles, metabolic pathways and methods of assay of the vitamins. Pr.: \*Biochem. 665. 211-820-0-0414

**211 830. Animal Nutrition Techniques.** (2) II. Laboratory investigations on vitamins, amino acids, minerals and energy. Practical experience in laboratory animal care, diet preparation, data collection and analysis. Pr.: \*Biochem. 655 and 656. 211-830-0-0414

**211 840. 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.: \*Biochem. 656 and 665. 211-840-0-0414

**211 845. Hormones.** (2) I. Offered 1978-79 and alt. years or on demand. A study of the structure, biosynthesis, biochemical role, metabolism and interrelations of internal secretions. Pr.: Biochem. 665. 211-845-0-0414

\*Non-majors lacking these prerequisites should obtain consent of instructor before enrollment.



**211 850. Advanced Biochemistry Laboratory.** (2) II. Specialized laboratory techniques for advanced biochemical investigations. Pr.: \*Biochem. 666. 211-850-1-0414

**211 899. Research in Biochemistry I.** (Var.) I, II, S. Research in biochemistry, agricultural chemistry and nutrition, which may be used for preparation of the M.S. thesis. Pr.: \*Sufficient training for research undertaken. 211-899-4-0414

**211 910. Lipids.** (2) II. Offered 1977-78 and alt. years. Chemistry of plant and animal lipids, their occurrence, metabolism and industrial uses. Pr.: \*Biochem. 665. 211-910-0-0414

**211 920. Nucleic Acids.** (2) II. Chemistry, function, metabolism, and biological roles of nucleic acids, purines, pyrimidines, nucleosides, nucleotides, and related compounds. Pr.: \*Biochem. 665. 211-920-0-0414

**211 930. Proteins.** (2) I. Offered 1977-78 and alt. years. Lectures and readings on the chemical nature of proteins; fractionation; purification, structure, chemical and physical properties of proteins and amino acids. Pr.: \*Biochem. 656 and 665. 211-930-0-0414

**211 940. Chemistry of Carbohydrates.** (2) I. Offered 1978-79 and alt. years. Lectures and readings on structural chemistry of carbohydrates, their general properties, biological and chemical reactions and the methods of characterization. Pr.: \*Biochem. 656 and 665. 211-940-0-0414

**211 950. Enzyme Chemistry.** (2) II. Offered 1978-79 and alt. years. Lectures and readings on the chemical nature of enzymes, their reactions and assay. Pr.: \*Biochem. 665. 211-950-0-0414

**211 951. Enzyme Laboratory.** (2) II. Offered 1978-79 and alt. years. A laboratory course to accompany Biochem. 950. Pr.: \*Biochem. 656 and 950 or conc. enrollment. 211-951-1-0414

**211 960. Advanced Animal Nutrition.** (3) I. Offered 1978-79 and alt. years or on sufficient demand. Lectures and readings on protein and amino acid requirements, metabolism, evaluation of protein quality, energy metabolism, nutrient interrelationships. Pr.: \*Biochem. 655, 656, and a course in nutrition. 211-960-0-0414

**211 999. Research in Biochemistry II.** (Var.) I, II, S. Research in biochemistry, agricultural chemistry and nutrition, which may be used for preparation of the Ph.D. thesis. Pr.: \*Sufficient training for research undertaken. 211-999-4-0414

\*Non-majors lacking these prerequisites should obtain consent of instructor before enrollment

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## DIVISION OF BIOLOGY

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*R.A. Consigli, Acting Director*

*M.F. Hansen, Associate Director*

*Jerry S. Weis, Associate Director for Development of Instruction*

Professors Barkley,\* Bode,\* Consigli,\* Fina,\* Hansen,\* Hulbert,\* Kramer,\* Marzolf,\* Pittenger,\* Robel,\* and Zimmerman;\* Associate Professors Center,\* Conrad,\* Iandolo,\* Johnson,\* Kammer,\* Kelley,\* Klaassen,\* Marchin,\* Rodkey,\* Roufa,\* Smith,\* Spooner,\* Tomb,\* Weis,\* and Wilson;\* Assistant Professors Brown,\* Denell,\* Fretwell,\* Murphy,\* Urban,\* Williams,\* and Wong;\* Instructors Eads, Granrose, Hook, Paulsen, Roberts, and A. Smith. Emeritus: Professors Ameel,\* Gier,\* Goodrich,\* Guhl,\* Pady,\* and Wimmer;\* Associate Professors Lockhart,\* McCracken,\* and Newcomb.\*

The Division of Biology has the largest science faculty in the College of Arts and Sciences, thereby reflecting the breadth of biology as a dominant academic discipline in our times. Developments in the past quarter century have linked many biological phenomena to firmly-based concepts of physics and chemistry, and have opened a wide array of theory

and techniques to approach biological phenomena which are only beginning to be understood; e.g. the mechanisms of organism development, the function of the nervous system and its manifestation in behavior, and the biological bases of malfunctions leading to disease. Likewise, developments in mathematics, statistics, data processing and geology are providing new approaches to the complex problems of ecological function and evolution. All of these biological problems are both intellectually challenging and relevant to many societal problems. Through research the faculty of the Division of Biology seeks to contribute to the solution of these problems. Through teaching it seeks to develop the competence in students to contribute creatively in the next generation of biological scientists and in the generally educated citizenry.

The several curricula which follow are supplemented by extracurricular experiences ranging from participation in Bioclub, Microbiology Club, the Student Chapter of the Wildlife Society or Alpha Epsilon Delta (national premedical professions honorary) to participation in independent research and assisting faculty members in teaching or research programs.

### Undergraduate Study

The biology undergraduate requirements provide students a basic understanding of biological principles and methods and allow opportunity for 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 specifically 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 advisers 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 advisers.

### Biology Degree.

Students may arrange their programs to receive either a B.A. or a B.S. degree; the essential distinction between the two is that the B.A. requires course work in a foreign language while the B.S. degree does not.

In addition to the general requirements of the College of Arts and Sciences, courses required for a bachelor's degree in biology are: Organismic Biology (5 hrs.) [note: credit for Principles of Biology (215 198), a prerequisite to Organismic Biology, is not necessarily required. Incoming biology majors who have had substantial high school biology are encouraged to enter Organismic Biology directly. Permission to do this requires the student take either the CLEP exam or an examination prepared by the Division of Biology and



achieve a score which qualifies to bypass Principles of Biology. If the student elects to take Principles of Biology for credit the elective requirement (see below) will be reduced from 17 to 15 hours of biology; Population Biology (4 hrs.); Molecular Biology (3 hrs.); Cellular and Developmental Biology (5 hrs.) plus 17 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: General Physics I and II (8 hrs.) or Engineering Physics I and II (10 hrs.); Analytic Geometry and Calculus (4 hrs.) [note: Math 100, 150, or two years of high school algebra and one semester of trigonometry are prerequisite to Analytic Geometry and Calculus I]; Chemistry I (4 hrs.), Chemistry II (4 hrs.); General Organic Chemistry (5 hrs.) or Organic Chemistry I (5 hrs.); and General Biochemistry (3 hrs.) or Biochemistry I and II (6 hrs.).

Students contemplating graduate school are encouraged to take additional work in mathematics, 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 adviser. 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: Principles of Biology (4 hrs.), Microbiology (4 hrs.), Bacteriology of Human Diseases (5 hrs.), Immunology (4 hrs.), Genetics of Microorganisms (3 hrs.), Microbial Physiology Lec. (3 hrs.), Microbial Physiology Lab. (2 hrs.), General Virology (3 hrs.), plus 8 additional hours of microbiology of the student's choice. The following courses given by other departments also are required: Analytic Geometry and Calculus I (4 hrs.), Chemistry I (4 hrs.), Chemistry II (4 hrs.), Chemical Analysis (4 hrs.), Organic Chemistry I (5 hrs.), Organic Chemistry II Lecture (3 hrs.), General Biochemistry Lecture (3 hrs.) or Biochemistry I and II Lecture (6 hrs.), and General Physics I & II (8 hrs.). Students contemplating graduate school should also consider taking a modern foreign language.

### Fisheries and Wildlife Biology Degrees.

This curriculum has three options: fisheries biology, wildlife biology, and conservation. In addition to the general requirements of the College of Arts and Sciences, these courses are required in each of the options.

**From the Division of Biology:** Organismic Biology (5 hrs.) [note: credit for Principles of Biology (215 198), a prerequisite to Organismic Biology, is not necessarily required. Incoming majors who have had substantial high school biology are encouraged to enter Organismic Biology directly. Permission to do this requires the student take either the CLEP exam or an examination prepared by the Division of Biology and achieve a score which qualifies to bypass Principles of Biology.]; Population Biology (4 hrs.); Wildlife Conservation (3 hrs.); and Ecology (4 hrs.).

These courses from other departments also are required for each option: Biometrics I (3 hrs.); Analytic Geometry and Calculus (4 hrs.) [note: Math 100, 150, or two years of high school algebra and one semester of trigonometry are prerequisite to Analytic Geometry and Calculus I]; Chemistry I (4 hrs.); Chemistry II (4 hrs.); General Organic Chemistry (5 hrs.) or Organic Chemistry I and II (8-10 hrs.); Oral Communications II or equivalent (2-3 hrs.); Soils (4 hrs.) or Geology I (3 hrs.); and Fundamentals of Nutrition (3 hrs.) or General Biochemistry (3 hrs.).

**Additional requirements for the fisheries biology option include:** Biometrics II (3 hrs.); General Physics I & II (8 hrs.); Lower Plants (3 hrs.); Ichthyology (3 hrs.); Fisheries Biology (2 hrs.); Fisheries Management (3 hrs.); Aquaculture (3 hrs.); Freshwater Invertebrate Biology (2 hrs.); Limnology (2 hrs.); Limnological Methods (1 hr.); Physiological Adaptations of Animals (4 hrs.); and Cellular and Developmental Biology (5 hrs.) or Microbiology (4 hrs.).

**Additional requirements for the wildlife biology option include:** Biometrics II (3 hrs.); General Physics I & II (8 hrs.); Higher Plants (4 hrs.); Ornithology (3 hrs.); Mammalogy (3 hrs.); Wildlife Management (2 hrs.); Wildlife Management Techniques (3 hrs.); Entomology (3 hrs.); Physiological Adaptations of Animals (4 hrs.); and Cellular and Developmental Biology (5 hrs.) or Microbiology (4 hrs.).

**Additional requirements for the Conservation option include:** Natural Resources Economics (3 hrs.); Descriptive Physics (4 hrs.); Higher Plants (4 hrs.); Fisheries Biology (2 hrs.); Wildlife Management (2 hrs.); Forest Conservation (2 hrs.); Range Management I (3 hrs.); Plant Physiology (4 hrs.) or Physiological Adaptations of Animals (3 hrs.); two of: Ichthyology (3 hrs.), Ornithology (3 hrs.), or Mammalogy (3 hrs.); and two of: Cellular and Developmental Biology (5 hrs.), Microbiology (4 hrs.), or Evolutionary Biology (2 hrs.).

### Professional and Pre-Professional Curricula.

Students preparing to seek admission to medical school, dental school, veterinary school or similar professional school 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 adviser through either the Division of Biology office or the Dean's office as early in their academic careers as possible. This will facilitate the planning of a proper academic program for the students' professional goals.

The Division of Biology is intimately associated with several professional degree programs which are officially organized by the office of the Dean of Arts and Sciences. These programs are physical therapy, medical technology and pre-nursing. 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.



## 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, genetics, and parasitology. Graduate programs in the division generally relate to one of the four 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, and systematics and ecology.

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 the Division of Biology

### Undergraduate Credit

**215 198. 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, equivalent to two hours of lec., one hour of rec., and three hours of lab. per week. 215-198-1-0401

**215 201. 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 six hours rec. and lab. Pr.: Biol. 198 or equiv. 215-201-1-0401

**215 202. Practicum in Nursing.** (2) Interim semester only. Designed for students considering professional nursing as a career. Introduction to development of nursing care skills. Lecture, laboratory and clinical experience. 215-202-2-1203

**215 210. General Botany.** (4) I, II. Plant groups and their evolutionary development. Physiology, anatomy, ecology, and identification of seed plants. Economic applications. Two hours rec. and six hours lab. per week. 215-210-1-0402

**215 220. 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. per week. Pr.: One course in Biology, one course in Chemistry. 215-220-0-0403

**215 222. Field Ornithology.** (1) II odd years. Identification of bird species in the field and the illustration of attributes of avian behavior and ecology. One three-hour lab. per week. Pr.: Sophomore standing. 215-222-1-0499

**215 230. Introduction to Physical Therapy.** (1) II. Designed for Physical Therapy students. An introduction to terminology and techniques used in the profession. Pr.: Sophomore standing in the Physical Therapy curriculum. 215-230-2-1212

**215 235. Introduction to Medical Technology.** (1) II. Designed for Medical Technology students. An introduction to the terminology and procedures used in the profession. Pr.: Sophomore standing in Medical Technology curriculum. 215-235-2-1223

**215 240. Structure and Function of the Human Body.** (6) I, II. Anatomy and physiology of the organ systems of the body. Course is directed toward non-biology majors. Four hours lec. and two three-hour lab. sessions per week. Pr.: Biol. 198. 215-240-1-0410

**215 303. Ecosystems and Society.** (3) II. Principles of ecology and their application to such problems as pollution, human population growth, and land use planning, and to show the interdependence of all fields of human endeavor in affecting environment. Two hours lec. and one hour discussion per week. Pr.: Two courses in natural science. 215-303-0-0420

**215 310. 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. Two hours lec. and one hour discussion per week. Pr.: Junior standing. 215-310-0-0401

**215 325'. Integrated-Independent Studies in Biology.** (1-6) Offered on demand. A course designed for utilization by single students or groups of students under the guidance of a faculty member that could allow for innovative approaches to biological investigation. 215-325-2-0401

**215 345'. Zoological Microtechnic.** (2) I, II, S. Methods in preparation of slides and whole mounts; principles of photomicrography. Six hours lab. per week. Pr.: Biol. 198. 215-345-1-0401

**215 350'. Basic Concepts of Human Disease.** (3) I. An exploration into the causes, pathogenesis, and therapeutic approaches to heart attack, arteriosclerosis, stroke, high blood pressure, cancer, bacterial and virus infections, venereal disease, genetic and congenital errors, alcoholism, drug abuse and addiction, and personality disorders. Three lectures and one rec./discussion per week. Pr.: Junior standing and a basic college biology course. 215-350-0-0408

**215 360. Freshwater Invertebrate Biology.** (2) II. A basic course in techniques of collection, preservation and identification of freshwater invertebrates of the Great Plains region. Two three-hour labs per week. Pr.: Biol. 198. 215-360-1-0407

**215 397. Topics in Biology.** (1-6) I, II, S. Pr.: Consent of instructor. 215-397-2-0401

**215 398. Junior Honors Colloquium in Biology.** (Var.) I, II. Open only to juniors in the Arts and Sciences Honors Program. 215-398-0-0401

**215 399. Honors Seminar in Biology.** (1-3) I, II. Selected topics. Open to non-majors in the Honors Program. 215-399-0-0401

**215 430. 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. 215-430-0-0420

**215 440. Cellular and Developmental Biology.** (5) II. A course that considers cellular and developmental biology of eukaryotic cells. Treatment of the subcellular and molecular aspects of requisite and specialized cellular properties from the viewpoint of structure and function. Pr.: Biol. 201 and Chem. 350 or equiv. 215-440-0-0417

**215 450. Molecular Biology.** (3) I. An introduction of the synthesis and regulation of DNA, RNA, and protein. Mutation and the chromosome are studied at the molecular level and emphasis is placed on the handling of biological information in both higher and lower organisms. Pr.: Biol. 430 and Chem. 350 or equiv. 215-450-0-0416



**215 460. Animal Virology Laboratory.** (2) II. Laboratory techniques and investigative procedures for the analysis of viral growth in animal cell cultures. This course is intended for undergraduate students only, but is offered in conjunction with General Virology (Biol. 730). Pr.: Concurrent enrollment in Biol. 730. 215-460-1-0416

**215 465. Practicum in Biology.** (2-4) I, II. Experimental approaches to learning biology through teaching. One hour rec. per week plus 3-9 hours lab. per week. Pr.: Permission of instructor and credit with superior performance in the course in which the student will be involved. 215-465-2-0401

### Undergraduate And Graduate Credit In Minor Field

**215 505. Comparative Anatomy of Vertebrates.** (4) II. Two hours rec. and six hours lab. per week. Pr.: Biol. 198. 215-505-1-0412

**215 510'. Embryology.** (4) I, II. Developmental anatomy and physiology of reproduction of birds and mammals. Three hours rec. and three hours lab. per week. Pr.: Biol. 198. 215-510-1-0427

**215 513. 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. 215-513-0-0410

**215 514. Physiological Adaptations of Animals Laboratory.** (1) I. One three-hour lab. per week. Pr.: Concurrent enrollment in Biol. 513. 215-514-1-0-0410

**215 518'. Histology.** (4) II. Microscopic anatomy of the organs and tissues of the mammal as a basis for understanding diversity of function and malfunction. Two lectures and two two-hour labs per week. Pr.: Biol. 198. 215-518-1-0413

**215 520. Microbiology of Foods.** (4) I. Microbial phenomena involved in the bacteriology and sanitation of foods. Two hours rec. and four hours lab. per week. Pr.: Biol. 555 or equiv. 215-520-1-0411

**215 524'. Human Anatomy.** (4) I. Human anatomy as studied by demonstrations and dissection. Two hours rec. and six hours lab. a week. Pr.: Biol. 198 and junior standing. 215-524-1-0412

**215 525. Systemic Physiology.** (4) II. Functions of various organ systems of vertebrates, primarily mammals. Three hours lec. and three hours lab. per week. Pr.: Biol. 198 and a course in biochemistry or organic chemistry. 215-525-1-5-0410

**215 529. Fundamentals of Ecology.** (3) I. Ecosystem structure and function including energy flow; biogeochemical cycling; effect of climate, soil, fire, succession; application of ecological principles to forests, range, agriculture and man. Two lectures and one discussion per week, plus three half-day field trips. Not open to biology majors. Pr.: Biol. 201 or 210 and Chem. 210. 215-529-0-0420

**215 533. Wildlife Conservation.** (3) II. Methods and techniques in the management and propagation of wildlife. Pr.: Two courses in Biology. 215-533-0-0107

**215 535. Cell Biology.** (3) I. Chemistry, structure, and function of cells and cellular components. Three hours lec. per week. Pr.: Biol. 440. 215-535-0-0417

**215 536. Cell Biology Laboratory.** (2) I. Two three-hour labs. per week. Pr.: Concurrent enrollment in Biol. 535. 215-536-1-0-0417

**215 542. Ichthyology.** (3) II. Classification, morphology, physiology, distribution, and natural history of fishes. Two hours lec. and three hours lab. a week. Pr.: Biol. 198. 215-542-1-0407

**215 543. Ornithology.** (3) II. Classification, morphology, physiology, distribution and natural history of birds. Two hours lec. and three hours lab. a week. Pr.: Biol. 198. 215-543-1-0407

**215 544. 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. 198. 215-544-1-0407

**215 545. 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. 198. 215-545-0-0411

**215 546. Human Parasitology Laboratory.** (1) II. Examination of prepared materials and identification of internal parasites of man. Two hours lab. a week. Pr.: Concurrent enrollment in Biol. 545. 215-546-1-0411

**215 550. Lower Plants.** (3) II. 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. 215-550-1-0402

**215 551. Higher 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. 215-551-1-0402

**215 555. Microbiology.** (4) I, II. Introduction to microorganisms; their morphology, physiology, classification, and importance. Two hours lec. and four hours lab. a week. Pr.: One course in biology and a course in organic chemistry. 215-555-1-0411

**215 560. Evolutionary Biology.** (2) II. Historical development and social impact of the theory of evolution, the process of speciation and phylogeny of major taxa. Three hours lec. and one hour rec.; first half of semester. Pr.: Biol. 201. 215-560-0-0422

**215 565. Developmental Biology.** (3) II. An experimental analysis of developmental phenomena in plants and animals. Emphasis on elucidation of molecular mechanisms. Three hours lec. per week. Pr.: Biol. 440. 215-565-0-0427

**215 566. Developmental Biology Laboratory.** (1) II. Experimental research in developmental biology of plants and animals. An investigative project approach will be followed rather than scheduled routine laboratory exercises. Pr.: Biol. 565 or concurrent enrollment. Enrollment by permission of instructor only. 215-566-1-0-0427

### Undergraduate And Graduate Credit

**215 600. Plant Physiology.** (4) I. Detailed consideration of the physiological processes of higher plants. Three hours rec. and three hours lab. a week. Pr.: Biol. 201 or 210 and a course in organic chemistry. 215-600-1-0406

**215 602'. Comparative Embryology.** (3) II in odd years. Vertebrate embryology and histogenesis, emphasizing the mechanics of development. One hour lec. and six hours lab. a week. Pr.: Biol. 510. 215-602-1-0427

**215 610. Bacteriology of Human Diseases.** (5) I. Three hours rec. and six hours lab. a week. Pr.: Biol. 555 or equiv. 215-610-1-0411

**215 625. Animal Parasitology.** (3) I. Biology, pathology, and prophylaxis of the principal external and internal parasites of domestic animals. Two hours rec. and three hours lab. a week. Pr.: Biol. 198 and junior standing. 215-625-1-0411

**215 631. Ecology.** (3) I. Descriptive and mathematical understanding of ecosystem structure and dynamics, including succession, energy flow, and nutrient cycling. Pr.: Biol. 430. 215-631-0-0420

**215 632. Ecology Laboratory.** (1) I. Laboratory and field experiences with ecological problems. Pr.: Biometrics I or equiv., Biol. 631 or concurrent enrollment. 215-632-1-0-0420

**215 634. Soil Microbiology.** (3) I. Microbial population of the soil and its role in soil fertility. Pr.: Biol. 555 or equiv.; Chem. 351 or equiv. 215-634-1-0411

\*Not offered in '77-78.



**215 640. Introductory Mycology.** (4) I. Comparative morphology, classification, and life cycles of the fungi. Two hours rec. and six hours lab. a week. Pr.: Biol. 201 or 210. 215-640-1-0411

**215 642'. Protozoology.** (3) II. Taxonomy, morphology, and biology of the free-living and parasitic protozoa. Two hours rec. and three hours lab. per week. Pr.: Biol. 201. 215-642-1-0407

**215 646'. Human Heredity and Evolution.** (2) I, II. A study of human genetics and a survey of the principles of evolution of animals including man. Pr.: Biol. 201. 215-646-0-0422

**215 650'. Molecular Genetics.** (3) I, II. Structure, function and transmission of genetic material with special emphasis on studies at the molecular level. Pr.: Organic chemistry or concurrent enrollment, 10 hours of biology. 215-650-0-0422

**215 651. Molecular and General Genetics.** (3) II. A course intended for those who have had an introduction to both Mendelian genetics and the elements of molecular biology. Classical genetics will be reviewed and expanded, and modern concepts of mutation, gene structure, function, and regulation will be considered at the genetic and molecular levels. Pr.: Biol. 450 or an introductory genetics course. 215-651-0-0422

**215 661. Evolution and Systematics.** (2) II. A survey of systematic approaches to evolutionary problems. Three hours lec. and one hour rec.; second half of semester. Pr.: Biol. 430 and 560 or graduate standing. 215-661-0-0422

**215 662. Evolution and Population Genetics.** (2) II. Evolution at the population level; mating systems, genetic load, maintenance of variation, sex. Three hours lec. and one hour rec.; second half of semester. Pr.: Biol. 430 and 560 or graduate standing. 215-662-0-0422

**215 667. Neurobiology.** (4) I. Neuroid and neuronal mechanisms of coordination in animals, with emphasis upon neural mechanisms underlying behavior in simple systems. Three hours rec. and two three-hour labs a week. Pr.: Biol. 412, 525, or 535. 215-667-1-0425

**215 670. 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 equivalent. 215-670-0-0411

**215 671. Immunology Lab.** (1) II. Laboratory exercises in conjunction with Biol. 670 Immunology. Pr. or conc.: Biol. 670. 215-671-1-0411

**215 675. 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. 215-675-0-0422

**215 680. Aquaculture.** (3) II. Principles of producing fish for use as human food. Topics of study include: species of fish used in production, breeding and selection; feeds and feeding of fishes; the role of essential vitamins and amino acids in maintaining growth and vitality of various sizes of fish; and the environmental implications of commercial fish production. Pr.: Biol. 695 and Animal Science 200 or Biochem. 521. 215-680-1-0107

**215 684. Wildlife Management.** (2) II. Designed for Fisheries and Wildlife Biology students. Fundamentals of managing wildlife with emphasis on North American game species; historical and recent developments in the field of wildlife management; habitat improvement, and related material. Two hours lec. a week. Pr.: Biol. 533. 215-684-0-0107

**215 685. Wildlife Management Techniques.** (3) I. Ecology and management techniques. Two hours rec. and three hours lab. a week. Pr.: Biol. 533 and 531. 215-685-1-0107

**215 690. 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 Biol. 521 or 655. 215-690-0-0411

**215 691. Microbial Physiology Laboratory.** (2) II. Examination of microbial processes by biological and biochemical methods. Six hours a week. Pr.: Concurrent enrollment in Biol. 690. Enrollment of students in curricula other than Microbiology is by permission of instructor. 215-691-1-0411

### Graduate Credit

**215 800. Mineral Nutrition of Plants.** (2) II, in odd years. Current interpretation of the absorption and transport of mineral nutrients. Pr.: Biol. 600. 215-800-0-0402

**215 802'. Advanced Parasitology.** (2) II in even years. Taxonomy of helminths; review of classical and current works of North American and foreign parasitologists; analysis of bibliography, format and drawings relative to manuscripts. Four hours combined rec. and lab. a week. Pr.: Biol. 625 and consent of instructor. 215-802-1-0411

**215 803'. Introduction to Research in Biology I.** (3) I. Participation with faculty in their research laboratories. The semester will consist of involvement in laboratories in Environmental Biology, Microbiology, Molecular and Cell Biology, AND Physiology and Developmental Biology. A student will divide his time in each of these laboratories equally. Pr.: Graduate standing in the Division of Biology. 215-803-2-0401

**215 804'. Introduction to Research in Biology II.** (3) II. Participation with faculty in their research laboratories. The semester will consist of involvement in laboratories in Environmental Biology, Microbiology, Molecular and Cell Biology, OR Physiology and Developmental Biology. At least two areas must be represented. Pr.: Biol. 803. 215-804-2-0401

**215 819. Light and Temperature Relations of Plants.** (2) II in odd years. Current concepts of light-energy relations involved in photosynthesis, respiration, growth form, and photoperiodism, and of temperature relations including thermoperiodism. Pr.: Biol. 600. 215-819-0-0402

**215 820'. Plant Physiological Technique.** (2) II. Six hours lab. per week. Pr.: Biol. 600 and a course in biochemistry. 215-820-1-0406

**215 824'. Paleobotany.** (3) II. Fossil plants and their use in elucidating ancient biospheres. Two hours rec. and two hours lab. per week. Pr.: Biol. 201 or 210 and Geol. 200. 215-824-1-0402

**215 830. 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. 215-830-1-0411

**215 833. Plant Growth and Development.** (2) II in even years. Current concepts of growth-regulating substances and their effects on growth, differentiation and reproduction in higher plants. Pr.: Biol. 600. 215-833-0-0402

**215 840. Molecular Immunology.** (3) I in odd years. Lectures and readings covering the chemical and physical properties of antibodies. Pr.: Biol. 670 or equiv. and consent of instructor. 215-840-0-0411

**215 845. Animal Behavior.** (3) II in odd years. The study of the mechanisms, ontogeny, and evolution of social and non-social behavior from an adaptive viewpoint. Discussion, lecture, laboratory and field exercises. Pr.: At least one year of biology. 215-845-1-0420

**215 858. Regulation of Gene Expression.** (3) I. 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.: Biochem. 522 or equiv.; a basic knowledge of molecular biology and consent of instructor. 215-858-0-0422



**215 693. Limnology.** (2) I. Studies of inland lakes and streams. Emphasis is placed on water as a physical and chemical environment as it affects the nature of biological interactions and productivity. Two hours lec. Pr.: Two laboratory courses in natural sciences plus Biol. 210 and 230. 215-693-0-0420

**215 694. Limnological Methods.** (1) I. Problems in field observation and measurement of limnological phenomena. One three-hour lab. a week. Pr.: Stat. 340, Biol. 530, and concurrent enrollment in Biol. 693. 215-694-1-0420

**215 695. Fisheries Biology.** (2) I. Principles and concepts that form the basis for management of fisheries resources. Topics include: physicochemical conditions in water; fish metabolism; fish population dynamics; and the interactions between fishes and varying environmental conditions. Two hours lec. Pr.: Biol. 542 and Chem. 230. 215-695-0-0107

**215 696. Fisheries Management.** (3) I. Methods of managing fisheries resources; physical and biological survey methods; methods of aquatic environment improvement; fish population manipulation; management of streams, ponds and lakes. Two hours lec. and three hours lab. a week. Pr.: Biol. 695 or concurrent enrollment. 215-696-1-0107

**215 697. Topics in Biology.** (1-6) I, II, S. Pr.: Consent of instructor. 215-697-3-0401

**215 698. Problems in Biology.** (1-8) I, II, S. Pr.: Consent of instructor. 215-698-3-0401

**215 699. Undergraduate Seminar in Biology.** (1) I, II. Pr.: Consent of instructor. 215-699-2-0401

**215 705. Advanced Mycology.** (3) II in even years. Study of fungi, with emphasis on structure, identification, classification, phylogeny, and economic importance. One hour rec. and six hours lab. a week. Pr.: Biol. 640. 215-705-1-0411

**215 710. 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. 215-710-0-0410

**215 725. Use of Models in Biology.** (3) I. Rationale behind the use of models, formal logic and statistical methods of data analysis in biological research. Review of commonly used biological models, exercises in formal hypothesis development and model building. Three hours lec. a week. Pr.: Math. 221 or 340 and Stat. 500 (or concurrently). 215-725-0-0419

**215 730. 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 Biochem. 521 or equiv.; consent of instructor. 215-730-1-0411

**215 740. Anatomy of Higher Plants.** (3) II. Structure and development of the various tissues and organs of seed plants. One hour rec. and six hours lab. a week. Pr.: Biol. 201 or 210. 215-740-1-0402

**215 750. Molecular and Cellular Biology.** (3) I. 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.: Biochem. 522 or equiv. 215-750-0-0417

**215 770<sup>1</sup>. Microorganisms of the Natural Environment.** (3) I in even years. A study of representatives of the major groups of bacteria isolated by enrichment methods from natural environments. Six hours lab. per week. Pr.: Biol. 690 and Biochem. 521. 215-770-1-0420

**215 860<sup>1</sup>. Microbial Genetic Techniques.** (4) II. Experiments in multiplication, recombination, and mutation in bacteria and bacteriophage. Pr.: Biol. 675, Biochem. 521 or equiv. 215-860-1-0422

**215 865. 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. per week. Pr.: Biol. 530 and 600. 215-865-1-0420

**215 868. Advanced Cellular and Developmental Biology.** (3) I. Chemistry, structure and function of cellular systems in growth, development and reproduction. Pr.: Biochem. 522 or equiv. 215-868-0-0417

**215 870. Advanced Systematic Botany.** (4) I in odd years. Classification, nomenclature, and taxonomic theory of vascular plants. Two hours rec. and six hours lab. per week. Pr.: Biol. 551. 215-870-1-0402

**215 880. Population Ecology.** (3) II. Growth and regulation of populations, cycles, competition theory, seasonal effects, predator-prey and community relationships, biogeography and social regulation. In-depth consideration of current theoretical developments, and recent field population studies. Pr.: Biol. 530, a course in Calculus and a course in Statistics. 215-880-0-0420

**215 881. Ecosystems Energetics.** (3) I in even years. Three credit hours of lecture and discussion. A study of the constraints placed on energy flow in ecosystems by bioenergetic principles at cellular, individual, and population levels of organization. The course will involve extensive reading of original literature. Pr.: Consent of instructor. 215-881-0-0420

**215 882. Reservoir Limnology.** (3) II in even 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. 693. 215-882-0-0420

**215 890. Advanced Topics in Biology.** (1-6) I, II, S. Pr.: Consent of instructor. 215-890-3-0401

**215 891. Advanced Problems in Biology.** (1-8) I, II, S. Pr.: Consent of instructor. 215-891-3-0401

**215 895. Graduate Seminar in Biology.** (1) I, II. Pr.: Consent of instructor. 215-895-0-0401

**215 898. Master's Research in Biology.** (1-9), I, II, S. 215-898-4-0401

**215 899. Master's Research in Microbiology.** (1-9) I, II, S. 215-899-4-0411

**215 998. Research in Biology.** (Var.) I, II, S. 215-998-4-0402

**215 999. Research in Microbiology.** (Var.) I, II, S. 215-999-4-0411

<sup>1</sup>. Not offered in '77-'78

## CHEMISTRY

*William G. Fateley,\* Head of Department*

Professors Copeland,\* Des Marteau\* Fateley,\* Hamaker,\* Hawley,\* Kruh, Lambert,\* McDonald,\* Meloan,\* Moser,\* and Setter,\* Associate Professors Danen,\* G.D. Johnson,\* Kay,\* Lanning,\* Paukstelis,\* Purcell,\* and van Swaay,\* Assistant Professor Fry T. Johnson, Lenhart and Peterson.\* Emeritus; Professors Andrews, Lash, Schrenk, and Silker; Assistant Professor Harriss; Instructor Crawford.

The Department of Chemistry occupies Willard Hall and the H.H. King Chemical Laboratory. The faculty of the department consists of 22 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

<sup>1</sup>. Not offered in '77-'78



undergraduate and graduate students in numerous other curriculums. Instruction and research in chemistry are conducted in laboratories well-equipped with modern facilities and instruments.

### Undergraduate Study

Chemistry graduates from KSU are sought by chemical industries and graduate schools and by high schools as chemistry teachers. Also, 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 good preparation in mathematics, chemistry, physics and English composition. Trigonometry and two years of algebra should be taken; more math is good.

### Transfer Students

Community college students should take general chemistry, qualitative and quantitative analysis, one year of organic chemistry, analytic geometry, calculus, physics, and English composition.

### Independent Study and Research

Many chemistry students at Kansas State are engaged in independent study and research. Some begin their freshman year, and some begin later, working on their own research projects in a research laboratory under the supervision of a faculty member of their choice. A significant number publish the results of their work in scientific journals.

### 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 are especially well suited for work in industry or 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 advisers in both chemistry and education.

### Graduate Study

Programs leading to the M.S. and Ph.D. degrees are offered. Research and graduate level courses are conducted in the areas of analytical, inorganic, organic, and physical chemistry and adequately prepare students for a career in research or college and university teaching.

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 (see below). Prospective graduate students whose undergraduate training does not meet these requirements may be admitted on a provisional basis but are 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 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, Kansas State University, Manhattan, Kansas 66506.

### Chemistry Curriculum for the B.S. Degree<sup>1</sup>

Preferred curriculum for those preparing for employment as chemists or those preparing for graduate study in chemistry.

120 credit hours required for graduation.

**Chemistry:** 41 hours (course hours are in parentheses)

Freshman: Chem. I (4); Chem. II (4); Chem. Analysis (4).

Sophomore: Org. I (3); Org. I Lab. (2); Org. II (3); Org. II Lab. (2); Chem. Separations (2).

Junior: Phys. Chem. I (3); Phys. Chem. II (3); Phys. Chem. II Lab. (2).

Senior: Struct. and Bonding (2); Instrumental Anal. (4); Undergrad. Research (3) (May be taken prior to the senior year.)

**Mathematics:** 12 hours

Freshman: Anal. Geom. & Calc. I (4); Anal. Geom. & Calc. II (4).

Sophomore: Anal. Geom. & Calc. III (4).

**Physics:** 10 hours

Sophomore: Engg. Phys. I (5); Engg. Phys. II (5).

**English:** 6 hours

Freshman: Engl. Comp. I (3); Engl. Comp. II (3).

**Speech:** Oral Communication (or another course recommended by the Speech Department).

**Physical Education:** Concepts in Phys. Ed. (1).

**Social Sciences and Humanities:** 7 courses from the Departments of Art, Economics, English, Geography, History, Journalism and Mass Communications, Modern Languages, Music, Philosophy, Political Science, Psychology, Sociology, Anthropology and Social Work, or Speech. Courses must include:

a. German: German I and II or German for Reading Knowledge I and II

b. Philosophy: 1 course

c. 2 advanced courses (500 level or above or German III and IV)

**Electives:** sufficient courses to complete a total of 120 hours.

### Chemical Science Curriculum for the B.S. Degree<sup>1</sup>

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, agriculture.

120 credit hours required for graduation.

<sup>1</sup> A program leading to the B.A. degree can be planned by modifying the social sciences and humanities requirements. See page 91 for specific requirements for the B.A. degree.



**Chemistry:** (course hours are in parentheses)

Chem. I (4); Chem. II (4); Chem. Analysis (4).  
Org. I (3); Org. I Lab. (2); Org. II (3); Org. II Lab. (2); Chem. Separations (2). Desc. Phys. Chem. (3)

One additional course in chemistry or biochemistry.

**Mathematics:**

College Algebra (3); Plane Trigonometry (3); Anal. Geom. & Calc. I (4); Anal. Geom. & Calc. II (4). (Requirements for College Algebra and Plane Trigonometry waived for those with credit in Anal. Geom. & Calc. I.)

**Physics:**

Gen. Phys. I (4); Gen. Phys. II (4).

**English:**

Engl. Comp. I (3); Engl. Comp. II (3).

**Speech:** Oral Communication I (or another course recommended by the Speech Department)

**Physical Education:** Concepts in Phys. Ed. (1).

**Social Sciences and Humanities:** Seven courses from the Departments of Art, Economics, English, Geography, History, Journalism and Mass Communications, Modern Languages, Music, Philosophy, Political Science, Psychology, Sociology, Anthropology and Social Work, or Speech. Courses must include:

- a. Philosophy: 1 course
- b. 2 advanced courses (500 level or above)

**Electives:** sufficient courses to complete a total of 120 hours.

## Courses in Introductory and General Chemistry

### Undergraduate Credit

**221 095. Chemistry Seminar.** (0) I. 221-095-0-1905

**221 100. 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. 221-100-0-1905

**221 110. General Chemistry.** (5) I, II. Principles, laws and theories of chemistry; important metallic and non-metallic substances. Three hours lec., one hour rec. and three hours lab. a week. 221-110-1-1905

**221 210. Chemistry I<sup>2</sup>.** (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 Chem. 100) and Math. 010 (or equiv.). 221-210-1-7-1905

**221 230. 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.: Chem. 210. 221-230-1-7-1905

**221 299. Honors Seminar in Chemistry.** (1) I or II. 221-299-0-1905

**221 499. Problems in Undergraduate Chemistry.** (Var.) I, II, S. Problems may include classroom and/or lab. work. Pr.: Consent of instructor. 221-499-3-1905

### Undergraduate And Graduate Credit In Minor Field

**221 599. Undergraduate Research.** (1, 2, 3) I, II, S. Analytical, inorganic, organic or physical chemistry. 221-599-4-1905

<sup>2</sup> 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 Chemistry I (Chem. 210) and Chemistry II (Chem. 230). 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. Students are enrolled in the accelerated program by the Chemistry Department and are placed in special sections of Chem. I and Chem. II.

## Undergraduate And Graduate Credit

**221 700. 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. 221-700-2-1905

**221 799. Problems in Chemistry.** (Var.) I, II, S. Problems may include classroom or laboratory work. Not for thesis research. Pr.: Consent of instructor. 221-799-3-1905

### Graduate Credit

**221 899. Research in Chemistry.** (Var.) I, II, S. Research in analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry for the M.S. degree. 221-899-4-1905

**221 999. Research in Chemistry.** (Var.) I, II, S. Research in analytical chemistry, inorganic chemistry, organic chemistry and physical chemistry for the Ph.D. degree. 221-999-4-1905

## Courses in Analytical Chemistry

### Undergraduate Credit

**221 240. Environmental Chemistry Laboratory.** (1) I, II. Selected experiments in air quality, water quality and other environmental topics. Three hours lab. a week. Pr.: Chem. 230 or concurrent enrollment. 221-240-1-0-1909

**221 271. 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.: Chem. 230. 221-271-1-1909

### Undergraduate And Graduate Credit In Minor Field

**221 540. Research Techniques.** (3) II. Principles and applications of techniques in research; to include chromatography, spectroscopy, electrochemistry, dialysis, electrophoresis, and distillation. Two hours lec. and three hours lab. a week. Pr.: Chem. 250 and 350. 221-540-1-1909

**221 545. Chemical Separations.** (2) II. Principles of modern separation techniques. One hour lec. and three hours lab. a week. Pr.: Chem. 271 or equiv. 221-545-1-1909

### Undergraduate And Graduate Credit

**221 666. Instrumental Analysis.** (3) I, II, S. Three hours lecture a week. Pr.: Chem. III 221-666-0-1909

**221 667. Instrumental Analysis Laboratory.** (1) I, II, S. Three hours lab. a week. Pr.: Chem. III 221-667-1-0-1909

**221 668. Chemical Equilibria.** (1) II. One hour lecture a week. Pr.: Chem. III 221-668-0-1909

**221 725. Instrumentation in Chemistry.** (3) I, II. 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.: Chem. 666 or consent of instructor. 221-725-1-1909

**221 728. 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.: Chem. 550, 597, 666 or equivalent courses. 221-728-1-1909

### Graduate Credit

**221 901. Graduate Seminar In Analytical Chemistry.** (0-1) I, II. 221-901-0-1909

**221 921. Advanced Separations.** (2) II in even years. Two hours lecture a week. Pr.: Chem. III 221-921-0-1909



**221 922. Advanced Separations Laboratory.** (1) II in even years. Three hours of lab. a week. Pr.: Chem. III 221-922-1-0-1909

**221 942. Advanced Analytical Chemistry.** (3) I in odd years. Elemental and functional group analyses, nonaqueous solvent systems, gas analysis, kinetics, and thermal methods of analysis. Pr.: Chem.<sup>3</sup> 221-942-0-1909

**221 944. Electroanalytical Chemistry.** (2-3) I in even years. Theory and applications of electrochemical methods; chronoamperometry, chronopotentiometry, cyclic voltammetry, coulometry, polarography, potentiometry, and instrumentation. Pr.: Chem.<sup>3</sup> 221-944-1-1909

**221 945. Selected Topics in Analytical Chemistry.** (1-3) Offered 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. Pr.: Chem.<sup>3</sup> 221-945-0-1909

**221 946. Principles and Techniques of Analytical Chemistry I.** (1-5) II of odd years. A lecture and laboratory course on emission spectroscopy, flame photometry, atomic absorption, and x-ray methods. Pr.: Chem.<sup>3</sup> 221-946-1-1909

**221 947. Principles and Techniques of Analytical Chemistry II.** (1-4) II of even years. A lecture and laboratory course on ultraviolet and visible absorption, infrared and Raman methods, fluorescence, phosphorescence, polarimetry, and refractometry. Pr.: Chem.<sup>3</sup> 221-947-1-1909

**221 948. Computer Control of Chemical Instruments.** (3) The technique and use of a mini-computer in the laboratory environment, 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.: Chem. 725. 221-948-1-1909

## Courses in Inorganic Chemistry

### Undergraduate And Graduate Credit In Minor Field

**221 597. Structure and Bonding.** (2) I, S. 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.: Chem. 550, 595. 221-597-0-1906

### Undergraduate And Graduate Credit

**221 710. Chemical Applications of Group Theory.** (1) I. Applications of group theory to molecular structure, bonding and spectra. One hour lec. a week. Pr.: Chem.<sup>3</sup> 221-710-0-1906

**221 760. Main Group Reactivity.** (2) II, S. Theory and properties of main group elements with emphasis on group characteristics. Two hours lec. a week. Pr.: Chem. 597. 221-760-0-1906

**221 765. Transition Metal Group Reactivity.** (2) II, S. The structure, spectroscopy, and reactivity of the transition metals and their compounds. Pr.: Chem. 597. 221-765-0-1906

### Graduate Credit

**221 855. Inorganic Techniques.** (2-3) S. A graduate level course in the preparation of inorganic compounds which are of unusual interest and which present challenges to the student of advanced inorganic laboratory techniques. Six to nine hours lab. a week. Pr.: Chem. 597. 221-855-1-0-1906

**221 902. Graduate Seminar in Inorganic Chemistry.** (0-1) I, II, S. 221-902-0-1906

**221 929. 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.: Chem. 597, 710. 221-929-0-1906

**221 931. Theoretical Inorganic Chemistry.** (3) II in odd years. Theory of crystal fields and paramagnetic resonance. Three hours lec. a week. Pr.: Chem. 597, 710, 854, 995 or conc. enrollment. 221-931-0-1906

**221 935. Selected Topics in Inorganic Chemistry.** (1-3) Offered on sufficient demand. 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. 221-935-0-1906

## Courses in Organic Chemistry

### Undergraduate Credit

**221 190. 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 Chem. 191 is recommended. Three hours lec. a week. Pr.: Chem. 110. 221-190-0-1907

**221 191. Elementary Organic Chemistry Laboratory.** (2) I, II, S. Six hours lab. a week. Pr. or conc.: Chem. 190. 221-191-1-1907

**221 350. 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 Chem. 351 is urged. Three hours lec. a week. Pr.: Chem. 230. 221-350-0-1907

**221 351. General Organic Chemistry Laboratory.** (2) I, II, S. Six hours lab. a week. Pr. or conc.: Chem. 350. 221-351-1-1907

### Undergraduate And Graduate Credit In Minor Field

**221 531. Organic Chemistry I.** (3) I. 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. Recommended for others who desire a more thorough course than the preceding ones. Three hours lec. a week. Pr.: Chem. 271. Conc. enrollment in Chem. 532 is recommended. 221-531-0-1907

**221 532. Organic Chemistry I Laboratory.** (2) I. Six hours lab. a week. Pr. or conc.: Chem. 531. 221-532-1-1907

**221 550. Organic Chemistry II.** (3) I, II. Cont. of Chem. 531, including additional aromatic chemistry, condensation reactions and introduction to some advanced topics, such as dyes, polymers and heterocyclic chemistry. Conc. enrollment in Chem. 551 is recommended. Three hours lec. a week. Pr.: Chem. 531 and 532. 221-550-0-1907

**221 551. Organic Chemistry II Laboratory.** (2) I, II. Six hours lab. a week. Pr. or conc.: Chem. 550. 221-551-1-1907

### Graduate Credit

**221 852. Systematic Organic Chemistry.** (3) II. Advanced study of organic compounds and fundamental types of reactions. Three hours lec. a week. Pr.: Chem.<sup>3</sup> 221-852-0-1907

**221 860. Advanced Organic Chemistry.** (3) I. Conditions, scope, and applications of reactions useful in synthetic organic chemistry. Three hours lec. a week. Pr.: Chem.<sup>3</sup> 221-860-0-1907

**221 903. Graduate Seminar in Organic Chemistry.** (0-1) I, II. 221-903-0-1907

**221 905. Current Organic Literature.** (0-1) I, II, S. Topics of current interest in organic chemistry will be presented and critically discussed by graduate students and faculty. Max. two hr. credit in M.S. program, four hr. in Ph.D. program. Pr.: Enrollment as graduate student in organic chemistry. 221-905-0-1907



**221 965. Theoretical Organic Chemistry I.** (3) II. Bond structure, stereo chemistry, relation of constitution to physical properties, solvents, and other general topics of a theoretical nature. Three hours lec. a week. Pr.: Chem.<sup>3</sup> 221-965-0-1907

**221 967. Theoretical Organic Chemistry II.** (3) I. The principal mechanisms of organic reactions and various types of evidence for them. Recent developments are followed in the current literature. Three hours lec. a week. Pr.: Chem. 965. 221-967-0-1907

**221 970. Selected Topics in Organic Chemistry.** (1-3) Offered 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. Pr.: Chem.<sup>3</sup> 221-970-0-1907

## Courses in Physical Chemistry

### Undergraduate And Graduate Credit In Minor Field

**221 500. Descriptive Physical Chemistry.** (3). Elementary principles of physical chemistry without higher mathematical applications. Three hours lec. a week. Pr.: Chem. 271, Math. 100. 221-500-0-1908

**221 535. Radioactive Tracer Techniques.** (3) II. Chemistry and physics of radioactive substances and applications to fields of biological and physical science. Two hours lec. and three hours lab. a week. Pr.: Consent of instructor. 221-535-1-1908

**221 585. Physical Chemistry I.** (3) I, S. Properties of matter in the gaseous state; kinetic and statistical theory; elementary quantum chemistry; elementary thermodynamics, including the statistical interpretation. Three hours lec. a week. Pr.: Chem. 230, Math. 222, Phys. 214. 221-585-0-1908

**221 586. Physical Chemistry I Laboratory.** (2) I. Six hours lab. a week. Pr.: Chem. 271 and Chem. 585 or conc. enrollment. 221-586-1-1908

**221 595. Physical Chemistry II.** (3) II, S. Thermodynamics and chemical equilibrium; reaction kinetics and mechanisms; elementary quantum theory of molecular structure and chemical bonding; properties of the solid state. Three hours lec. a week. Pr.: Chem. 585. 221-595-0-1908

**221 598. Physical Chemistry II Laboratory.** (2) II. Six hours lab. a week. Pr.: Chem. 595 or conc. enrollment. 221-598-1-1908

### Undergraduate And Graduate Credit

**221 720. Electrochemistry.** (3) II in even years. Fundamentals of electrochemistry and their applications. Two hours rec. and three hours lab. a week. Pr.: Chem.<sup>3</sup> 221-720-1-1908

### Graduate Credit

**221 801. Chemical Thermodynamics.** (3) II in odd years. The laws, principles, and methods of thermodynamics and their applications to chemical systems, both pure and of variable composition. Introductory statistical-molecular approach also included. Three hours lec. a week. Pr.: Chem.<sup>3</sup> 221-801-0-1908

**221 802. Chemical Kinetics.** (3) II. Survey of experimental and/or theoretical aspects of dynamics of chemical reactions. The topics presented will depend upon the instructor. Three hours lec. a week. Pr.: Chem.<sup>3</sup> 221-802-0-1908

**221 854. Molecular Structure.** (3) I. Introduction to quantum mechanics and atomic and molecular spectroscopy. Three hours lec. a week. Pr.: Chem.<sup>3</sup> 221-854-0-1908

**221 904. Graduate Seminar in Physical Chemistry.** (0-1) I, II, S. Presentation of topics from literature in physical chemistry. 221-904-0-1908

**221 950. Chemical Statistical Thermodynamics.** (3) II in even years. Application of classical and quantum statistical mechanics to chemical phenomena. Three hours lec. a week. Pr.: Chem. 801, 854. 221-950-0-1908

**221 955. Selected Topics in Physical Chemistry.** (1-3) Offered 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.: Chem.<sup>3</sup> 221-955-0-1908

**221 995. Theoretical Chemistry I.** (3) II. Principles of diatomic and polyatomic molecular spectroscopy and chemical bonding. Three hours lec. a week. Pr.: Chem. 854 or consent of instructor. 221-995-0-1908

**221 996. Theoretical Chemistry II.** (3) I. Development of the basic principles of quantum mechanics and application to problems of energy states of atoms and molecules. Three hours lec. a week. Pr.: Chem. 854 or consent of instructor. 221-996-0-1908

## COMPUTER SCIENCE

*Paul S. Fisher, Head of Department*

At KSU: Associate Professors Calhoun,\* Conrow,\* Fisher,\* Gallagher,\* Hankley,\* Sincovec,\* and Wallentine;\* Assistant Professors Maryanski, Miller, Shapiro,\* and Unger; Instructor Basham.

At KU: Professors Bavel,\* Bulgren,\* Horowitz,\* Jones,\* Schweppe,\* S. Sedelow,\* W. Sedelow,\* and Wallace;\* Associate Professors Hetherington,\* Lien,\* Mansfield,\* and Tuggle;\* Assistant Professors Horgan,\* and Muchnick.\*

### Undergraduate Study

The first digital computer was demonstrated in 1944; today there are thousands of such computers in use throughout the world. It has been estimated that one-third of all jobs now involve some use of, or interaction with, computers. That figure is expected to climb to more than 80 percent by 1984. This wide use of computers will be supported by increasing numbers of computer terminals and personal mini-computers in stores, banks, schools, libraries, and even in homes and on farms. In spite of the great hardware (electronic) aspect of computers, computers owe their power to people. People create application systems; they design, sell, manage, and program computer systems; they supply and use data and information to and from computers.

The creation and utilization of the best possible hardware and software is, broadly speaking, the field of computer science.

The program of study in computer science prepares a student for careers in scientific and business applications programming, systems programming and analysis, marketing and sales, and management. Career opportunities for both men and women are excellent. 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 more common.

The department has several mini-computers (Interdata 8/32, 7/16, 85; Nova 2/10) and several micro-computers, a graphics terminal, and several

<sup>3</sup> All chemistry courses numbered 600 or above require the following as minimum prerequisites: Organic Chem. II (Chem. 550), Organic Chem. II Lab. (Chem. 551), Physical Chem. II (Chem. 595), and Physical Chem. II Lab. (Chem. 598).



typewriter-like terminals for personal access to either the IBM/370 computer at KSU or the Honeywell 66/60 computer at KU. There is also a card reader and a line printer in the computer science building which provide remote access to the IBM/370.

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; complete Math 220 and 221 and either 224 or 551; Electrical Engineering 241; Computer Science 200, one language laboratory, 300, 305, 505, 405, 420, 560, and 580, plus 15 additional hours of technical electives which are approved by the student's adviser.

### Graduate Study

The Department of Computer Science 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. Either a thesis, a written report, or a publishable paper is required as well as satisfactory performance on a master's examination. The master's examination covers areas of data structures, programming languages, operating systems, and software engineering.

The Doctor of Philosophy degree 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 completion of the master's examination at a level specified for Ph.D. candidacy; selection of a research supervisory committee; completion of written preliminary examinations in three areas supportive of the student's proposed research area; and presentation of a proposal for Ph.D. research. Completion of the doctoral degree requires 30 semester-hours of course work beyond the master's degree, a minimum of 30 hours of research, and presentation and defense of the dissertation.

Central areas of research emphasis at KSU include: programming languages and language processors; operating systems; software engineering; computer architecture; numerical methods and software development.

Areas of current research include: minicomputer networks; business and data base systems using minicomputers; numerical solution of differential equations; image recognition and graphics; systems simulation and modeling.

## Courses in Computer Science

### Undergraduate Credit

**286 200. Fundamentals of Computer Programming.** (2) I, II, S. History of computers, description of digital computing systems, strategy of problem solving using digital computers, concepts and properties of algorithms, introduction to procedure-oriented languages, relevance of computers to society. Pr.: Algebra, plus conc. enrollment in one C.S. Language Lab. 286-200-0-0704

**286 201. FORTRAN Language Laboratory.** (1) I, II, S. Fundamentals of programming in FORTRAN; applications. Three hours lab. a week. Pr. or conc.: C.S. 200. 286-201-1-0-0704

**286 202. PL/1 Language Laboratory.** (1) I, II, S. Fundamentals of programming in PL/1; applications. Three hours lab. a week. Pr. or conc.: C.S. 200. 286-202-1-0-0704

**286 203. APL Language Laboratory.** (1) I, II. Fundamentals of programming in APL; applications. Three hours lab. a week. Pr. or conc.: C.S. 200. 286-203-1-0-0704

**286 204. SNOBOL Language Laboratory.** (1) Fundamentals of programming in SNOBOL; applications. Three hours lab. a week. Pr. or conc.: C.S. 200. 286-204-1-0-0704

**286 205. COBOL Language Laboratory.** (1) I, II. Fundamentals of programming in COBOL; applications. Three hours lab. a week. Pr. or conc.: C.S. 200. 286-205-1-0-0704

**286 206. BASIC Language Laboratory.** (1) I, II. Fundamentals of programming in BASIC; applications. Three hours lab. a week. Pr. or conc.: C.S. 200. 286-206-1-0-0704

**286 300. Algorithmic Processes.** (3) I, II. Analysis and development of algorithms for solution of computational problems using the language PL/1; applied programming utilizing file handling, debugging aids, and other system features; advanced programming techniques for specialized problems. Pr.: One C.S. Language Lab. or C.S. 790. 286-300-1-0-0704

**286 305. Computer Organization and Programming I.** (3) I. Introduction to assembly languages; logical computer organization; instruction sequencing; addressing systems; subroutine linkages and command languages for several mini-computers and IBM 360/370 computers. Each subject is developed by student computer programs. Pr.: One C.S. Language Lab. or C.S. 790. Pr. or conc.: E.E. 241. 286-305-1-6-0704

**286 306. Operating Systems Laboratory.** (3) II. Advanced programming laboratory for experience in O/S 360/370, job control language, utilities, and access methods. Pr.: C.S. 305. 286-306-1-2-0704

**286 397. Seminar in Computer Science.** (1-3). 286-397-3-0704

**286 405. Introduction to Programming Languages.** (3) I. Structure of algorithmic, conversational, list processing, and string manipulation languages; concepts and facilities of programming languages; structure of compilers. Pr.: C.S. 300 or 790. 286-405-1-8-0701

**286 420. Operating Systems I.** (3) II. Basic systems concepts: assemblers, linking loaders, batch monitors, interrupt systems, input/output systems, and files; procedure implementation; process parallelism and synchronization; memory and name management. Pr.: C.S. 305 or 790. 286-420-1-8-0701

### Undergraduate And Graduate Credit In Minor Field

**286 505. Computer Organization and Programming II.** (3) II. Advanced computer organization topics including channel organization, input/output processing, microprogramming, assemblers and macro processors, virtual systems, peripheral devices. Examples on both minicomputers and IBM 360/370 series. Pr.: C.S. 305. 286-505-1-6-0704

**286 560. Data Structures.** (3) I, II. Study of list, string, array, and graph structures within a computer; memory management. Pr.: C.S. 300. 286-560-1-7-0701

**286 565. 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.: C.S. 200. 286-565-1-7-0703



**286 580. Numerical Computing.** (3) I, II. 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.: One C.S. Language Lab. or C.S. 790 and Math 224 or 551. 286-580-1-7-0701

### Undergraduate And Graduate Credit

**286 640. Introduction to Software Engineering.** (3) I. Software design; program specification; proofs of programs; structured programming; top-down design; modular organization; program style, debugging, testing, and documentation; management of programming teams; aids for software construction; planning, estimates, and evaluation of performance; team project. Pr.: C.S. 300. 286-640-0-0701

**286 650. Design Automation for Digital Systems.** (3) Programming of digital design automation systems for hardware compilers, digital simulators and simulation, documentation and editing, placement and wire-routing algorithms, graphical aids for printed circuit board design and production. Pr.: C.S. 305 or 790 and E.E. 241. 286-650-1-6-0701

**286 658. Microcomputer Programming and Applications.** (2) I, II. Organization and programming of a typical microcomputer. One hour lec. and three hours lab. each week. Pr.: E.E. 241 and conc. enrollment in E.E. 648. 286-658-1-5-0704

**286 660. Data Structures and Information Storage and Retrieval.** (3) I, II. Study of list, string, array, and graph structures within a computer; memory management; individual project. Pr.: C.S. 300. 286-660-1-7-0701

**286 665. Computer Installation Management.** (3). Computer selection, personnel organization and management, budget, optimizing system operation, PERT. Students plan, recommend, and defend small data processing systems. Pr.: C.S. 300 or 790. 286-665-0-0705

**286 670. Discrete Computational Structures.** (3) I. Introduction to theoretical foundations of computer science; computational and representational aspects of graphs, formal languages, Boolean algebras, propositional calculus, combinatorics, and discrete probability. Pr.: C.S. 300. 286-670-0-0702

**286 680. Searching Procedures.** (3). Design and implementation of procedures and algorithms for numerical and semi-numeric searching; mathematical programming; interactive searching with programming projects primarily using the language APL. Pr.: C.S. 580. 286-680-1-7-0701

**286 690. 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, mini-computer operating systems, graphics, numerical software, etc. Pr.: Junior standing. 286-690-3-0799

**286 697. Seminar in Computer Science.** (1-3). Pr.: Junior standing. 286-697-0-0701

**286 700. Translator Design I.** (3). Language structure and meaning; associated recognition algorithms, and interpreters. Emphasis on construction of a translator or an interpreter for a programming language. Pr.: C.S. 405 and 560. 286-700-1-8-0701

**286 710. Computer Simulation Experiments.** (3) I. Digital computer simulations will be programmed and used to predict data and test hypotheses. Pr.: C.S. 410. 286-710-1-7-0701

**286 720. Operating Systems II.** (3). Design of executive systems, scheduler strategies for central processor, system integrity (protection), methods of system development, languages for system implementation. Pr.: C.S. 420 and 560. 286-720-1-7-0701

**286 730. Artificial Intelligence.** (3). Application of heuristics to problem solving; perceptrons and pattern recognition; learning and self-evolving programs. Pr.: C.S. 430 and 560. 286-730-1-8-0701

**286 735. Decision Processing.** (3). Pattern recognition by metric and linguistic techniques, feature extraction, clustering techniques. Pr.: One C.S. Language Lab. or 790 and Math 551 and Stat. 510. 286-735-0-0702

**286 750. Advanced Computer Architecture Experiments.** (3). Students will investigate characteristics of various computers including those with execution support of multi-processing, multi-programming, micro-programmable, high-level language, stack processing, and communication architectures. Two hours lec. and three hours lab. each week. Pr.: C.S. 450 and E.E. 641. 286-750-1-6-0701

**286 760. Information Organization and Retrieval.** (3) I. Models for representing structured information; techniques for organizing and searching files; query analysis; analysis of information by statistical, syntactic, and logical methods; applications to automatic information retrieval systems, question answering systems, and man-machine interaction. Pr.: C.S. 560. 286-760-1-7-0702

**286 765. EDP Systems Analysis.** (4). 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. Three hours lec., two hours lab. a week. Pr.: C.S. 560. 286-765-1-7-0703

**286 780. Numerical Solution of Ordinary Differential Equations.** (2). Computer algorithms and techniques for solving ordinary differential equations; programming exercises on the digital computer. Pr.: One C.S. Language Lab. and Math. 555 or C.S. 580 and Math. 240 plus concurrent enrollment in Math. 780. 286-780-1-7-0701

**286 785. Numerical Solution of Partial Differential Equations.** (2). Computer algorithms and techniques for solving partial differential equations; programming exercises on the digital computer. Pr.: C.S. 780 & Math. 780 plus concurrent enrollment in Math. 785. 286-785-1-7-0701

**286 790. Intensive Computer Science: Concepts.** (3) I, II, S. Intensive course in design of algorithms, computer programming, and advanced computational techniques for students with minimal background in Computer Science. Meets four hours each week. Pr.: One C.S. Language Lab. 286-790-1-6-0704

**286 798. Topics in Computer Science.** (Var.) I, II, S. Pr.: Prerequisite varies with the announced topic. 286-798-3-0701

### Graduate Credit

**286 800. Theory of Parsing.** (3). Introduction to formal language and automata theory; theoretical study of parsing techniques. Pr.: C.S. 405 and 670. 286-800-0-0701

**286 805. Semantics of Programming Languages.** (3). Theoretical prerequisites and computational techniques for mechanical interpretation of language sentences; semantics of formal computer languages; proofs of program validity and implementation equivalences; structural representation of meaning. Pr.: C.S. 405. 286-805-0-0701

**286 820. Introduction to Operating Systems Theory.** (3). Theoretical treatment of process synchronization, multiprocessors, resource allocation, scheduling theory, evaluation techniques for hierarchical memory and machines. Pr.: C.S. 405, 420, and 560. 286-820-0-0705

**286 830. Computer Graphics and Image Processing.** (3). Computer representation and display of line drawing and contour images; man-machine interaction; transformations on images, clipping, hidden line removal, structured image files; design of image processing software. Pr.: C.S. 201 and Math. 551. 286-830-1-7-0701



**286 840. Advanced Concepts in Software Engineering.** (3). Software system design and construction, descriptive and definitional tools, implementation techniques, and performance evaluation of software systems. Pr.: C.S. 405, 420, and 560. 286-840-0-0704

**286 870. Automata and Computability I.** (3). Elements of abstract algebra; review of finite automata; recursive functions and programmed machines; computable functions, loop programs and primitive recursive functions, theses of Turing and Church. Pr.: C.S. 700. 286-870-0-0701

**286 875. Automata and Computability II.** (3). Problems in unsolvability; topics in computability; cellular automata; student produces term paper or project. Pr.: C.S. 870. 286-875-0-0701

**286 890. Special Topics in Computer Science.** (2-4). Study in selected areas of artificial intelligence, computational linguistics, linear and nonlinear programming, theorem proving by computer, models of intelligent processes, and the like. Pr.: Prerequisite varies with the announced topic. 286-890-0-0701

**286 891. Intensive Computer Science: Applications.** (3) I, II, S. Intensive course in design of algorithms, programming, JCL, and program libraries. Meets four hours each week. Not for credit for C.S. majors. Pr.: Graduate standing in student's won area. 286-891-1-6-0704

**286 897. Seminar in Computer Science.** (1-3) I, II. Pr.: Full graduate standing in C.S. 286-897-0-0701

**286 898. Master's Report in C.S.** (1-2) I, II, S. Pr.: C.S. 897. 286-898-3-0701

**286 899. Research in Computer Science.** (1-6) I, II, S. Pr.: C.S. 897. 286-899-4-0701

**286 900. Translator Design II.** (3) Special topics in translator construction involving incremental, extensible, and conversational compilers, and translator writing systems. Pr.: C.S. 800. 286-900-0-0701

**286 920. 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.: C.S. 720 and 805 and Stat. 510. 286-920-0-0701

**286 925. Computation Structures.** (3). Theoretical study of hardware/software means for implementing total computer systems; structures arising during execution; computation schemata accommodating parallelism; monosequence and multi-process implementation; process synchronization and determinism. Pr.: C.S. 720 and 805 and E.E. 641. 286-925-0-0701

**286 999. Research in Computer Science.** (Var.) I, II, S. Pr.: C.S. 897. 286-999-4-0701

## ECONOMICS

*Paul L. Kelley,\* Head of Department*

*Edgar S. Bagley,\* Assistant Head, Teaching and Graduate Studies*  
*Norman V. Whitehair,\* Assistant Head, State Leader, Extension*  
*Marketing, Management and Resource Development*

Professors Bagley,\* Chalmers,\* Emerson,\* and Nordin,\* Associate Professors Gormely,\* Nafziger\* and Thomas,\* Assistant Professors Akkina,\* Bobcock,\* Haggart, Kennedy,\* and Olson,\* Instructors Bradley and Higham. Emeritus: 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 the fields of 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 major in economics will help prepare a student for a career in business, in government or in education. The study of economics also will be useful to a student in acquiring the background needed as a citizen for understanding problems of our society and appraising policies of governments.

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 Economics 110 and Economics 120, or equivalent courses, and College Algebra.

### Undergraduate Study

Requirements for an economics major for either the B.A. or B.S. degree (see page 90) are (1) Econ. 110, 120, 510, 520, (2) five additional courses numbered 500 or above in the Department of Economics in at least four branches of economics. Economics 112, 505 and 506 cannot be counted in fulfillment of this requirement, (3) Stat. 330 or 350, and (4) one of the following: Math 220 or 500; Bus. Admin. 260; Stat. 351, 702, or 703. 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 (see page 201). This program leads to the Bachelor of Science degree (see page 91). The sequence of courses should be planned in cooperation with the student's advisers in both economics and education so that the requirements of secondary education are met (see pages 202 and 205).

**Industrial Relations and Manpower Studies Options.** Students planning to work in the industrial relations or manpower development utilization field (holding a government, industrial, or trade union position) will 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, 627; Soc. 746, 747; Pol. Sc. 704; B.A. 530, 630, 631.

### 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 or to a B.S. in agricultural economics at the end of four years and a Master of Arts in economics or a Master of Science in agricultural 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 adviser will plan an individualized program of study which meets requirements for the B.A., M.A. and B.S., 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.

### 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.

Research facilities available to graduate students include modern electronic computers.

Opportunities for advanced study are enhanced by close contacts with the agricultural economics section of the 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

**225 110. 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. 225-110-0-2204

**225 111. Economics I Honors.** (3) I, II. Course description same as Econ. 110. (3) I, II, S. Pr.: Open to students in Honors Program. 225-111-0-2204

**225 112. Economics Seminar for Education Majors.** (1) I, II. For elementary and secondary education majors for the purpose of relating economic concepts and theory of Econ. 110 to the teaching areas of the education student. If not taken concurrently with 225, 110, instructor's permission required.

**225 120. 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. 225-120-0-2204

**225 399. Honors Seminar in Economics.** (1) I, II. Readings and discussions. Open to students in the Honors Program not majoring in economics. 225-399-0-2204

### Undergraduate And Graduate Credit In Minor Field

**225 505. Introduction to the Civilization of South Asia I.** (3) I. Interdisciplinary survey of the development of civilization in South Asia, geographical and demographic context, philosophical and social concepts, economic, social and political institutions, literature and historical movements. (Same as Hist. 505, P. Sci. 505, Soc. 505, Anthro. 505.) 225-505-0-2204

**225 506. Introduction to the Civilization of South Asia II.** (3) II. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Ceylon, Nepal, and Afghanistan, including recent history, current economy, religion, culture, languages and literature, geography, social and political structures and ideas. (Same as Hist. 506, P. Sci. 506, Soc. 506, Anthro. 506.) 225-506-0-2204

**225 510. 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. 225-510-0-2204

**225 520. Intermediate Microeconomics.** (3) I, II, S. An examination of the theories of consumer behavior and demand, and the theories of production, cost and supply. The determination of product prices and output in various market structures, and an analysis of factor pricing. Introduction to welfare economics. Pr.: Econ. 120. 225-520-0-2204

**225 530. 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. 225-530-0-2204

**225 532. 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. 225-532-0-2204

**225 555. Urban and Regional Economics.** (3) II. An examination of the determinants of the economic performance of urban and regional economies, including theory, problems, and policy. Pr.: Econ. 120. 225-555-0-2204

### Undergraduate And Graduate Credit

**225 620. Labor Economics.** (3) I, S. Economics of the labor market—labor force composition and trends, structure and characteristics of labor markets, wages, employment and unemployment; economics of trade unions; theories of the labor movement and history of trade unions in the U.S.; current issues. Pr.: Econ. 120 or consent of instructor. 225-620-0-2204

**225 627. Contemporary Labor Problems.** (3) II. Emphasis on current research and public policies dealing with such matters as full employment, poverty and discrimination, impact of automation and technological change on the labor force, work orientations, women in the work force, labor market problems of minority groups, training, retraining, and education. Pr.: Econ. 620 or consent of instructor. 225-627-0-2204

**225 631. 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. 225-631-0-2204

**225 633. Public Finance.** (3) I, II, S. Course seeks answers to questions such as: What is an equitable and efficient tax system? Who bears the tax burden? How should we spend public funds? How can government influence prices and employment? Pr.: Econ. 110. 225-633-0-2204



**225 636. 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. 225-636-0-2204

**225 640. 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. 225-640-0-2204

**225 681. 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. 225-681-0-2204

**225 682. 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. 225-682-0-2204

**225 686. Business Fluctuations and Forecasting.** (3) I, some S. 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. 120. 225-686-0-2204

**225 690. Monetary, Credit, and Fiscal Policies.** (3) II. Goals of aggregative economic policy, conflicts among goals, and measures to resolve conflicts; money markets; tools and targets of central bank control; the relative strength of monetary and fiscal policies; management of the public debt; term structure of interest rates. Pr.: Econ. 530. 225-690-0-2204

**225 699. Seminar in Economics.** (1-3) Offered on sufficient demand. Seminars of special interest will be offered on demand. Pr.: Econ. 120. 225-699-0-2204

**225 730. Introduction to Econometrics.** (1-3) II, some S. Analytical and quantitative methods used in economics. Applications to specific problems. Pr.: Math. 220 or 500 and Stat. 702 or 703 or consent of instructor. 225-730-0-2204

**225 735. 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 500 or consent of instructor. 225-735-0-2204

**225 740. Managerial Economics.** (3) Offered on sufficient demand. A study of maximizing an individual business firm's profits under conditions of (a) fixed supply and (b) variable supply for (1) a fixed time period and (2) multiple time periods. A critical appraisal will be made of efforts of business firms to increase profits by affecting the position and slope of the demand schedule for their products by different patterns of expenditure or advertising and selling. Pr.: Econ. 520. 225-740-0-2204

**225 795. Problems in Economics.** (Var.) I, II, S. Advanced study on an individual basis is offered in money and banking, public finance, general economics, international trade, labor relations, transportation. Pr.: Background of courses needed for problem undertaken. 225-795-3-2204

### Graduate Credit

**225 801. Topics in Monetary Theory.** (3) I (even numbered 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. 225-801-0-2204

**225 805. Income and Employment Theory I.** (3) II, S in even years. 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. 225-805-0-2204

**225 810. History of Economic Thought.** (3) I, some S. Development of economic ideas and doctrines and the relation of these to conditions existing when they were formulated. Pr.: Econ. 110. 225-810-0-2204

**225 815. Value and Distribution Theory.** (3) I, S in odd years. Neoclassical value and distribution theory; theories of imperfect competition; introduction to general equilibrium theory and dynamic analysis. Pr.: Econ. 520 or consent of instructor. 225-815-0-2204

**225 823. 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. 225-823-0-2204

**225 832. Public Sector Analysis I.** (3) II in odd numbered years. Conditions for economic efficiency in the public sector; public good production functions; non-market decision making; rationale for public sector growth; systems analysis, cost-benefit and related techniques of allocating public goods. Pr.: Econ. 633 and 815. 225-832-0-2204

**225 833. Public Sector Analysis II.** (3) II in even numbered years. Conditions for economic efficiency in the public sector; effect of specific taxes on (1) allocation of resources, (2) distribution of income, (3) rate of revenue growth; analysis of tax shifting and incidence; intergovernmental fiscal relations. Pr.: Econ. 815 and 832. 225-833-0-2204

**225 860. Growth and Development Theories.** (3) II. Advanced theories of economic growth; 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. 225-860-0-2204

**225 880. Seminar in Economics.** (3) I, II. Special topics in economic theory. Pr.: Graduate standing. 225-880-0-2204

**225 898. Research in Economics.** MA—Master's Report. 225-898-4-2204

**225 899. Research in Economics.** MA—Research for Master's Thesis. 225-899-4-2204

**225 905. Income and Employment Theory II.** (3) II. 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. 225-905-0-2204

**225 920. Labor Economics Seminar.** (3) I. A critical analysis of wage theories, collective bargaining and unemployment problems. Pr.: Econ. 620 or consent of instructor. 225-920-0-2204

**225 925. 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. 225-925-0-2204

**225 935. Econometric Methods.** (3) I. Quantitative methods of research used in economics. Pr.: Econ. 730 or consent of instructor. 225-935-0-2204

**225 940. Economic Welfare and Public Policy.** (3) II (odd numbered years). Theory of welfare economics, with application to current economic problems and policy. Pr.: Econ. 815 or consent of instructor. 225-940-0-2204



**225 945. 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. 225-945-0-2204

**225 955. 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. 225-955-0-2204

**225 999. Research in Economics.** PhD—Research for PhD Dissertation. 225-999-4-2204

## ENGLISH

*Richard D. McGhee,\* Head of Department*  
*Mary Frances White,\* Assistant Head*

Professors Higginson,\* McCarthy,\* Moses,\* Noonan,\* and Rogerson,\* Associate Professors Adams,\* Ansdell,\* Carpenter,\* Chapman,\* Eitner,\* Grindeil,\* Johnston,\* Keiser,\* Koch,\* McGhee,\* Nyberg,\* Rees,\* M. Schneider,\* Stewart,\* and White,\* Assistant Professors Agosta, Brondell,\* Cohen, Conrow,\* Dees,\* Donnelly,\* Evans, Gillespie, Geissler, Hedrick, Matherne,\* H. Schneider, Warren,\* and Williams,\* Instructors Baker, Burke, Bussing, Clark, and Rochat. Emeritus: Professors Aberle and Davis; Associate Professor Jones; Assistant Professors Glenn and Laman; Instructors Bergman, Vance, and Pelischek.

### 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:

#### I. Literature

9 hours—core courses\*

6 hours—one sequence of survey courses (English 260 and 265, or 280 and 285)

12 hours—four 3-credit courses from 600-799 offerings\*\*

\*\*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.

6 hours—electives at the 500 level or above, except that **one** course from the Introduction to Genres listings (English 310, 320, 340, 345) **or one** course from the Humanities sequence (English 230, 231, 233, 234, 492) **or** a third survey (260, 265, 280, or 285) may be substituted.

**33 hours Total**

A student must take at least six hours of American Literature in the total program.

#### II. Literature and Creative Writing

9 hours—core courses\*

6 hours—any two survey courses (English 260, 265, 280, and 285)

6 hours—two 3-credit courses in literature and English language from the 600-799 offerings\*\*

\*\*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.

3 hours—Introduction to Creative Writing

9 hours—three 3-credit courses in writing at the advanced level, in at least two genres.

**33 hours Total**

A student must take at least six hours of American Literature in the total program.

\*Core 3 hours—Forms of Literature (229-250)

3 hours—Shakespeare

3 hours—one of the following.

229 300 English Language Study

229 530 Modern English Grammar

229 780 Introduction to Linguistics

229 790 History of the English Language

### III. Literature with Teaching Certification

3 hours—Forms of Literature (229 250)

3 hours—Shakespeare

3 hours—Modern English Grammar

6 hours—any two Survey courses (English 260, 265, 280, and 285)

9 hours—three 3-credit courses from the 600-799 offerings.\*\*

\*\*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.

3 hours—Advanced Composition

3 hours—Literature for Adolescents

6 hours—electives at the 500 level or above, except that **one** course from the Introduction to Genres listings (English 310, 320, 340, 345) **or one** course from the Humanities sequence (English 230, 231, 233, 234, 492) **or** a third survey (260, 265, 280, or 285) may be substituted.

**36 hours Total**

A student must take at least six hours of American Literature in the total program.

### Teacher Certification

Students preparing to teach English in high school may adopt either of two programs: (1) the regular major outlined in III above, leading to the B.A. degree, or (2) the major in Secondary Education, leading to the B.S. degree. Either degree may provide for teaching certification. Regular majors desiring certification should consult their advisers in the English Department.

The department offers many general education courses for the non-major student. All are intended to introduce such students to the appreciation of literature. Examples are: Engl. 210, 220, 230, 231, 233, and 234; 310; 320; 340; 345; 350; 360; 365; 370; 375; 387; 388; 492; 505, 510; 515; 520; 560; 570; 580; 702; 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

Both the M.A. and the Ph.D. are awarded by the department. For the Ph.D., the emphasis may be on either English or American literature; for the M.A.,



the emphasis may be on one of the two literatures, or on creative writing or linguistics.

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. The Graduate Record Examination is required of doctoral applicants; 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 must demonstrate competence in one foreign language. A written and an oral examination are required (though the oral is often waived). A report or thesis is required, as are Engl. 790 (unless waived) and 802.

Requirements for the Ph.D. include some 60 semester hours of course work and 30 of research on the dissertation. Candidates must demonstrate competence in two foreign languages or in one foreign language plus a specified substitute for the second. They must pass a written preliminary examination and write an acceptable dissertation and defend it in a final oral examination.

For more detailed and current information about either the M.A. or the Ph.D., consult the chairman of graduate studies, Department of English.

## Courses in English

### Undergraduate Credit

**229 030. Writing Laboratory.** (2) I, II, S. Credit/No Credit. Laboratory practice in writing for all students who need review in fundamentals of composition. Especially designed 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. 229-030-1-1501

**229 075. English for Foreign Students.** (3) I, II, S. Review of English structure for students whose first language is not English; designed to improve understanding and written expression. While hours will count in the grade-point average, hours are not applicable toward degree requirements. Required of all students not making a satisfactory TOEFL or ETS score. Students may also be admitted on recommendation of their adviser. 229-075-0-1508

**229 100. 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 non-fiction prose. Theme and paragraph organization and the basic elements of sentence structure and grammar receive emphasis. 229-100-0-1501

**229 110. English Composition IH.** (3) I, II, S. 229-110-0-1501

**229 111. English Composition IS.** (3) I. Reading and composition for freshmen. Composition IH is for freshmen who score high on their entrance examination in English and who are interested in pursuing a more sophisticated and challenging program than that of I. Composition IS is open only to students in the Arts and Sciences Honors Program. 229-111-0-1501

**229 120. 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. 229-120-0-1501

**229 125. English Composition IIH.** (3) II. Continues Engl. 110. 229-125-0-1501

**229 126. English Composition IIS.** (3) II. Continues Engl. 111. Engl. 120 concentrates on critical reading and evaluation. Engl. 125 and 126 place an emphasis on literary forms and themes. Students who have taken Engl. 100 may, on the recommendation of their instructor, be admitted to Engl. 125. Otherwise, admission is on a similar basis to that for Engl. 100, 110, and 111. 229-126-0-1501

**229 200. English Composition III.** (3) I, II, S. Advanced exposition and argumentation. Pr.: Engl. 120, 125 or 126. 229-200-0-1501

**229 210. 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. 229-210-0-1502

**229 220. Fiction into Film.** (2) I, II, S. Credit/No Credit only. Discussions of film adaptation of works of literature. Not for major credit. 229-220-0-1501

**229 230. Humanities: Classical Cultures.** (3) I, S. 229-230-0-4901

**229 231. Humanities: Medieval and Renaissance.** (3) II, S. 229-231-0-4901

**229 233. Humanities: Baroque and Enlightenment.** (3) I, S. 229-233-0-4901

**229 234. Humanities: Modern.** (3) II, S. The four 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. 229-234-0-4901

**229 250. 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. Pr.: Engl. 100, 110 or 111. 229-250-0-1502

**229 260. British Survey I.** (3) I, II, S. English literature from Anglo-Saxon times through Milton. Not designed for the general student. Pr.: Engl. 120, 125 or 126. 229-260-0-1502

**229 265. British Survey II.** (3) I, II, S. English literature from Dryden to the end of the nineteenth century. Not designed for the general student. Pr.: Engl. 120, 125 or 126. 229-265-0-1502

**229 280. American Survey I.** (3) I, II, S. An introductory review of our literary history from the early accounts of colonization through the American Renaissance. Not designed for the general student. Pr.: Engl. 120, 125, or 126. 229-280-0-1502

**229 285. American Survey II.** (3) I, II, S. An introductory review of our literary history from the Civil War to the present. Not designed for the general student. Pr.: Engl. 120, 125 or 126. 229-285-0-1502

**229 300. English Language Study.** (3) I, II, S. Survey of the principal areas of English Language study including American dialects, backgrounds of modern English, and language in literature. Pr.: English 120, 125, or 126. 229-300-0-1505

**229 310. Introduction to Fiction.** (3) I, II. Selected short stories, novellas and novels from world literature, with emphasis on the present. Concern for the forms of fiction and critical analysis. Pr.: Engl. 120, 125 or 126, or consent of instructor. 229-310-0-1501

**229 320. Introduction to the Short Story.** (3) I, II, S. American, British and Continental stories are studied. Pr.: Engl. 120, 125 or 126. 229-320-0-1501



**229 340. Introduction to Poetry.** (3) I, II, S. Close reading of poems and analysis of poetic genres, with emphasis on modern poetry. Pr.: Engl. 120, 125 or 126. 229-340-0-1502

**229 345. Introduction to Drama.** (3) I, II. Study of drama from classical times to the present. Pr.: Engl. 120, 125 or 126. 229-345-0-1502

**229 350. Introduction to Shakespeare.** (3) I, II, S. Study of representative comedies, histories and tragedies. Pr.: Engl. 120, 125 or 126. 229-350-0-1502

**229 360. English Literature I.** (3) I, II, S. Major works to about 1700, selected for the general student; emphasizing Chaucer, Shakespeare and Milton. Not for English majors. Pr.: Engl. 120, 125 or 126. 229-360-0-1502

**229 365. English Literature II.** (3) I, II, S. Major works since about 1700, selected for the general student. Not for English majors. Pr.: Engl. 120, 125 or 126. 229-365-0-1502

**229 370. American Literature I.** (3) I, II, S. Major works selected for the general student. Not for English majors. Pr.: Engl. 120, 125 or 126. 229-370-0-1502

**229 375. American Literature II.** (3) I, II, S. Major works, including the modern, selected for the general student. Not for English majors. Pr.: Engl. 120, 125 or 126. 229-375-0-1502

**229 387. Books and Men I.** (3) I, II, S. Introduction to great world classics from past to present. Not for English majors. Pr.: Engl. 120, 125 or 126. 229-387-0-1501

**229 388. Books and Men II.** (3) I, II, S. Continues Engl. 387. Not for English majors. Pr.: Engl. 120, 125 or 126. 229-388-0-1501

**229 395. Topics in English.** (0-3) I, II, S. Selected studies in literature and language. Repeatable with change in topic. Pr.: Consent of instructor. 229-395-0-1501

**229 399. Honors Seminar in English.** (1-3) I, II, S. Readings and colloquia in selected masterpieces. For non-English majors in the Honors Program. May not be used to satisfy the three-course requirement in Humanities. Pr.: Honors students only. 229-399-0-1501

**229 400. Advanced Composition.** (3) I, II, S. Expository writing, primarily for candidates for the teaching certificate in Secondary Education. Pr.: Engl. 120, 125 or 126. 229-400-0-1501

**229 405. Narrative Writing I.** (3) I. Subjects selected from the student's particular field of work; exposition of mechanisms, processes, and general expository writing. Pr.: Consent of instructor. 229-405-0-1507

**229 410. Narrative Writing II.** (3) I. Narrative writing, both in its relation to the other forms of composition and as an independent form. Pr.: Consent of instructor only. 229-410-0-1507

**229 490. Humanities Abroad.** (0-6) Intersession and/or S. A concentrated study tour of selected European cultural centers; credit is arranged at the rate of about one credit hour per week abroad. Preliminary attendance for one class study session a week in the preceding semester is required of on-campus undergraduates enrolled in the course. If credit is to be applied toward the degree, at least three hours of appropriate courses in the department are required. 229-490-0-4901

**229 492. 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 equivalent background, such as courses in western civilization, art, or world literature, with consent of instructor). 229-492-0-1501

### Undergraduate And Graduate Credit In Minor Field

**229 500. Introduction to Creative Writing.** (3) I, II, S. For those beginning the craft of imaginative writing; a practical introduction to all the major genres. Pr.: Engl. 120, 125, or 126. 229-500-0-1502

**229 505. 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, 125, or 126. 229-505-0-1502

**229 510. Literary Kinds.** (1-3) I, II, S. Examinations of such topics as the characteristics, the growth and development or the uses of specified literary genres. Repeatable with change in topic. Pr.: Engl. 120, 125, or 126. 229-510-0-1502

**229 515. 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, 125, or 126. 229-515-0-1502

**229 520. 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.: English 120, 125 or 126, or consent of instructor. 229-520-0-1503

**229 530. 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, 125 or 126. 229-530-0-1505

**229 540. Literature for Children.** (3) I, II, S. A survey of the field of literature for children, providing an opportunity for reading and evaluating books for children. Primarily for teachers of elementary grades and students of child guidance. Pr.: Engl. 120, 125 or 126. 229-540-0-1502

**229 545. 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, 125 or 126 and junior standing. 229-545-0-1502

**229 560. American Folklore and Folk Literature.** (3) I, II, S. Focus on definition, form, and function of folktales and anecdotes, legends, proverbs and riddles, beliefs and customs, folklife and Anglo-American balladry. Pr.: Junior standing. 229-560-0-1502

**229 570. English Bible.** (3) I, II, S. The Bible as literature and history; cultural and historical backgrounds of the Old Testament. Pr.: Engl. 120, 125 or 126. 229-570-0-1504

**229 580. The Epic Tradition.** (3) I. Greek and Roman masterpieces in translation as background for the study of literature. Pr.: Junior standing. 229-580-0-1504

### Undergraduate And Graduate Credit

**229 699. English Seminar.** (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. 229-699-0-1501

**229 702. The Folk tale.** (3) II. Myths, legends, folktales of Europe and America. Half of course devoted to American Plains Indian oral literature, especially that dealing with cosmology and trickster tales. Pr.: Junior standing. 229-702-0-1502

**229 707. Medieval Literature.** (3) II. A survey of non-Chaucerian literature, with stress on the Arthurian romances. Pr.: Junior standing. 229-707-0-1502

**229 708. Chaucer.** (3) I, II, S. Pr.: Junior standing. 229-708-0-1502

**229 711. Elizabethan Non-dramatic Literature.** (3) I alt. years. An introduction to the literature of the English Renaissance. Pr.: Junior standing. 229-711-0-1502

**229 712. Spenser.** (3) II alt. years. Pr.: Junior standing. 229-712-0-1502

**229 714. British Drama to 1642.** (3) I, S in alt. years. A survey of the dramatic literature of Elizabethan and Jacobean times, exclusive of Shakespeare. Pr.: Junior standing. 229-714-0-1502



**229 716. Shakespearean Drama I.** (3) I, S in alt. years. A study of Shakespearean drama from the first plays through about 1600, with an emphasis on the histories and comedies; special attention to the criticism and bibliography. Pr.: Junior standing. 229-716-0-1502

**229 717. Shakespearean Drama II.** (3) II, S in alt. years. A study of Shakespearean drama from about 1601 through the last plays, with an emphasis on the mature tragedies and the romances; special attention to the criticism and bibliography. Pr.: Junior standing. 229-717-0-1502

**229 721. Seventeenth Century Literature.** (3) II, S. A survey of the principal non-dramatic writers, apart from Milton. 1600-1660. Pr.: Junior standing. 229-721-0-1502

**229 722. Milton.** (3) II, S. Pr.: Junior standing. 229-722-0-1502

**229 724. Restoration and Eighteenth Century Drama.** (3) I, S in alt. years. A survey of English dramatic literature from 1660 to 1800. Pr.: Junior standing. 229-724-0-1502

**229 726. Eighteenth Century I.** (3) I, S. English literature from the Restoration to the death of Swift, with emphasis on Dryden, Swift and Pope. Pr.: Junior standing. 229-726-0-1502

**229 727. Eighteenth Century II.** (3) II, S. The age of Dr. Johnson and the beginnings of Romanticism. Pr.: Junior standing. 229-727-0-1502

**229 731. British Novel I.** (3) I, S. A survey of British fiction from Defoe to the Brontës. Pr.: Junior standing. 229-731-0-1502

**229 732. British Novel II.** (3) II, S. A survey of British fiction from Dickens and Thackeray to Galsworthy and Bennett. Pr.: Junior standing. 229-732-0-1502

**229 736. The Romantic Movement.** (3) I, S. The poetry and prose of Blake, Wordsworth, Coleridge, Byron, Shelley and Keats. Pr.: Junior standing. 229-736-0-1502

**229 738. 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. 229-738-0-1502

**229 739. The New England Transcendentalists.** (3) II in alt. years, S. A study of the Transcendental Movement, with emphasis on Emerson and Thoreau. Pr.: Junior standing, or Engl. 280. 229-739-0-1502

**229 741. Nineteenth Century American Poetry.** (3) II, S. Emphasis on Poe, Whitman and Dickinson. Pr.: Junior standing. 229-741-0-1502

**229 742. Nineteenth Century American Fiction I.** (3) I, S. Emphasis on Brown, Cooper, Poe, Hawthorne and Melville. Pr.: Junior standing, or Engl. 280. 229-742-0-1502

**229 743. Nineteenth Century American Fiction II.** (3) II, S. Emphasis on Twain, James, Howells, Crane and Norris. Pr.: Junior standing. 229-743-0-1502

**229 748. The Victorian Era.** (3) II, S. The poetry of Arnold, Browning and Tennyson; the criticism of Arnold; additional related prose. Pr.: Junior standing. 229-748-0-1502

**229 749. Nineteenth Century British Prose.** (3) II. Significant prose writing of the period from Edmund Burke to Samuel Butler and Walter Pater, with an emphasis on Thomas Carlyle. Pr.: Junior standing. 229-749-0-1502

**229 751. American Humor and Satire.** (3) II, S. Emphasis on works produced in the nineteenth and twentieth centuries. Pr.: Junior standing. 229-751-0-1502

**229 754. Twentieth Century British Novel.** (3) II. British fiction from Conrad and Joyce to Greene and Waugh. Pr.: Junior standing. 229-754-0-1502

**229 756. Twentieth Century American Novel.** (3) I, S. The American novel from Dreiser to figures of the 1940s. Pr.: Junior standing, or Engl. 285. 229-756-0-1502

**229 757. Twentieth Century American Short Story.** (3) II, S. The development of the form since 1900. Pr.: Junior standing. 229-757-0-1502

**229 758. American Novel, 1950-1970.** (3) II in alt. years. A study of distinctive qualities of selected American novels since 1950. Pr.: Junior standing, or one course in American literature. 229-758-0-1501

**229 761. Advanced Creative Writing: Prose Fiction.** (3) I, II, S. Advanced writing of prose fiction. Repeatable once. Pr.: English 500, or proof of equivalent proficiency. 229-761-0-1507

**229 762. Advanced Playwriting.** (3). Same as Speech 762. 229-762-0-1507

**229 763. Advanced Creative Writing: Poetry.** (3). I, II, S. Advanced writing of poetry. Repeatable once. Pr.: English 500, or proof of equivalent proficiency. 229-763-0-1507

**229 764. Twentieth Century British Drama.** (3) I, S. British drama from Wilde and Shaw to Pinter and his contemporaries. Pr.: Junior standing. 229-764-0-1502

**229 765. Twentieth Century American Drama.** (3) II, S. American drama from O'Neill and Rice to Leroi Jones and his contemporaries. Pr.: Junior standing. 229-765-0-1502

**229 766. Twentieth Century British Poetry.** (3) I. Development of British poetry from Hardy and Yeats to the present. Pr.: Junior standing, or Engl. 265. 229-766-0-1502

**229 767. Twentieth Century American Poetry.** (3) II, S. Development of American poetry from Robinson and Frost to Eliot and the present. Pr.: Junior standing, or Engl. 285. 229-767-0-1502

**229 790. 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. 229-790-0-1505

**229 795. 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. 229-795-0-1502

**229 799. Problems in English.** (Var.) I, II, S. Studies in major authors, genres and periods of English and American literature and language. Pr.: Background of courses needed for problem undertaken. 229-799-3-1501

### Graduate Credit

**229 802. 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. 229-802-0-1502

**229 810. Old English.** (3) I, S. The elements of Old English grammar, with readings in prose and poetry. Pr.: Consent of instructor. 229-810-0-1505

**229 811. Old English Poetry.** (3) II, S. Pr.: Engl. 810 or consent of instructor. 229-811-0-1502

**229 812. Middle English Poetry.** (3) I. Pr.: Engl. 790 or consent of instructor. 229-812-0-1502

**229 820. Selected Topics in the Study of Language.** (3). Pr.: Engl. 790 or consent of instructor. 229-820-0-1505

**229 830. Chaucer Seminar.** (3). Pr.: Engl. 630. 229-830-0-1502

**229 850. Shakespeare Seminar.** (3). Pr.: Engl. 650 or 652. 229-850-0-1502

**229 870. Milton Seminar.** (3). Pr.: Engl. 670 or consent of instructor. 229-870-0-1502

**229 890. Topics in Poetry.** (3). Intensive study of a poet or group of poets, either British or American. Pr.: Consent of instructor. 229-890-0-1502

**229 892. Topics in Drama.** (3). Intensive study of a dramatist or group of dramatists, either British or American. Pr.: Consent of instructor. 229-892-0-1502

**229 894. Topics in Fiction.** (3). Intensive study of a novelist or group of novelists, either British or American. Pr.: Consent of instructor. 229-894-0-1502

**229 898. Master's Report.** (2) I, II, S. 229-898-4-1501



**229 900. Bibliography and Methods of Research.** (3) I, S. An introduction to textual, bibliographic and professional problems, required of Ph.D. candidates. 229-900-0-1502

**229 940. Studies in Sixteenth Century Literature.** (3). Pr.: Consent of instructor. 229-940-0-1502

**229 950. Studies in Seventeenth Century Literature.** (3). Pr.: Consent of instructor. 229-950-0-1502

**229 960. Studies in Eighteenth Century Literature: British.** (3). Pr.: Consent of instructor. 229-960-0-1502

**229 965. Studies in Eighteenth Century Literature: American.** (3). Pr.: Consent of instructor. 229-965-0-1502

**229 970. Studies in Nineteenth Century Literature: British.** (3). Pr.: Consent of instructor. 229-970-0-1502

**229 975. Studies in Nineteenth Century Literature: American.** (3). Pr.: Consent of instructor. 229-975-0-1502

**229 980. Studies in Twentieth Century Literature: British.** (3). Pr.: Consent of instructor. 229-980-0-1502

**229 985. Studies in Twentieth Century Literature: American.** (3). Pr.: Consent of instructor. 229-985-0-1502

**229 999. Research in English.** (Var.) I, II, S. Pr.: Sufficient training to carry on the research undertaken. 229-999-4-1501

## Courses in Linguistics

### Undergraduate And Graduate Credit

**229 681. General Phonetics.** (3). 229-681-1-1502

**229 780. Introduction to Linguistics.** (3) I, II, S. Same as Speech and Modern Languages 780. 229-780-0-1502

**229 781. Introduction to Historical Linguistics.** (3) II. Same as Speech and Modern Languages 781. 229-781-0-1502

**229 782. Language Typology.** (3). Same as Speech and Modern Languages 782. 229-782-0-1502

**229 783. Phonology I.** (3). Same as Speech and Modern Languages 783. 229-785-0-1502

**229 784. Phonology II.** (3). Same as Speech and Modern Languages 784. 229-784-0-1502

**229 785. Syntax I.** (3). Same as Speech and Modern Languages 785. 229-785-0-1502

**229 786. Syntax II.** (3). Same as Speech and Modern Languages 786. 229-786-0-1502

**229 787. Advanced Syntax.** (3). Same as Speech and Modern Languages 787. 229-787-0-1502

**229 788. Advanced Phonology.** (3). Same as Speech and Modern Languages 788. 229-788-0-1502

**229 789. Topics in Linguistics.** (3). Same as Speech and Modern Languages 789. 229-789-0-1502

**229 791. Methods and Techniques of Learning a Second Language.** (3). Same as Speech and Modern Languages 791. 229-791-0-1502

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## GEOGRAPHY

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W. R. Siddall,\* Head of Department

Professors Kromm\* and Siddall;\* Associate Professors Self,\* and Stover;\* Assistant Professors Bussing,\* Seyler, and White.\* Emeritus: Professor Stacey.

Geographers, in studying the differences in human activities from one place to another, deal with vital questions about current national and international situations. Why are the people of some areas wealthy and those of other regions poor, some well-fed and others starving, some industrialized and some agricultural, some free and others enslaved?

In their attempts to answer such questions geographers draw upon other disciplines, especially

in the social sciences, in order to discern the various interrelated factors which combine to bring about particular conditions in specific areas. Geography is, therefore, a very broad inquiry into the state of the world today, advanced by bringing together the ideas and concepts of many disciplines to obtain some measure of understanding about specific areas.

Geographers may also pursue a more theoretical inquiry into the major problems of human society by examining spatial structure and processes. In this more rigorously scientific approach full use is made of various techniques of mathematical and cartographic analysis of spatial phenomena, computer mapping, and remote sensing, with the expectation of acquiring greater insight into many old problems with this spatially-oriented approach.

A typical and traditional problem in geography concerns man's impact on the land; over a century ago the geographer George Perkins Marsh published his now classic *Man and Nature*. Deterioration of environmental quality is best understood by the geographer's characteristically broad approach. 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, and cultural traditions.

Professional opportunities for students trained in geography exist especially in government service, teaching, planning, and business; and for the non-professionally oriented student it is a study characterized by a broad and liberalizing approach to worldwide political, social, and economic conditions.

### Undergraduate Study

Requirements for a major in geography under the curriculum leading to the Bachelor of Science degree (see page 91) are as follows: Geography 100 or 200; 220; two out of three of 420, 440, and 450; 470; 480; one course at the 600 level; one course at the 700 level; additional courses at the 490 level or above to make a total of 28 hours.

The student also has the option of majoring in geography under a curriculum leading to a Bachelor of Arts degree. The geography requirements are the same, although the college requirements differ as described on page 91.

In either of these curricula 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.

A third curriculum is available leading to the Bachelor of Science degree in secondary education. For information concerning this program see the College of Education section of this catalog.

### 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 Geography 700 (except option B students), 800, 820, and 840.

Students may choose, in consultation with their advisers, 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 Geography 898 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 non-thesis 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-six hours of graduate level work are required of which at least nine and no more than 12 hours must be outside the Geography Department.

The Geography Department is equipped with a small reference library, a good collection of research maps, a cartography laboratory, and a seminar room, and 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

**235 100. 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. 235-100-0-2206

**235 120. Geography of Kansas.** (2) 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. 235-120-0-2206

**235 200. Man, Space, and the Environment.** (3) I, II. 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. 235-200-0-2206

**235 220. Environmental Geography I.** (4) I, II. A comprehensive survey of the natural environment focusing on contemporary issues such as air pollution, water resource depletion, soil erosion, natural hazards, lack of open space, and environmental quality. Three hours lec. and two hours lab. a week. 235-220-1-1917

**235 299. Honors Seminar in Geography.** (Var.) Selected topics. Open to non-majors in the Honors Program. 235-299-0-2206

**235 390. Experimental Studies in Geography.** (1-6). Experimental and interdisciplinary studies in geography. Topics selected in consultation with instructor. Pr.: Permission of instructor. 235-390-0-2206

**235 420. Environmental Geography II.** (4) I, II. Interrelations existing between features of the natural environment and the manner in which their distribution affects settlement patterns, land use patterns, quality of life, and human adjustments to the environment. Three hours lec. and two hours lab. a week. Pr.: Geog. 220. 235-420-1-1917

**235 440. 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 production and consumption of natural resources. 235-440-0-2206

**235 450. Geography of Economic Behavior.** (3) II. The location of manufacturing industries and patterns of commercial activity. Case studies and simulations are utilized with emphasis on modern concepts of site selection and community development. 235-450-0-2206

**235 460. Future Worlds.** (3). 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. 235-460-0-2206

**235 470. Cartography.** (3) I. Theory, interpretation, and design and drafting of maps, with emphasis on presenting quantitative data. 235-470-1-2206

**235 480. Pro-Seminar in Geography.** (2) II. A survey of geography as a profession—its philosophy and its methodology. Graduation requirement for all undergraduate majors in geography. Pr.: Four courses in geography or consent of instructor. 235-480-0-2206

**235 490. Problems in Geography.** (Var.) I, II, S. Pr.: Consent of instructor. 235-490-4-2206

### Undergraduate And Graduate Credit

**235 600. Geography of the United States.** (3) I. 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. 235-600-0-2206

**235 620. Geography of Latin America.** (3) I, odd years. A broad survey of the physical and human patterns of the Latin American culture area, past and present, with emphasis on the changing landscape features in the successive patterns of human occupancy. 235-620-0-2206

**235 640. Geography of Europe.** (3) II. People and their environment, their cultures, problems and prospects in Europe west of the Soviet sphere; trends of development as affected by changing political and economic factors. 235-640-0-2206

**235 650. Geography of the Soviet Union.** (3). Geographic regions of the U.S.S.R.; the agriculture, minerals, manufacturing, and settlement in each, particularly as affected by climatic and locational factors. 235-650-0-2206

**235 670. Geography of Australia and New Zealand.** (2). Present conditions and prospects, with special attention to regional structure, economic development, and roles of these countries in world trade. 235-670-0-2206

**235 680. Seminar in Regional Geography.** (1-3). Pr.: Consent of instructor. 235-680-0-2206

**235 700. 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. 235-700-0-2206



**235 705. Remote Sensing of the Environment.** (2) II. Remote sensing and its application to earth study, especially environmental problems and land use. Course employs both readings and the use of imagery. One hour lecture, two hours laboratory. Pr.: One course in physical science and one in biological science. 235-705-1-2206

**235 710. Geography of Hunger.** (2) I, 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. 235-710-0-2206

**235 715. World Population Patterns.** (3) I, 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. 235-715-0-2206

**235 720. Resources and Economic Development.** (3) I, even years. The role of natural resources in global and regional development. Considers the limits to growth created by resources scarcity. Pr.: Six hours of social science. 235-720-0-2206

**235 730. Advanced Economic Geography.** (3) II, odd years. Economic and place factors in the shifting locations of major production: agricultural, mineral, manufacturing and other world industries. Lecture and seminar. Pr.: Geog. 450 or equiv. 235-730-0-2206

**235 740. Geography of Transportation.** (3) II. 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. 235-740-0-2206

**235 750. 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. 235-750-0-2206

**235 760. Human Impact on the Environment.** (3) II, 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. 235-760-0-2206

**235 770. Perception of the Environment.** (3) II, even years. An examination of the way people perceive their geographic environment and the role of perception in spatial behavior. Perceptions of neighborhoods, cities, states, nations, frontier regions, and 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. 235-770-0-2206

**235 780. Cultural Geography.** (3). 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. 235-780-0-2206

**235 790. Seminar in Cultural-Economic Geography.** (1-3). Pr.: Consent of instructor. 235-790-0-2206

### Graduate Credit

**235 800. Graduate Colloquium.** (2) I. The nature, aims, methods and evaluation of geographical research. Required of all graduate students majoring in geography. 235-800-0-2206

**235 820. 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. 235-820-0-2206

**235 840. Seminar in Current Geographical Research.** (1) II. Department-wide seminar required of all graduate students. 235-840-0-2206

**235 850. Topics in Environmental Geography.** (1 to 3) I, II. Pr.: Consent of instructor. 235-850-3-2206

**235 860. Topics in Economic Geography.** (1 to 3) I, II. Pr.: Consent of instructor. 235-860-3-2206

**235 870. Topics in Cultural Geography.** (1 to 3) I, II. Pr.: Consent of instructor. 235-870-3-2206

**235 898. 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. 235-898-4-2206

**235 899. Thesis.** (6) I, II. For students enrolled in Geography Option A. Pr.: Registration in Graduate School, with sufficient training to carry on the line of research undertaken. 235-899-4-2206

## GEOLGY

*Page C. Twiss,\* Head of Department*

Professors Beck,\* Shenkel,\* Twiss,\* and Walters;\* Associate Professors Chaudhuri,\* Cullers,\* and West;\* Assistant Professors Riseman,\* and Whittemore;\* Emeritus: Professor Chelikowsky.\*

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. "What type of foundation is necessary to support a 14-story building in Atlantic City? Where can Kansas City find unpolluted water for an increasing population? What are the world's reserves in oil and natural gas and where can more be found? Is the ocean floor spreading? can Mars support life?" These are some of the questions geologists try to answer.

The earth and other members of the solar system are dynamic physical systems composed of atoms interacting under extreme conditions of temperature and pressure. Consequently, geology relies heavily on other sciences—mathematics, physics, chemistry, biology, and astronomy. In the solar system, the earth seemingly has been the only known habitat of life for at least the last billion years.

Geologists operate in two laboratories: the earth itself (field laboratory) and the standard chemical, physical or biologic laboratory. However, geologists cannot control the variables affecting the natural process 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 events that may be reproduced in part in a laboratory.

### Undergraduate Study

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. For detailed plans of study, consult the head of the department.

**Geology Option.** In addition to the general requirements for the B.A. or B.S. degree, the



following must be completed: Geol. 100, 130, 200, 502, 503, 507, 520, 530, 570, 580, 581, 703, 718; Math. 220 and 221; Phys. 113 and 114; Chem. 210 and 230; Biol. 198.

**Geophysics Option.** In addition to the general requirements, the following must be completed: Geol. 100, 130, 200, 502, 503, 530, 570, 703, and 718; Math. 220, 221, 222, 240, 551; Phys. 213, 214, 551; Chem. 210 and 230; Biol. 198.

**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, 130, 502, 512, and 520; Geog. 220; Math. 100 and 150; Chem. 210 and 230; Biol. 198; Phys. 113, 114, 191, and 193.

**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. 200, 502, 503, 520, 530, 703, and 718.

### 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: Chem. 210 and 230; Engl. 100 and 120; Math. 100, 150, 220, and 221; Spch. 105; Geol. 100, 130, and 200; Phys. 113 and 114; Biol. 198.

### Graduate Study

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, mathematics, and the biological sciences. The Graduate Record Examination (verbal, quantitative, and advanced geology sections) is required for entrance. Additional requirements of the Graduate School are listed in the appropriate section of this catalog.

Graduate degrees are essential for careers as professional geologists in business, government, or higher education. 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, emission spectrograph, x-ray diffractometer and spectrograph, atomic absorption/flame emission spectrophotometer, cathode luminescence microscope, a fully equipped geochemistry laboratory for isotopic work, instrumentation for chemical analysis of natural waters, complete petrographic, paleobiological, and general geology laboratories. Geophysical facilities include resistivity, seismic, and magnetic exploration equipment.

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, plains-type structures, invertebrate paleobiology, and paleoecology.

## Courses in Geology

### Undergraduate Credit

**234 100. Geology I.** (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. 234-100-0-1914

**234 105. Oceanography.** (3) I, II, S. The oceans: their boundaries, contents and processes. Three hours rec. a week. 234-105-0-1919

**234 110. Geology of Planets.** (3) I. Application of geochemical and geophysical principles to the evolution of planetary structures. Alternative interpretations of current observations of planet features will be discussed. Three hours rec. a week. 234-110-0-1914

**234 120. Environmental Geology.** (2) II. Influence of earth processes on human activity and the geological consequences of the use of the environment. Two hours rec. a week. 234-120-0-1914

**234 130. Elementary Geology Laboratory.** (1) I, II, S. Field and laboratory investigation of minerals, rocks; use of maps; environmental studies; erosion, transportation, sedimentation. Three hours lab. a week. Pr.: Geol. 100, 105, 110, or 120 or conc. enrollment. 234-130-1-1914

**234 200. Geology II.** (4) I, II, S. Physical and biologic events that have occurred on Planet Earth throughout geologic time. Three hours rec. and three hours lab. a week. Pr.: Geol. 100 or 105. 234-200-1-1914

**234 310. Topics in Geology.** (2) I, II. Seminar discussion of subjects of current interest in geology. Pr.: Geol. 100 or equivalent natural science course. 234-310-0-1914

**234 399. Honors Seminar in Geology.** (1-3) I, II. Selected topics. Open to non-majors in the Honors Program. 234-399-0-1914

### Undergraduate And Graduate Credit In Minor Field

**234 501. Independent Study in Geology.** (1-3) I, II, S. Independent reading, field and/or laboratory investigations of geologic problems. Pr.: Geol. 200 and junior standing. 234-501-0-1914

**234 502. Mineralogy and Petrology I.** (4) I. Fundamentals of crystallography and crystal chemistry; physical properties of crystals; descriptive mineralogy and petrology of non-silicates. Three hours lec. and three hours lab a week. Pr.: Geol. 100 or 105 and 130 and Chem. 230. 234-502-1-5-1914

**234 503. Mineralogy and Petrology II.** (4) II. Descriptive mineralogy and petrology of the silicates; fundamental geochemistry; microscopic identification of minerals and rocks. Three hours lec. and three hours lab. a week. Pr.: Geol. 502. 234-503-1-5-1914

**234 504. Oil and Gas Exploration and Evaluation Methods.** (3) I, II. 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 non-geology majors only. Pr.: Junior standing or equivalent experience. 234-504-0-1914

**234 506. Earth Science Institute.** (8) S. A study of the integrated physical sciences encompassing the Earth's crust; patterns on the Earth's surface and in the Earth's atmosphere; includes the description and interaction of the atmosphere, weather, climate, composition, and processes of the Earth. Five hours lec., five hours rec. and six hours lab. a week and a five-day field trip into the Rocky Mountains. Pr.: Geol. 100 or Geog. 220. 234-506-1-1917



**234 507. 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. 234-507-1-4-1915

**234 512. Earth Science.** (4) I, II, S. 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. 234-512-1-1917

**234 520. Geomorphology.** (4) I, II, S. Various landforms and their evolution; geologic interpretation of landscapes, especially of features in the United States; interpretation of topographic maps. Three hours rec. and three hours lab. a week. Pr.: Geol. 100. 234-520-1-1914

**234 530. Structural Geology.** (4) II. Mechanics of the Earth's crust; interrelation of structures in the Earth. Three hours rec. and three hours lab. a week. Pr.: Geol. 570. 234-530-1-5-1914

**234 570. Field Methods in Geology.** (2) I, II. Construction of geologic maps; application of field methods to the problems of geology. One hour rec. and three hours lab. a week. Pr.: Geol. 200. 234-570-1-1914

**234 580. Paleobiology I.** (3) I. Concepts and problems of paleobiology; systematic approach to lower invertebrate phyla and marine calcareous algae with emphasis on fossil forms. Two hours rec. and three hours lab. a week. Pr.: Geol. 200 or Biol. 198 or 201 or 205 or consent of instructor. 234-580-1-1918

**234 581. Paleobiology II.** (3) II. Continuation of Paleobiology I dealing with higher invertebrate phyla with fossil records. Two hours rec. and three hours lab. a week. Pr.: Geol. 580. 234-581-1-1918

### Undergraduate And Graduate Credit

**234 640. Petroleum Geology.** (3) II. Origin, migration and accumulation of petroleum; stratigraphy and structure of important fields. Three hours rec. a week. Pr.: Geol. 200. 234-640-0-1914

**234 702. Economic Geology.** (3) I, II. Origin and mode of occurrence of nonmetallic minerals, including coal and petroleum, and of metallic mineral deposits. Two hours rec. and three hours lab. a week. Pr.: Geol. 200, 561. 234-702-1-1914

**234 703. Stratigraphic Geology.** (4) I, II. Description, classification, and correlation of stratigraphic units, with emphasis on those of Kansas. Three hours rec. and three hours lab. a week. Pr.: Geol. 580. 234-703-1-1914

**234 704. Paleocology.** (3) I, II. 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. 580 or consent of instructor. 234-704-1-1918

**234 708. Optical Mineralogy-Petrology.** (4) I. Identification of minerals and rocks as crushed fragments and in thin sections; petrology of igneous, metamorphic and sedimentary rocks. Two hours lec. and six hours lab. a week. Pr.: Geol. 503. 234-708-1-3-1914

**234 710. Applied Geology.** (3) I, II. Geology applied to the science of engineering in urban and regional planning. Two hours rec. and three hours lab. a week. Pr.: Consent of instructor. 234-710-1-1914

**234 711. Water Resources Geochemistry.** (2) I, 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. 707 or Agron. 605 or 705 or consent of instructor. 234-711-0-1915

**234 712. 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 Chem. 585. 234-712-1-5-1915

**234 716. 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, 630, or 703, or consent of instructor. 234-716-0-1914

**234 718. Field Geology.** (Var.) S. Opportunity is offered students to do field work in the Rocky Mountains. Students interested should consult the head of the department. 234-718-2-1914

**234 720. Quaternary Geology.** (2) I, II. Quaternary stratigraphy and its development in North America; correlation of European and North American Quaternary rocks and sediments. Two hours rec. a week and one field trip a semester. Pr.: Geol. 703. 234-720-0-1914

**234 740. Regional Geology.** (3) I, II. Structure and stratigraphy of the major tectonic units of North America. Pr.: Geol. 630, 703. 234-740-0-1914

**234 770. Subsurface Methods.** (3) I, II. Study of well cutting, electric logs, and radioactive logs as applied to subsurface mapping of rocks and their fluid content. One hour rec. and six hours lab. a week. Pr.: Geol. 540, 561 or consent of instructor. 234-770-1-1914

**234 790. Problems in Geology.** (Var.) I, II, S. Work is offered in mineralogy, paleobiology, paleoecology, stratigraphy, structural geology, sedimentary petrology, and geochemistry. Pr.: Background of courses needed for problem undertaken. 234-790-3-1914

### Graduate Credit

**234 800. Graduate Seminar in Geology.** (Var.) I, II. Topics in geology, geochemistry and geophysics. 234-800-3-1914

**234 801. Advanced Paleobiology.** (1-4) I, II. Detailed study of the functional morphology, ecology, biogeography, evolution, and classification of selected groups. Pr.: Geol. 580, Biol. 630 or consent of instructor. 234-801-0-1918

**234 802. Advanced Hydrogeology.** (3) II, alt. years. Computer applications to ground-water flow; system analysis of surface and subsurface water in the ecosystem. Three hours rec. a week. Pr.: Geol. 716 or consent of instructor for non-majors. 234-802-0-1914

**234 804. Igneous and Metamorphic Petrology.** (4) II. Selected problems in the petrogenesis of igneous and metamorphic rocks. Three hours lec. and three hours lab. a week. Pr.: Geol. 708. 234-804-1-5-1914

**234 806. 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. 708. 234-806-1-5-1914

**234 810. 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. 709 or consent of instructor. 234-810-0-1914

**234 840. Planetology.** (3) II. Geologic principles applied to a study of the solar system. Pr.: Geol. 630, 714 or consent of instructor. 234-840-0-1914

**234 880. 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.: Consent of instructor. 234-880-1-1914

**234 899. Research in Geology, M.S.** (Var.) I, II, S. Work is offered in mineralogy, paleobiology, paleoecology, stratigraphy, structural geology, igneous, metamorphic and sedimentary petrology, geochemistry and isotope geology. Pr.: Registration in Graduate School, with sufficient training to undertake research in specific area. 234-899-4-1914



## INTERCOLLEGIATE ATHLETICS

*John Jermier, Head of Department and Athletic Director*

Coaches Akers, Anderson, Dwight, Hartman, Rainsberger, Ross, and Wilson; Assistant Coaches Buds, Dunkelberger, Emerson, Holmes, Robinson Schroeder, Selcer, Walstad, and Williams; Sports Information Director Stone, Assoc. Director Habiger; Trainers Morgan, Benner, and Goering; Administrative Staff Bocchi, Colbert, Harper, Nay and Wilson.

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. In addition, the women's program also competes in Region VI of the National Association of Intercollegiate Athletics for Women.

Intercollegiate competition is open to all students and is coached by staff members who are specialists in their respective fields.

The men's intercollegiate program competes in football, basketball, baseball, track (indoor and outdoor) and cross country, tennis and golf. The women's program offers competition in cross country, volleyball, basketball, swimming, track and field, softball, tennis and golf.

## Courses in Intercollegiate Athletics

### Undergraduate Credit

**206 101. Varsity Baseball.** (1) I, II. Pr.: Consent of instructor. 206-101-5-0899

**206 102. Varsity Basketball.** (1) I, II. Pr.: Consent of instructor. 206-102-5-0899

**206 103. Varsity Cross Country.** (1) I, II. Pr.: Consent of instructor. 206-103-5-0899

**206 104. Varsity Football.** (1) I, II. Pr.: Consent of instructor. 206-104-5-0899

**206 105. Varsity Golf.** (1) I, II. Pr.: Consent of instructor. 206-105-5-0899

**206 106. Varsity Tennis.** (1) I, II. Pr.: Consent of instructor. 206-106-5-0899

**206 107. Varsity Track—Indoor.** (1) I, II. Pr.: Consent of instructor. 206-107-5-0899

**206 108. Varsity Track—Outdoor.** (1) I, II. Pr.: Consent of instructor. 206-108-5-0899

**206 109. Varsity Wrestling.** (1) I, II. Pr.: Consent of instructor. 206-109-5-0899

**207 150. Intercollegiate Basketball.** (1) I, II. Pr.: Consent of instructor. 207-150-5-0899

**207 151. Intercollegiate Gymnastics.** (1) I, II. Pr.: Consent of instructor. 207-151-5-0899

**207 152. Intercollegiate Track.** (1) I, II. Pr.: Consent of instructor. 207-152-5-0899

**207 153. Intercollegiate Swimming.** (1) I, II. Pr.: Consent of instructor. 207-153-5-0899

**207 154. Intercollegiate Tennis.** (1) II. Pr.: Consent of instructor. 207-154-5-0899

**207 155. Intercollegiate Volleyball.** (1) I. Pr.: Consent of instructor. 207-155-5-0899

**207 156. Intercollegiate Softball.** (1) II. Pr.: Consent of instructor. 207-156-5-0899

## HEALTH, PHYSICAL EDUCATION, AND RECREATION,

*Don Kirkendall, Head of Department*

Professors Corbin,\* Kirkendall;\* Associate Professors Johnson,\* Lindly,\* Noble,\* and Wauthier;\* Assistant Professors Cox,\* Gench,\* Laurie,\* Mahler, Merriman,\* Snyder,\* Stewart and Zuti;\* Instructors Poole; Emeritus: Professors Evans and Geyer, Associate Professor McKinney.

Students enrolling in the Department of Health, Physical Education, and Recreation may earn a degree in dance, health, physical education or recreation. A major in health will prepare a student for a career in teaching or in other health occupations. Majors in physical education may select specialization areas such as elementary physical education, secondary physical education, athletic coaching, dance, exercise science, or non-teaching. The non-teaching degree is a more general degree which does not prepare the student for teacher certification. The recreation major is prepared for careers in community and other recreation agencies.

### Transfer Students

Students transferring to Kansas State and desiring to complete a major in the HPER Department should send an up-to-date transcript to the coordinator of professional preparation, Department of HPER, Kansas State University. It will be evaluated prior to entrance to the University. If possible, transfer students should adhere to the following:

- Complete a three-hour speech class prior to transfer. If your transfer school offers a two-hour speech class, take it and also take a literature course or four-hour language course.
- Check the general requirements of Kansas State University and the college you intend to enroll in upon arrival. 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 if enrolled at a community college. Courses which will transfer from the junior college are Intro. to Physical Education and Personal and Community Health. If there are other courses you desire to take at the institution from which you are transferring, check with the Kansas State HPER Department for clearance prior to taking the courses.

### Undergraduate Study

#### Basic Physical Education Requirement

*David Laurie, Coordinator*

Freshmen enroll in one semester of the course 261 101, 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 (261 101 through 261 170), where an opportunity will be given for gaining knowledge, skill, and appreciation of lifetime recreational activities.



## Undergraduate Majors in Dance, Health, Physical Education and Recreation

Barbara Gench, Coordinator

**Dance Major.** For a major in dance students should take the following:

I. General education requirements—see Bachelor of Arts or Bachelor of Science degree, page 91.

### II. Dance core

261 206	Professional Orientation	1
261 500	Methods and Materials of Dance	3
261 501	Dance Composition	3
261 502	Dance Workshop	1
241 511	Hist. of Dance in Its Cultural Setting	3
284 160	Introduction to the Theatre	3
257 100	Fundamentals of Music	3
261 171	Jazz Dance	1
209 195	Survey of Art History I	3
	or	
209 196	Survey of Art History II	3
284 260	Stage Movement	3
284 261	Fundamentals of Acting	3
261 117	Social, Square & Folk Dance	1
261 290	Kinesiology	3
261 355	Movement Exploration	3
261 373	First Aid—Multimedia	1
284 266	Fundamentals of Tech. Production	3

### III. Dance specialization (students select A or B)

#### A. Modern Dance

261 120	Modern Dance I	1
261 121	Modern Dance II	1
261 323	Tech. of Intermediate Modern Dance (complete a total of 4 hours)	2
261 324	Tech. of Advanced Modern Dance (complete a total of 4 hours)	2
	One semester of study in ballet	1

#### B. Ballet

261 165	Ballet I	1
261 166	Ballet II	1
261 325	Tech. of Intermediate Ballet (complete a total of 4 hours)	2
261 326	Tech. of Advanced Ballet (complete a total of 4 hours)	2
	One semester of study in modern dance	1

**Health Major.** For a degree in health the student should take the following:

I. General education requirements—see Bachelor of Science degree, page 91.

### II. Professional education requirements

(For those seeking teacher certification)

Educational Psychology I and II, 6 hours  
Health Education Professional Semester  
Teaching Participation—8 hours  
Principles of Education (415 451 or 415 300), 3 hours  
Educational Sociology, 3 hours  
Methods (Health) (415 476), 3 hours

### III. Health major core (to be taken by all majors)

#### Core:\*

261 201	Personal and Community Health	3
261 206	Professional Orientation	1
261 555	Community Health	3
261 780	Seminar in Health Education	3
	or	
261 583	Current Health Issues	3
261 375	First Aid—Multimedia	1
261 377	First Aid—Multimedia Instructor	1
261 765	Human Sexuality (or 620 765)	3
261 747	Drugs and the Student	3

### IV. Health specialization areas

To earn a major in health, a student must complete one of the following in addition to the health major core:

#### A. Elementary Health Education Specialization:\*

261 381	Health for Elementary Teachers	3
261 378	First Aid (Basic Instructors)	1
261 515	Health Appraisal	3
415 779	Primary School Education	3

Two courses to be selected from the following:

415 780	Kindergarten Education	3
215 303	Ecosystems and Society	3
273 280	Psych. of Childhood & Adolescence	3
273 622	Psych. of Exceptional Children	3
273 505	Abnormal Psychology	3
261 462	Practicum in Health	2
261 385	Consumer Health & Quackery	3

Six hours of health-related electives to be selected from the following

215 310	Biology & the Future of Man	3
273 420	Personality Development	3
640 132	Basic Nutrition	3
620 332	Concepts in Family Health	3
261 780	Seminar in Health Education	3
261 583	Current Health Issues	3
261 365	Health, Illness & Death	3

#### B. Secondary Health Education Specialization:\*

261 462	Practicum in Health	2
261 378	First Aid—Basic Instructors	1
640 132	Basic Nutrition	3
261 550	Health Appraisal & Counseling	3

Two courses selected from the following

620 230	Intro. to Human Development	3
273 280	Psych. of Childhood & Adolescence	3
415 325	Safety	3
620 332	Concepts in Family Health	3
261 780	Seminar in Health Education	3
261 583	Current Health Issues	3
261 550	Health Appraisal	3
261 385	Consumer Health & Quackery	3

Six hours of health-related electives to be selected from the following

273 420	Personality Development	3
277 411	Social Problems	3
273 550	Group Dynamics	3
620 650	The Family	3
630 110	Consumer Action	3
215 303	Ecosystems and Society	3
261 365	Health, Illness & Death	3

#### C. Community Health Specialization: \*\*

415 316	Media	1
277 411	Social Problems	3
289 630	Public Relations	3
273 435	Social Psychology	3
261 585	Field Experience in Health	3
221 190	Elementary Organic Chemistry	3
221 191	Elementary Organic Chemistry Lab.	2
	or	
221 230	Chemistry II	4

Three courses selected from the following:

410 680	Introduction to Adult Education	3
405 215	Educational Psychology I	3
277 641	Social Gerontology	3
269 704	Interest Groups & Political Opinion	3
215 303	Ecosystems and Society	3
261 550	Health Appraisal	3
215 555	Microbiology	4
261 385	Consumer Health & Quackery	3

Six hours of health-related electives to be selected from the following

289 635	Public Information Methods	3
277 531	Urban Sociology	3
620 332	Concepts in Family Health	3
640 132	Basic Nutrition	3
277 450	Group Processes & Social Behavior	3
277 631	Community Organization & Leadership	3
215 520	Microbiology of Foods	3
261 365	Health, Illness & Death	3

\* Students in allied health specialization substitute 261 740 Administration of Health Care Programs (3) and 261 550 Health Appraisal (3) for 261 765 and 261 747



**D. Health Care Administration Specialization: \*\*\***

550 609	Occupational Safety and Health	3
261 585	Field Experience & Internship	8
277 641	Social Gerontology	3
269 507	Intro. to Public Administration	3

Two courses from the following

640 132	Basic Nutrition	3
620 230	Intro. to Human Development	3
289 630	Public Relations	3
410 680	Intro. to Adult Education	3
225 110	Economics I	3

Four courses from the following

305 260	Fundamentals of Accounting	4
305 292	Business Law I	3
305 391	Administrative Communications	3
305 270	Managerial and Cost Controls	3
305 420	Management Concepts	3
305 520	Organizational Behavior	3
305 530	Labor Legislation	3
305 531	Personnel and Wage Administration	3

**Physical Education Major.** For a degree in physical education students should take the following:

**I. General education requirements**—see Bachelor of Science degree, page 91.

**II. Professional education requirements****A. For Those Seeking Teacher Certification**

1. Educational Psychology I and II, 6 hours
2. Physical Education Professional Semester Teaching Participation—8 hours (must be done in area of specialization )
- Principles of Education (415 451 or 415 300)—3 hours
- Educational Sociology—3 hours
- Methods (415 476 or 415 469)—3 hours

**B. For Those Seeking Non-Teaching Degrees**

Courses to be selected from no more than two University academic departments. A minimum of one course 300 level or above must be taken in each department from which courses are selected. If all courses are taken from one department, at least two courses must be numbered 300 or above—17 hours

**III. Professional physical education core (to be taken by all majors)**

Concepts in Physical Education	1
Lifetime Sport	1

\*\* Secondary physical education specialization. Must take four lifetime sports in addition to the lifetime sport requirement in the physical education core. Courses must be reported for CR/NCR, but may be taken for zero or one credit. Courses must be chosen from approved list

**Core Courses (to be taken by all majors):**

261 201	P & C Health	3
261 206	Prof. Orientation	1
261 230	Social Dimensions	3
261 290	Kinesiology	3
261 375	First Aid—Multimedia	1
261 458	Philosophy, History & Principles of PE	3
261 565	Exercise Physiology	4
261 570	Motor Behavior	3
261 710	Tests and Measurements	3

**IV. Physical education specialization area**

To earn a major in physical education a student must complete one of the following in addition to the

**\* For teacher certification—The following Natural Science courses should be taken:**

215 198	Principles of Biology	4
215 240	Structure & Function of the Human Body	6
	Physical Science elective	
215 310	Biology and the Future of Man	3

**\*\* Natural Sciences:**

The following natural science courses should be taken.

215 198	Principles of Biology	4
215 240	Structure & Function of the Human Body	6
215 220	Bacteriology and Man	3
221 210	Chemistry I	4

**\*\*\* Natural Sciences**

The following courses should be taken.

215 198	Principles of Biology	4
285 350	Business & Economic Statistics	3
215 240	Structure & Function of the Human Body	6
	One other course	3

**professional physical education core:****A. Elementary Physical Education Specialization**

261 280	Phys. Ed. Materials for the Elem. Schools	3
261 252	Rhythms for Elem. Schools	3
261 355	Movement Exploration	3
261 241	Gymnastics and Lead-up Games for Elem. Schools	3

**B. Secondary Physical Education Specialization**

261 331	Individual Activities for Sec. Schools	3
261 266	Team Sports for Sec. Schools	3
261 251	Rhythms for Sec. Schools	3
261 242	Gymnastics and Recreational Games for Sec. Schools	3
261 460	Practice Teaching	3

**C. Non-Teaching Physical Education Specialization****1. Dance Specialization:**

284 261	Fundamentals of Acting	3
284 565	Fundamentals of Directing	3
284 165	Appreciation of Theatre	2
284 370	Dramatic Structure	3
284 260	Stage Movement	3
284 560	Advanced Stage Movement	3
261 021	(121) Beginning Modern Dance	0-1
261 060	(160) Beginning Ballet	0-1
261 323	Tech. of Inter. Modern Dance	2*
261 324	Tech. of Adv. Modern Dance or	2*
261 325	Tech. of Inter. Ballet	2*
261 326	Tech. of Adv. Ballet	2*
261 500	Methods & Materials of Dance	3
261 501	Dance Composition	3
241 744	History of the Dance	3

\* Each must be taken twice

**2. Exercise Science Specialization**

261 307	Techniques of Training & Conditioning	2
261 759	Organ. Imple. & Admin. of Exercise Prog.	4
261 792	Internship in Recreation	8
261 535	Nutrition and Physical Activity	3

**3. General Non-Teaching Specialization**

Any 15 hours of physical education courses numbered 300 or higher

**Recreation Major.** For a degree in recreation students should take the following:

**I. General education requirements**—see Bachelor of Science degree, page 91.

**II. Directed field experience (internship semester)**

261 492	Internship in Recreation	15
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Student must meet the following qualifications

A. Overall 2.2 GPA in all course work attempted at KSU, 2.5 GPA in recreation major courses or in exercise science specialization

B. Recommended by major adviser

C. Recreation majors must have satisfactory pre-internship experience in leisure/recreation field; minimum of 280 hours during college/university preparation. Students in non-teaching specializations must have met all specialization requirements

D. Physical examination required

**III. Recreation core**

261 206	Professional Orientation	1
261 320	Recreation Leadership	3
261 390	Prin. & Phil. of Recreation	3
261 373	First Aid—(Multimedia)	1
261 480	Orientation in Recreation	2
261 481	Participation in Recreation	2
261 488	Recreation for Special Populations	3
261 489	Recreation Program	3
261 490	Recreation Admin. I	3
261 491	Recreation Seminar	2

**IV. Recreation specialization (select and complete A or B)****A. Recreation program administration (18 hours)**

This option is designed for the person who will be conducting and operating a recreation program in a variety of recreation settings. Courses will be selected from the Recreation Major Approved Course List, with at least one two-hour course taken from each of the three categories.



**B. Special populations (18 hours)****1. Three courses from the following:**

- 273-505 Abnormal Psychology
- 273-622 Psychology of Exceptional Children
- 110-757 Design for Special Populations
- 277-660 Juvenile Delinquency
- 277-661 Criminology
- 405-628 Characteristics of the Emotionally Disturbed
- 620-272 The Helping Relationship

**2. Nine hours from Group I and II as listed on the Recreation Major Approved Course List.**

**Coaching Program.** This program is designed to prepare coaches in all areas of varsity athletics, and is open to non-majors as well as students majoring in health, physical education or recreation. Students completing the following courses will receive an athletic coaching endorsement from the Department of Health, Physical Education, and Recreation. Majors taking this program must also complete all requirements for a major in either health, physical education or recreation. The coaching program is not a substitute for specialization requirements. Non-majors are not required to take any work in the department in addition to the coaching program.

261 359	Org. and Adm. of Athletics	3
261 315	Treatment of Athletic Injuries	3
261 307	Tech. of Training and Conditioning	2
261 202	Exercise Science or Physiology of	
261 565	Exercise	3
261 373	First Aid (Multimedia)	1
	or	
261 376	First Aid (Multimedia)	1

Four hours selected from the following

261 302	Coaching and Officiating Basketball	2
261 305	Coaching and Officiating Football	2
261 301	Coaching and Judging Gymnastics	2
261 298	Coaching and Officiating Wrestling	2
261 299	Coaching and Officiating Swimming	2
261 309	Coaching and Officiating Tennis and Golf	2
261 303	Coaching and Umpiring Baseball	2
261 304	Coaching and Officiating Track & Field	2
261 300	Coaching and Officiating Volleyball	2

**Graduate Study**

*Charles Corbin, Coordinator*

Graduate study leading to the degree Master of Science in Health, Physical Education or Recreation is offered.

Prerequisite to the work in the graduate program is an undergraduate major in Health, Physical Education or equivalent. Specific deficiencies may be made up prior to final acceptance for the graduate program.

Students may choose from the following degree options: (1) 30 hours including a six- to eight-hour thesis and an oral comprehensive examination; (2) 30 hours including a two-hour master's report and an oral comprehensive examination; or (3) 33 hours including an oral comprehensive examination. A minimum of 18 semester hours must be earned in the Department of Health, Physical Education and Recreation.

**Courses in Physical Education****Undergraduate Credit**

The following undergraduate courses in physical education may be taken to meet the physical education

requirement. All courses are coed unless otherwise indicated.

**261 001. Concepts in Physical Education.** (0). 261-001-1-0835

**261 002. Concepts in Physical Education.** (Majors) (0). 261-002-1-0835

**261 003. Concepts in Physical Education** (Honors) (0). 261-003-1-0835

**Lifetime Sports**

**261 004. Adapted Physical Education.** (0). 261-004-1-0835

**261 005. Beginning Swimming.** (0). 261-005-1-0835

**261 006. Intermediate Swimming.** (0). 261-006-1-0835

**261 007. Advanced Swimming.** (0). 261-007-1-0835

**261 008. Diving.** (0). 261-008-1-0835

**261 009. Synchronized Swimming.** (0). 261-009-1-0835

**261 010. Beginning Scuba Diving.** (0). 261-010-1-0835

**261 011. Advanced Scuba Diving.** (0). 261-011-1-0835

**261 012. Advanced Life Saving.** (0). 261-012-1-0835

**261 013. Wrestling.** (0). 261-013-1-0835

**261 014. Weight Training.** (0). 261-014-1-0835

**261 015. Crew.** (0). 261-015-1-0835

**261 016. Calisthenics and Fitness Conditioning.** (0). 261-016-1-0835

**261 017. Folk Dance.** (0). 261-017-1-0835

**261 018. Social Dance.** (0). 261-018-1-0835

**261 019. Square Dance.** (0). 261-019-1-0835

**261 021. Modern Dance I.** (0). 261-021-1-0835

**261 022. Water Polo.** (0). 261-022-1-0835

**261 024. Tumbling and Trampoline.** (0). 261-024-1-0835

**261 025. Beginning Gymnastics and Apparatus.** (0). 261-025-1-0835

**261 026. Advanced Gymnastics and Apparatus.** (0). 261-026-1-0835

**261 027. Beginning Bowling.** (0). 261-027-1-0835

**261 028. Advanced Bowling.** (0). 261-028-1-0835

**261 029. Beginning Golf.** (0). 261-029-1-0835

**261 030. Advanced Golf.** (0). 261-030-1-0835

**261 031. Fencing.** (0). 261-031-1-0835

**261 032. Billiards and Snooker.** (0). 261-032-1-0835

**261 033. Table Tennis.** (0). 261-033-1-0835

**261 034. Horse Shoes.** (0). 261-034-1-0835

**261 035. Beginning Tennis.** (0). 261-035-1-0835

**261 036. Advanced Tennis.** (0). 261-036-1-0835

**261 037. Beginning Badminton.** (0). 261-037-1-0835

**261 038. Advanced Badminton.** (0). 261-038-1-0835

**261 039. Archery.** (0). 261-039-1-0835

**261 040. Field Archery.** (0). 261-040-1-0835

**261 041. Beginning Riflery.** (0). 261-041-1-0835

**261 042. Advanced Riflery.** (0). 261-042-1-0835

**261 043. Roller Skating.** (0). 261-043-1-0835

**261 044. Handball.** (0). 261-044-1-0835

**261 045. Paddleball-Racquetball.** (0). 261-045-1-0835

**261 047. Soccer.** (0). 261-047-1-0835

**261 048. Power Volleyball.** (0). 261-048-1-0835

**261 049. Cycling.** (Bicycle). (0). 261-049-1-0835

**261 050. Jogging.** (0). 261-050-1-0835

**261 051. Water Skiing.** (0). 261-051-1-0835

**261 052. Camping.** (0). 261-052-1-0835

**261 053. Hiking.** (0). 261-053-1-0835

**261 054. Bait and Fly Casting.** (0). 261-054-1-0835

**261 055. Angling.** (Fishing). (0). 261-055-1-0835

**261 056. Canoeing.** (0). 261-056-1-0835



- 261 057. **Field Hockey.** (0). 261-057-1-0835  
 261 058. **Judo.** (0). 261-058-1-0835  
 261 059. **Trap Shooting.** (0). 261-059-1-0835  
 261 060. **Ballet I.** (0). 261-060-1-0835  
 261 061. **Skiing.** (0). 261-061-1-0835  
 261 062. **Orienteering.** (0). 261-062-1-0835  
 261 063. **Sailing.** (0). 261-063-1-0835  
 261 064. **Self Defense.** (0). 261-064-1-0835  
 261 067. **Beginning Western Horsemanship.** (0). 261-067-1-0835  
 261 069. **Beginning English Horsemanship.** (0). 261-069-1-0835

The following undergraduate courses in physical education may be taken for elective credit.

- 261 101. **Concepts in Physical Education.** (1). 261-101-1-0835  
 261 102M. **Concepts in Physical Education (Majors).** (1). 261-102-1-0835  
 261 103H. **Concepts in Physical Education (Honors).** (1). 261-103-1-0835  
 261 104. **Adapted Physical Education.** (1). 261-104-1-0835  
 261 105. **Beginning Swimming.** (1). 261-105-1-0835  
 261 106. **Intermediate Swimming.** (1). 261-106-1-0835  
 261 107. **Advanced Swimming.** (1). 261-107-1-0835  
 261 108. **Diving.** (1). 261-108-1-0835  
 261 109. **Synchronized Swimming.** (1). 261-109-1-0835  
 261 110. **Beginning Scuba Diving.** (1). 261-110-1-0835  
 261 111. **Advanced Scuba Diving.** (1). 261-111-1-0835  
 261 112. **Advanced Life Saving.** (1). 261-112-1-0835  
 261 113. **Wrestling.** (1). 261-113-1-0835  
 261 114. **Weight Training.** (1). 261-114-1-0835  
 261 115. **Crew.** (1). 261-115-1-0835  
 261 116. **Calisthenics and Fitness Conditioning.** (1). 261-116-1-0835  
 261 117. **Social, Square and Folk Dance.** (1). 261-117-1-0835  
 261 118. **Social Dance.** (1). 261-118-1-0835  
 261 119. **Square Dance.** (1). 261-119-1-0835  
 261 120. **Modern Dance I.** (1) 216-120-1-0835  
 261 121. **Modern Dance II.** (1). Pr.: HPER 120. 261-121-1-0835  
 261 122. **Water Polo.** (1). 261-122-1-0835  
 261 124. **Tumbling and Trampoline.** (1). 261-124-1-0835  
 261 125. **Beginning Gymnastics and Apparatus.** (1). 261-125-1-0835  
 261 126. **Advanced Gymnastics and Apparatus.** (1). 261-126-1-0835  
 261 127. **Beginning Bowling.** (1). 261-127-1-0835  
 261 128. **Advanced Bowling.** (1). 261-128-1-0835  
 261 129. **Beginning Golf.** (1). 261-129-1-0835  
 261 130. **Advanced Golf.** (1). 261-130-1-0835  
 261 131. **Fencing.** (1). 261-131-1-0835  
 261 132. **Billiards and Snooker.** (1). 261-132-1-0835  
 261 133. **Table Tennis.** (1). 261-133-1-0835  
 261 134. **Horse Shoes.** (1). 261-134-1-0835  
 261 135. **Beginning Tennis.** (1). 261-135-1-0835  
 261 136. **Advanced Tennis.** (1). 261-136-1-0835  
 261 137. **Badminton.** (1). 261-137-1-0835  
 261 138. **Advanced Badminton.** (1). 261-138-1-0835  
 261 139. **Archery.** (1). 261-139-1-0835  
 261 140. **Field Archery.** (1). 261-140-1-0835  
 261 141. **Beginning Riflery.** (1). 261-141-1-0835  
 261 142. **Advanced Riflery.** (1). 261-142-1-0835  
 261 143. **Roller Skating.** (1). 261-143-1-0835

- 261 144. **Handball.** (1). 261-144-1-0835  
 261 145. **Paddleball-Racquetball.** (1). 261-145-1-0835  
 261 147. **Soccer.** (1). 261-147-1-0835  
 261 148. **Power Volleyball.** (1). 261-148-1-0835  
 261 149. **Cycling.** (Bicycle). (1). 261-149-1-0835  
 261 150. **Jogging.** (1). 261-150-1-0835  
 261 151. **Water Skiing.** (1). 261-151-1-0835  
 261 152. **Camping.** (1). 261-152-1-0835  
 261 153. **Hiking.** (1). 261-153-1-0835  
 261 154. **Bait and Fly Casting.** (1). 261-154-1-0835  
 261 155. **Angling.** (Fishing). (1). 261-155-1-0835  
 261 156. **Canoeing.** (1). 261-156-1-0835  
 261 157. **Field Hockey.** (1). 261-157-1-0835  
 261 158. **Judo.** (1). 261-158-1-0835  
 261 159. **Trap Shooting.** (1). 261-159-1-0835  
 261 161. **Skiing.** (1). 261-161-1-0835  
 261 162. **Orienteering.** (1). 261-162-1-0835  
 261 163. **Sailing.** (1). 261-163-1-0835  
 261 164. **Self Defense.** (1). 261-164-1-0835  
 261 165. **Ballet I.** (1). 261-165-1-0835  
 261 166. **Ballet II.** (1). Pr.: HPER 165. 261-166-1-0835  
 261 167. **Beginning Western Horsemanship** (1). 261-167-1-0835  
 261 168. **Advanced Western Horsemanship.** (1). 261-168-1-0835  
 261 169. **Beginning English Horsemanship.** (1). 261-169-1-0835  
 261 170. **Advanced English Horsemanship.** (1). 261-170-1-0835  
 261 171. **Jazz Dance.** (1). I, II. A basic course in jazz technique and style, focusing on isolations, rhythmic articulation, and the control and release of energy. 2 hours lab. a week. 261-171-1-0835

The following courses may be taken by students majoring in physical education or other students meeting prerequisite requirements.

- 261 200. **Concepts of Adult Physical Fitness.** (2). A study of the facts about the effects of regular exercise on physical fitness and health. 261-200-0-0835  
 261 202. **Exercise Science.** (3). To teach the basic principles of physiology, psychology, and use of audio-visual analysis in reference to coaching. Pr.: Sophomore standing. 261-202-0-0835  
 261 206. **Professional Orientation.** (1). I, II, S. Orientation to the fields of health, physical education and recreation; the university; and the department. 261-206-0-0835  
 261 210. **Drill Team Fundamentals.** (2). The organization, instruction and routines suitable for junior and senior high school drill teams. 261-210-1-0835  
 261 215. **Techniques of Officiating Team Sports.** (2). Principles and practices of officiating team sports. 261-215-1-0835  
 261 216. **Techniques of Officiating Individual Sports.** (2). Principles and practices of officiating individual sports. 261-216-1-0835  
 261 230. **Social Dimensions of Physical Activity.** (3). I, II. An in-depth review of pertinent research dealing with the social significance of physical activity and the implications of that research to physical education and athletic programs. Pr.: Sociology 211. 261-230-0-0835  
 261 241. **Gymnastics and Lead-Up Games for Elementary Schools.** (3). A selection of activities and techniques of teaching beginning tumbling and apparatus work and games suitable for acquiring skills and basic concepts used in sports activities for grades K-6. One hour rec., four hours lab. 261-241-1-0835



**261 242. Gymnastics for the Secondary Schools.** (3). Theory and practice of tumbling and gymnastics. One hour lec. and four labs a week. Required for secondary program. 261-242-1-0835

**261 251. Rhythms for Secondary Schools.** (3). Fundamental rhythms, techniques and materials for teaching folk, square, modern, and social dance in secondary schools. One hour rec. and four hours lab. a week. Required for secondary program. 261-251-1-0835

**261 252. Rhythms for Elementary Schools.** (3). An introduction to and techniques of basic dance moves, including creative, folk, country, and square for grades K-6. One hour rec. and four hours lab. a week. 261-252-1-0835

**261 266. Team Sports for Secondary Schools.** (3). Theory and practice of selected activities from the following list: basketball, soccer, speedball, speedaway, field hockey, flag football and softball. One hour rec. and four hours lab. a week. Required for secondary program. 261-266-1-0835

**261 280. Physical Education Materials for Elementary Schools.** (3). Selection and presentation of physical education activities suitable for use with elementary school age children, with emphasis on fundamental movements and skills, games of low organization, classroom games, self-testing activities, body mechanics and warm-up activities, physical fitness, stunts and tumbling. One hour rec., four hours lab. Required for elementary program. 261-280-1-0835

**261 290. Kinesiology.** (3). Basic mechanics of human motion, action of joints and muscles, major types of motor skills and application to physical education activities. Laboratory exercises supplement this. Two hours rec., two hours lab. Pr.: Biol. 240. 261-290-1-0835

**261 298. Coaching and Officiating Wrestling.** (2). Study of rules, theory and practices; methods of coaching. Pr.: HPER 230 or 202 or consent of head of department. 261-298-1-0835

**261 299. Coaching and Officiating Swimming.** (2). Study of rules, theory and practices; methods of coaching. Pr.: HPER 230 or 202 or consent of head of department. 261-299-1-0835

**261 300. Coaching and Officiating Volleyball.** (2). Study of rules, theory, and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-300-1-0835

**261 301. Coaching and Judging Gymnastics.** (2). Study of rules, theory, and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-301-1-0835

**261 302. Coaching and Officiating Basketball.** (2). Study of rules, theory and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-302-1-0835

**261 303. Coaching and Umpiring Baseball.** (2). Study of rules, theory, and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-303-1-0835

**261 304. Coaching and Officiating Track and Field.** (2). Study of rules, theory, and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-304-1-0835

**261 305. Coaching and Officiating Football.** (2). Study of rules, theory and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-305-1-0835

**261 307. Techniques of Training and Conditioning.** (2). A study of the anatomical and physiological responses of the body to specific forms of exercise such as calisthenics, isotonic and isometric exercise, aerobics, and interval training. Pr.: Junior standing and HPER 202 or 565. 261-307-0-0835

**261 309. Coaching and Officiating Tennis and Golf.** (2). Study of rules, theory, and practices; methods of coaching. Pr.: HPER 230 or 202, or consent of head of department. 261-309-1-0835

**261 315. Treatment of Athletic Injuries.** (3). Principles and practices of massage, taping and care of minor athletic injuries. Pr.: Junior standing and HPER 202 or Biol. 565. 261-315-0-0835

**261 331. Individual Activities for Secondary Schools.** (3). Theory and practice of selected activities from the following list: archery, badminton, tennis, bowling, golf, fencing, and wrestling. One hour rec. and four hours lab. a week. Required for secondary program. 261-331-1-0835

**261 341. Water Safety Instruction.** (2). Methods of teaching swimming, lifesaving, and water safety. Upon satisfactory completion of this course, a certificate is awarded by the American Red Cross as a water safety instructor. Not open to students in Health, Physical Education and Recreation. Pr.: A current senior lifesaving certificate. 261-341-1-0835

**261 345. Water Safety Instruction.** (2). Methods of teaching swimming, lifesaving and water safety. Upon satisfactory completion of this course, a certificate is awarded by the American Red Cross as a water safety instructor. For majors in Health, Physical Education and Recreation only. Pr.: A current senior lifesaving certificate. 261-345-1-0835

**261 355. Movement Exploration.** (3). A study of a problem-solving approach to teaching movement and motor skills to elementary school children. One hour rec. and four hours lab. a week. 261-355-1-0835

**261 359. Organization and Administration of Athletics.** (3). A study of the organization of athletics, including budgeting, equipment, legal aspects and public relations. Pr.: Junior standing. 261-359-0-0835

**261 379. Physical Education for the Elementary School Teacher.** (3). Materials, techniques, and programs in physical education activities suitable for the different age periods in the elementary school. Two hours rec. and two hours lab. a week. Pr.: Sophomore standing and Educ. 202 or consent of instructor. Not open to majors in Health, Physical Education and Recreation. 261-379-1-0835

**261 399. Honors Seminar in Physical Education.** (1-3). Selected topics in physical education. Open to non-majors in the Honors Program. 261-399-4-0835

**261 458. Philosophy, History and Principles of Physical Education.** (3) I, II. Study of the historical and philosophical foundations of physical education, and a survey of the principles of physical education. Pr.: 261-206. 261-458-0-0835

**261 460. Practice Teaching in Physical Education.** (2). Supervised students assist in basic physical education classes. Four hours lab. a week. Pr.: Junior standing. 261-460-2-0835

**261 461. Observation in Elementary Physical Education.** (2) I, II. Experiences in observing elementary children in the physical activity setting. One hour of recitation a week with laboratory hours to be arranged. Pr.: Junior standing and one or more courses in Elementary Physical Education. 261-461-1-0835

### Undergraduate And Graduate Credit In Minor Field

**261 515. 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 History 515.) 241-515-0-2205

**261 530. Minority Groups In Sports.** (3). The contributions, problems, and discrimination of minority groups in sport. Pr.: Soc. 211, HPER 230, Psych. 435, or Hist. 539. 261-530-0-0835



**261 535. Nutrition and Physical Activity.** (3). The study of nutrition concepts, physical activity and their interrelationships. Emphasis will be on weight control; fads and fallacies of diet; physical fitness; and athletics. Pr.: Biol. 198 and consent of instructor. (See Foods and Nutrition 535.) 261-535-1-0835

**261 561. Adapted Physical Education.** (3). I, II. Developmental, Remedial and Corrective Physical Education. Emphasis placed on adaptations designed to meet the needs of individuals requiring special attention beyond the regular physical education program Pr.: Biol. 240; HPER 290. 261-561-0-0835

**261 565. Physiology of Exercise.** (4). A study of the effects of exercise on the human organism, and a survey of the health benefits of exercise. Specific areas of study include exercise and child development, exercise metabolism, ergogenic aids to performance, and techniques of physical fitness development. Three hours rec. and two hours lab. a week. Pr.: Biol. 240. 261-565-1-0835

**261 570. Motor Behavior and Skill Learning.** (3). A study of learning in the psychomotor domain. Specific areas of study include motor learning theories, motor development, physiological bases of skill behavior, motor and skill learning, the state of the performer, and the application of instructional techniques. Two hours rec. and two hours lab. a week. 261-570-1-0835

**261 586. Administration of Health and Physical Education in Elementary and Secondary Schools.** (3) I, II. Policies and procedures in organization and administration, with emphasis on elementary and secondary school health and physical education. Pr.: Junior standing. 261-586-0-0835

**261 599. Independent Studies in Health, Physical Education and Recreation.** (1-3). Selected topics in health, physical education and recreation. Maximum of three hours applicable toward a degree. Pr.: Consent of department head. 261-599-3-0835

### Undergraduate And Graduate Credit

**261 700. Principles and Philosophy of Physical Education.** (3). Study of historical and philosophical foundations of physical education and an analysis of the principles of physical education. 261-700-0-0835

**261 701. Sport and Human Behavior.** (3). A study of the state of the sport performer and the effects of sport on human behavior. Pr.: HPER 570. 261-701-0-0835

**261 702. HPER Workshop.** (1-3) I, II, S. Intensified study of new and innovative techniques used in health, physical education or recreation. 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. 261-702-0-0835

**261 710. Tests and Measurements in Physical Education.** (3). Techniques of measuring and evaluating, including elementary statistical procedures, the preparation and administration of skill and written tests, and the use of other evaluative materials. Pr.: HPER 208, 252, 355, 241 or 331, HPER 266, 251, 242. 261-710-0-0835

**261 718. Film Analysis of Sport.** (3). The analysis of human movement using film, tape and other related aids. Pr.: HPER 290. 261-718-0-0835

**261 730. Writing Behavioral Objectives for Physical Education.** (3). A study of the major objectives of physical education including techniques for writing specific behavioral objectives. Pr.: C&I 476, C&I 469. 261-730-0-0835

**261 731. Physical Education Curriculum for the Secondary School.** (3). Organization of material in a progression for a secondary school physical education program. Pr.: C&I 476. 261-731-0-0835

**261 732. Physical Education Curriculum for the Elementary School.** (3). Organization of material in a progression for an elementary physical education program. Pr.: C&I 469. 261-732-0-0835

**261 745. Sociology of Sport.** (3). 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 (see Soc. 745). Pr.: Soc. 211. 261-745-0-0835

**261 750. Teaching Concepts of Physical Education.** (3). A study of teaching methods applied to instruction of the basic concepts of physical education; organization of teaching materials for a foundations or conceptual program on physical education. 261-750-0-0835

**261 759. Organization, Implementation, and Administration of Exercise Programs.** (4) A study of the organization, implementation and administration of exercise programs, which include physical fitness testing, budgeting, equipment, legal aspects, publicity, public relations program management, and theory and practical use of various exercise regimens. Three hours rec. and two hours lab. a week. Pr.: HPER 565 and consent of instructor. 261-759-0-0835

**261 775. Seminar in Physical Education.** (Var.) Recent trends and problems in physical education. Pr.: Senior standing and consent of instructor. 261-775-0-0835

**261 799. Problems in Health, Physical Education and Recreation.** (Var.) Pr.: Background of courses needed for problem undertaken. 261-799-3-0835

### Graduate Credit

**261 800. Advanced Physiology of Exercise.** (4). Effects of exercise on the human organism with special emphasis on current research in sport medicine and exercise science. Pr.: HPER 565. 261-800-1-0835

**261 801. Motor Behavior Seminar.** (3). Current trends, problems and topics related to psychomotor learning, motor development and the psychology of coaching. Pr.: HPER 570. 261-801-0-0835

**261 810. Evaluation in Physical Education.** (3). A study of basic techniques used to evaluate objectives, conduct research, and conduct laboratory experiments in physical education. Pr.: HPER 710. 261-810-0-0835

**261 815. Research Methods in Health, Physical Education and Recreation.** (3). A study of techniques of research including the design of experiments and the use of appropriate statistics. 261-815-0-0835

**261 820. Supervision of Physical Education.** (3). A study of the objectives, organization, and methods of supervising elementary and secondary physical education programs. 261-820-0-0835

**261 825. Mechanical Analysis of Human Movement.** (3). A study of mechanical principles applied to analysis of human movement including cinematographical analysis of sports activities. Pr.: HPER 290. 261-825-0-0835

**261 896. Topics in Health, Physical Education and Recreation.** (1-4). 261-896-3-0835

**261 897. Research in Health, Physical Education and Recreation.** (Var.) Pr.: Sufficient training to carry on the line of research undertaken. 261-897-4-0835

**261 898. Master's Report** (1-4). 261-898-4-0835

**261 899. Master's Thesis** (1-6). 261-899-3-0835

### Courses in Dance

#### Undergraduate Credit

**261 251. Rhythms for Secondary Schools.** (3). Fundamental rhythms, techniques and materials for teaching folk, square, modern, and social dance in secondary schools. One hour rec. and four hours lab. a week. Required for secondary program. 261-251-1-0835



**261 252. Rhythms for Elementary Schools.** (3). An introduction to and techniques of basic dance moves, including creative, folk, country, and square for grades K-6. One hour rec. and four hours lab. a week. 261-252-1-0835

**261 323. Techniques of Intermediate Modern Dance.** (2). Pr.: HPER 120 and 121. 261-323-1-1008

**261 324. Techniques of Advanced Modern Dance.** (2). Pr.: HPER 323 (four hours) and/or consent of instructor. May be repeated for a total of eight hours. 261-324-1-1008

**261 325. Techniques of Intermediate Ballet.** (2). Pr.: HPER 165 and 166. 261-325-1-1008

**261 326. Techniques of Advanced Ballet.** (2). Pr.: HPER 325 (four hours) and/or consent of instructor. May be repeated for a total of eight hours. 261-326-1-1008

**261 355. Movement Exploration.** (3). A study of a problem-solving approach to teaching movement and motor skills to elementary school children. One hour rec. and four hours lab. a week. 261-355-1-0835

### Undergraduate And Graduate Credit In Minor Field

**261 500. Methods and Materials of Dance.** (3). A theoretical and practical investigation of literal and abstract materials for the dance; methods of dance. One hour rec., four hours lab. per week. Pr.: HPER 323 (four hours) or 325 (four hours). 261-500-0-1008

**261 501. Dance Composition.** (3). Study of techniques of choreography. Emphasis is placed on practical application. One hour rec., four hours lab. per week. Pr.: HPER 500. 261-501-1-1008

**261 502. Dance Workshop.** (1). Studies in the techniques of dance production and performance. Emphasis is on practical application. May be repeated three times. Pr.: Four hours of HPER 323 or four hours of HPER 325. 261-502-1-1008

## Courses in Health

### Undergraduate Credit

**261 201. Personal and Community Health.** (3) I, II, S. Presents scientific and well-balanced information concerning personal, family, and community health, so vitally essential to the individual in meeting the needs of daily living, professional, parent, and community responsibilities. 261-201-0-0835

**261 250. You and Your Sexuality.** (3). Study of the role and meaning of human sexuality in relation to oneself as well as in interrelationships with others. Limited to freshmen and sophomores only. (Same as F.C. Dev. 250.) 261-250-0-0835

**261 373. First Aid (Multimedia).** (1). I, II, S. First aid training for prevention and treatment of injuries in an emergency. Upon satisfactory completion of this course, a certificate is awarded by the American Red Cross. Not open to students in Health, Physical Education and Recreation. 261-373-1-0835

**261 365. Health, Illness and Death.** (3) I, II. Basic concepts of positive health, and the relationship and effects of illness, dying and death. Pr.: 261-201. 261-365-0-0837

**261 375. First Aid (Multimedia).** (1) First aid training for prevention and treatment of injuries in an emergency. Upon satisfactory completion of this course, a certificate is awarded by the American Red Cross. For majors in the Department of Health, Physical Education and Recreation only. 261-375-1-0835

**261 377. First Aid (Multimedia Instructors).** (1). Education in methods of teaching the American Red Cross Multimedia first aid course. Upon successful completion of the course the student is certified as a multimedia instructor. For majors in the Department of Health, Physical Education and Recreation only. Pr.: Current certification in multimedia first aid. 261-377-1-0835

**261 378. First Aid (Basic Instructors).** (1). Training in methods of teaching basic first aid measures to young children. For majors in Department of Health, Physical Education and Recreation only. Pr.: Current certification in first aid (multimedia) or current teaching certificate in any teaching field. 261-378-1-0835

**261 381. Health for Elementary Teachers.** (3). To assist the student in the development of the understandings and competencies essential for the teaching of health in elementary schools. 261-381-0-0835

**261 385. Consumer Health and Quackery.** (3) I, II. To understand the health implications of quackery and evaluating health services and products. Pr.: 261-201. 261-385-0-0837

**261 462. Practicum in Health.** (2). Supervised students assist in personal health classes. Four lab. hours a week. Pr.: Junior standing. 261-462-2-0835

### Undergraduate And Graduate Credit In Minor Field

**261 550. Health Appraisal.** (3). Study of health appraisal information, correction and follow-up procedures needed for screening and identifying health problems and concerns. Pr.: HPER 201; Psych. 110. 261-550-0-0835

**261 555. Community Health.** (3). Identification of local, state, and national health problems; programs and agencies designed to meet these problems. Emphasis on principles, objectives, and methods of community health planning. Pr.: HPER 201 and Biol. 198. 261-555-0-0837

**261 583. Current Health Issues.** (3). A study and discussion of current issues of concern such as drug abuse, sexuality, human diseases and relationship of ecology to health. Pr.: Junior standing. 261-583-0-0835

**261 585. Field Experience and Internship in Health.** (3-8). Observation and participation in activities of a public health agency either official, voluntary, or private. Internship may also be in nursing home and hospital setting. Planning and supervision of experience is done jointly by university staff members and agency representatives; can be repeated once. Pr.: Must notify instructor semester before taking class and HPER 555. 261-585-2-0837

### Undergraduate And Graduate Credit

**261 736. Health Education Curriculum.** (3). I, II, S. Organization of material and concepts in a need-based progression for a secondary school health education program. Pr.: 415-476. 261-736-0-0837

**261 740. Administration of Health Care Programs.** (3). Organization and administration of school health programs concerning health services, health instruction, and health environment. Emphasis will also be placed on various community health agencies such as public, private and voluntary. Two recitations and two lab. hours a week. Pr.: HPER 583 or 555. 261-740-0-0835

**261 747. Drugs and the Student.** (3). Current problems and programs relative to drug use, abuse, and control. Pr.: HPER 201, Psych. 110 and restricted to students with senior standing in Health, Physical Education and Recreation. 261-747-0-0837

**261 765. Human Sexuality.** (3). Focus on implications of personal and familial aspects of human sexuality throughout the life cycle. Pr.: F.C. Dev. 350 or Biol. 240. 261-765-0-0837

**261 780. Seminar in Health Education.** (Var.). Recent trends and problems in health education. Pr.: HPER 486 and consent of instructor. 261-780-0-0835

## Courses in Recreation

### Undergraduate Credit

**261 220. Recreational Games.** (2). Lead-up and recreational games suitable for use in both recreation and school settings. Four hours lab. a week. 261-220-0-0835



**261 320. Recreational Leadership.** (3). Principles and methods of organizing communities for leisure activities. 261-320-0-0835

**261 382. Camp Counseling.** (3). Basic principles and skills in camping for future counselors. Pr.: Sophomore standing or consent of instructor. 261-382-0-0835

**261 390. Principles and Philosophy of Recreation.** (3). A study of the basic principles of recreation, including a survey of past and current trends in the recreation movement. 261-390-0-0835

**261 480. Observation in Recreation.** (2). To orient the student to recreation programs in voluntary, public, military, private and commercial agencies. 261-480-2-0835

**261 481. Participation in Recreation.** (2). I, II. Directed beginning experience in recreation/leisure service agencies. An evaluation and reports on experiences within the agencies will be done. Pr.: 261-320. 261-481-2-2103

**261 488. Recreation for Special Populations.** (3). I, II. Study of recreation programs for special populations. Characteristics of the disabled, disadvantaged, mentally ill, retarded, aged, physically handicapped, etc. Pr.: 261-320 and consent of instructor. 261-488-0-2103

**261 489. Recreation Program.** (3). I, II. A study of the program forms and structures related to public, voluntary, military, private and commercial agencies. Pr.: 261-480. 261-489-0-2103

**261 490. Recreation Administration I.** (3). I, II. Development and evaluation of recreation patterns, programs, and structures. Pr.: 261-480. 261-490-0-2103

**261 491. Seminar in Recreation.** (2). I, II. The study of current trends and issues in recreation. Pr.: 261-481. 261-491-0-2103

**261 492. Internship in Recreation.** (15). I, II, S. Intensive practical experience over a 15-week period in an approved recreation/leisure service agency. Pr.: 261-491. 261-492-2-2103

### Undergraduate And Graduate Credit

**261 705. Recreation Theory and Policy.** (3). I, II. Development of theory and resulting recreational policies for public, community, institutional and private agencies. Pr.: 261-489. 261-705-0-0835

**261 715. Recreation Program, Finance and Budget.** (3). I, II, S. Development of recreation programs and programmatic budgets for a recreation agency. Study of sources for financing recreational programs of all types and a study of money management systems for recreation agencies. Pr.: 261-489 or 261-705. 261-715-0-0835

**261 720. Organization and Administration of Intramural Programs.** (3). Policies and procedures in organizing and administering an intramural program. 261-720-0-0835

**261 725. Recreation Administration II.** (3). Development of administrative procedures as applied to programs, personnel and facilities. Design administrative models and apply theories to the recreation/leisure field. Pr.: 261-490. 261-725-0-2103

**261 791. Seminar in Recreation.** (1-3). Designed for recreation specialists. Discussion of current research and innovations. Evaluation of recreational programs. Small group interaction. May be taken with Internship in Recreation. 261-791-2-0835

**261 792. Internship in Recreation.** (3-8). Supervised experiences with recreation services, such as city recreation, government agencies, and other recreation agencies. May be completed in one of the following two ways, as directed by the student's adviser: 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 job, both with concurrent enrollment in the course designation. May be repeated once. HPER 791 (may be taken concurrently) and consent of instructor. 261-792-2-0835

## HISTORY

*Joseph M. Hawes,\* Head of Department*

Professors Carey,\* Higham,\* Linder,\* Socolofsky,\* and Wilcoxon;\* Associate Professors Crawford,\* Hawes,\* Jones,\* Kaufman,\* Kipp,\* Kren,\* Page,\* and Zieger;\* Assistant Professors Donovan,\* Ferguson,\* Frey,\* Gray,\* Hamscher,\* McCulloh,\* Mrozek,\* and Nieman. Emeritus: Professors Parrish,\* Sageser,\* and Sweedlun;\* Associate Professors Alsop\* and Riggs.\*

History is the common possession of mankind. In the words of historian Carl Becker, "The value of history is . . . not scientific but moral: by liberalizing the mind, by deepening the sympathies, by fortifying the will, it enables us to control, not society, but ourselves,—a much more important thing; it prepares us to live more humanely in the present and to meet rather than to foretell the future." Historical understanding is the basic attribute of the educated person.

Business, government and professional practice in other fields as well as the traditional academic and archival callings offer opportunities for the effective and satisfying use of a background in historical methodology. An introduction to the historian's wide-ranging concern with the numerous and interrelated aspects of human culture—including social, economic, intellectual and religious, to name but a few—is a useful experience for any man or woman contemplating a career which will influence the course of events in a complex society. Within their broad spectrum of topics and approaches, historical studies emphasize a process of disciplined thinking, training the mind to assess evidence and reach rational conclusions. Career opportunities for people with training in history are as broad as the need for that kind of thinking.

The history program at Kansas State appeals not only to majors but to all students seeking a rewarding educational experience. The curriculum includes courses in traditional and non-traditional 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.

### 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 a community college, only courses equivalent to those taught at the freshman-sophomore level at Kansas State University (courses numbered 241-100 through 241-299) can receive history credit.

### Undergraduate Study

Requirements for a major in history consist of a minimum of 30 hours in history, including Hist. 101 and 102 (or Hist. 103 and 104, or Hist. 127 and 128), a minimum of 18 hours in courses numbered 500 and above and Hist. 397 in the junior year. Students must distribute their upper division courses over at least three of the following fields:

I. ancient, medieval and early modern Europe



- II. modern Europe (including Great Britain)
- III. the third world (Asia, Africa, Latin America)
- IV. the United States (including the colonial period)
- V. topical courses not focusing upon a specific geographical region, such as history of science, technology, dance, sport, military history, psychohistory, and other similar courses.

### 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 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 non-thesis, non-report 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 on page 95. 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

**241 100. Introduction to History.** (3). 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. 241-100-0-2205

**241 101. Western Civilization: The Rise of Europe.** (3). Major trends in western history from the beginnings of European civilization to the end of the 17th 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. 241-101-0-2205

**241 102. Western Civilization: The Modern Era.** (3). Principal developments in western civilization from the beginning of the 18th 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. 241-102-0-2205

**241 103. Western Civilization: The Rise of Europe, Honors.** (4). Major trends in western history from the beginnings of European civilization to the end of the 17th 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. Pr.: For freshmen and sophomores in the Honors Program. 241-103-0-2205

**241 104. Western Civilization: The Modern Era, Honors.** (4). Principal developments in western civilization from the beginning of the 18th 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. Pr.: For freshmen and sophomores in the Honors Program. 241-104-0-2205

**241 127. Far Eastern Civilization I.** (3). The culture, history and traditions of China, Japan, Korea, Taiwan and Indochina. 241-127-0-2205

**241 128. Far Eastern Civilization II.** (3). The history and traditions of China, Japan, Korea, Taiwan and Indochina in the context of contacts and developing involvement with the West. 241-128-0-2205

**241 137. Special Studies for Freshmen and Sophomores.** (3). Provides instructor and students an opportunity to explore the historical dimensions of a particular topic or theme. Topics vary. May be repeated once. 241-137-0-2205

**241 250. Russian Culture and Civilization.** (3). I. 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 Modern Language 250). 241-250-0-2205.

**241 251. 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. 241-251-0-2205

**241 252. 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. 241-252-0-2205

**241 253. History of the United States to 1877, Honors.** (4). Focuses on selected topics and normally does not attempt complete chronological coverage. Class activity emphasizes reading, discussion, written work and individual consultation. Pr.: For freshmen and sophomores in the Honors Program. 241-253-0-2205

**241 254. History of the United States since 1877, Honors.** (4). Focuses on selected topics and normally does not attempt complete chronological coverage. Class activity emphasizes reading, discussion, written work and individual consultation. Pr.: For freshmen and sophomores in the Honors Program. 241-254-0-2205



**241 299. Honors Seminar in History.** (3). Selected topics in history. May be repeated once for credit. Pr.: Membership in Honors Program or consent of instructor. 241-299-0-2205

**241 397. Junior Seminar.** (3). Provides for the study of the historical method for students in their junior year. Emphasis upon both research techniques and writing. 241-397-0-2205

### **Undergraduate And Graduate Credit In Minor Field**

**241 501. Heritage of the Western World.** (4-6). The heritage and legacies of western civilization especially designed for the non-major; the emphasis is upon broad themes in the evolution of the political, economic, social, cultural and ideological inheritance. May not be used to fill major requirement in History. Pr.: Sophomore standing. 241-501-0-2205

**241 505. Introduction to the Civilization of South Asia I.** (3). Interdisciplinary survey of the development of civilization in South Asia, including consideration of the geographical and demographic context, philosophical and social concepts, social and political institutions, literature and historical movements. (Same as Geog. 505, P.Sci. 505, Soc. 505, Anthro. 505.) 241-505-0-2205

**241 506. Introduction to the Civilization of South Asia II.** (3). Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Ceylon, Nepal and Afghanistan, including recent history, current economy, religion, culture, language and literature, geography, social and political structure and ideas. (Same as Geog. 506, P.Sci. 506, Soc. 506, Anthro. 506). 241-506-0-2205

**241 509. History of Childhood.** (3). Examines some theoretical positions on childhood (Freud, Erikson, DeMause, Rheingold and others), and then attempts to determine what it meant to be a child at various times in the past, from Greek and Roman antiquity to 20th century Europe and America. Concentrates on such questions as infanticide, child beating, toilet training, swaddling and methods of schooling, as well as the impact of religious and secular ideologies on the theory and practice of child-raising. Pr.: Sophomore standing. 241-509-0-2205

**241 511. 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. 241-511-0-2205

**241 513. Battles and Leaders.** (3) I. 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. 241-513-0-2205

**241 515. 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. (Same as HPER 515.) Pr.: Sophomore standing. 241-515-0-2205

**241 525. Colonial America.** (3). About 1450 to 1763. Includes the European background of North American colonization, the rivalry for new world empire, 17th century English colonial foundations, and development of the various colonial societies. Pr.: Sophomore standing. 241-525-0-2205

**241 526. The American Revolution.** (3). 18th 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. 241-526-0-2205

**241 527. The Early National Period.** (3). 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. 241-527-0-2205

**241 528. The Age of Jackson.** (3). 1815-1848. Political party instability in the aftermath of the War of 1812, emergence of modern political parties in the 1830s and 1840s, the transportation revolution and growth of societal interdependence, the nature of antebellum reform. Emphasis is on the problem of social order and the relation of the individual to society in a period of rapid and fundamental change. Pr.: Sophomore standing. 241-528-0-2205

**241 529. Civil War and Reconstruction.** (3). 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-19th-century American leaders to deal with the complex problems of slavery and race. Pr.: Sophomore standing. 241-529-0-2205

**241 530. Populism and the Progressive Movement.** (3). "The Gilded Age," "Populism," and "The Progressive Movement" as significant developments in the American scene, 1877-1914, provide the emphasis for this course. An understanding of the nature of American life, with concentration on activities of "typical" Americans, is a major goal of this course. Pr.: Sophomore standing. 241-530-0-2205

**241 531. The United States in the Twentieth Century.** (3). 1917 to the present. Efforts are made to deal with ethnic, cultural and social as well as political, economic and diplomatic themes. Pr.: Sophomore standing. 241-531-0-2205

**241 535. History of the South.** (3). Survey of southern history from the colonial period to the present. Origins and growth of slavery and the plantation system, the nature of society in the slave South, the impact of the Civil War and emancipation on southern society, the emergence of the "New South" in the late 19th and early 20th centuries. Pr.: Sophomore standing. 241-535-0-2205

**241 537. History of the Indians of North America.** (3). 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. 241-537-0-2205

**241 539. Black American History.** (3). Blacks in America from the 17th 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. 241-539-0-2205

**241 541. Women in American History.** (3). 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. 241-541-0-2205

**241 543. History of United States Foreign Policy to 1900.** (3). The evolution of United States foreign policy from its origins through the promulgation of the Open Door Notes of 1899 and 1900. Stresses the continuity and intellectual foundations of foreign policy. Emphasizes territorial and foreign commercial expansion. Pr.: Sophomore standing. 241-543-0-2205

**241 544. History of United States Foreign Policy since 1900.** (3) II. The emergence and development of the United States as a world power. Focuses on America's response to war and revolution, including the Mexican, Russian and Chinese Revolutions, the diplomacy of World Wars I and II, and the Korean and Vietnamese wars. Pr.: Sophomore standing. 241-544-0-2205



**241 548. American Business History.** (3). 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. 241-548-0-2205

**241 550. American Economic History.** (3). 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. 241-550-0-2205

**241 552. American Social History.** (3). Evolution and development of American social institutions, including marriage, sexual customs, ethnicity and community problems. Also emphasizes the different methodologies used in writing social history. Pr.: Sophomore standing. 241-552-0-2205

**241 555. American Constitutional History.** (3). 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 is designed to offer insight into the relationship of constitutional-legal institutions to American society. Pr.: Sophomore standing. 241-555-0-2205

**241 557. History of American Agriculture.** (3). 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. 241-557-0-2205

**241 558. History of Kansas.** (3). Land, people, and cultural developments in Kansas, from the earliest written records to the present. Designed to provide the student with an intimate understanding of the State of Kansas. Pr.: Sophomore standing. 241-558-0-2205

**241 561. War in the Twentieth Century.** (3). 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 20th century, including civil wars, "total war," and guerrilla warfare. Pr.: Sophomore standing. 241-561-0-2205

**241 562. History of American Military Affairs.** (3). 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. 241-562-0-2205

**241 582. Latin American Nations.** (3). 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 fifty years. Pr.: Sophomore standing. 241-582-0-2205

**241 583. Colonial Hispanic America.** (3). 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. 241-583-0-2205

**241 584. Modern Mexico.** (3). Brief survey of lines of national development, 1821-1910, and major emphasis on the 20th-century Revolution and its reforms (1910-1940) as well as its subsequent implications. Pr.: Sophomore standing. 241-585-0-2205

**241 585. Topics in the History of the Americas.** (3). 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. 241-585-0-2205

**241 598. Senior Seminar for Secondary Teachers.** (3). The purpose of this course is to examine critically the historical content of teaching materials currently in use at the secondary level in public schools. The aim of this examination is to weigh the historical validity of the materials. Pr.: Sophomore standing. 241-598-0-2205

**241 599. Senior Seminar.** (3). A seminar for seniors in problems and interpretations concerning broad areas of historical enquiry and relating to the teaching of history. Pr.: Sophomore standing. 241-599-0-2205

**241 601. History of Science I.** (3). Scientific thought and activity from antiquity to the mid-17th century, emphasizing Greek science, medieval science, and the Scientific Revolution, and especially developments in astronomy, theories of motion, and biology. Pr.: Sophomore standing. 241-601-0-2205

**241 602. History of Science II.** (3). Scientific thought from the mid-17th to the late 19th century, with emphasis on developments in astronomy, physics, chemistry, geology, and biology (including evolutionary thought), and discussion of the role of philosophies of science and scientific societies. Pr.: Sophomore standing. 241-602-0-2205

**241 606. A History of Witchcraft and the Occult.** (3). A study of the history of witchcraft and the occult in western civilization with special attention to religious, intellectual, and social issues and influences. Pr.: Sophomore standing. 241-606-0-2205

**241 608. History of Christianity.** (3). 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. 241-608-0-2205

**241 610. History and Culture of Greece.** (3). 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. 241-610-0-2205

**241 611. History and Culture of Rome.** (3). 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. 241-611-0-2205

**241 612. Europe in the Middle Ages.** (3). Europe from the fall of the Roman Empire to the 13th 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. 241-612-0-2205



**241 613. The Renaissance.** (3). The Italian Renaissance as a major phase in the history of western civilization and its spread to Northern Europe. Pr.: Sophomore standing. 241-613-0-2205

**241 614. The Reformation.** (3). 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. 241-614-0-2205

**241 615. Europe in the Age of Absolutism.** (3). Surveys the economic, social, political and intellectual history of Western Europe in the 17th 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. 241-615-0-2205

**241 616. Revolutionary Europe.** (3). 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. 241-616-0-2205

**241 617. Nineteenth-Century Europe.** (3). 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. 241-617-0-2205

**241 618. Twentieth-Century Europe.** (3). 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 anti-democratic and non-democratic 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. 241-618-0-2205

**241 619. Europe since World War II.** (3). Post-war 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. 241-619-0-2205

**241 620. England to 1603.** (3). 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. 241-620-0-2205

**241 621. England since 1603.** (3). II. 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. 241-621-0-2205

**241 622. The British Empire.** (3). On demand. A survey of the British Empire and its conversion into the Commonwealth emphasizing the period 1780-1965. The objective is to familiarize the student with the cultural, political, and constitutional backgrounds of many widely scattered nations once closely linked. Pr.: Sophomore standing. 241-622-0-2205

**241 623. An End to Empire: The Dynamics of Asian Nationalism.** (3). Examines, through a study of the careers and writings of great leaders of modern Asia (Mao Tse-tung, Mahatma Gandhi, Ho Chi Minh, Mohammed Ali Jinnah, Jawaharlal Nehru, and Chiang Kai-shek), the rise, development and success of Asian nationalism in its struggle with Western colonialism. No background in Asian studies necessary. Pr.: Sophomore standing. 241-623-0-2205

**241 625. Topics in British History.** (3). Provides instructor and students the opportunity to investigate in detail a particular theme, event or problem in British history. Topics vary. May be repeated for credit. Pr.: Sophomore standing. 241-625-0-2205

**241 627. History of France, 1400-1715.** (3). 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. 241-627-0-2205

**241 628. History of France since 1715.** (3). 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 18th 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. 241-628-0-2205

**241 630. Topics In French History.** (3). Provides instructor and students the opportunity to investigate in detail a particular theme, event or problem in French history. Topics vary. May be repeated for credit. Pr.: Sophomore standing. 241-630-0-2205

**241 633. Modern Germany, 1789-1914.** (3). 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. 241-633-0-2205

**241 634. Modern Germany, 1914-1945.** (3). 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. 241-634-0-2205

**241 636. Topics in German History.** (3). Provides instructor and students the opportunity to investigate in detail a particular theme, event or problem in German history. Topics vary. May be repeated for credit. Pr.: Sophomore standing. 241-636-0-2205

**241 639. History of Russia to 1801.** (3). 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. 241-639-0-2205

**241 640. Grandeur and Decline of Imperial Russia.** (3). Russia in the 19th century with emphasis on the political, economic, social, and intellectual development of tsarist society. Topics of special concern: origins of the intelligentsia, plans for political reform under absolutism, serfdom and economic development, the legacy of the Great Reforms and counter reforms, origins and evolution of revolutionary populism. Pr.: Junior standing or consent of instructor. 241-640-0-2205



**241 642. Topics in Russian History.** (3). Provides instructor and students the opportunity to investigate in detail a particular theme, event or problem in Russian history. Topics vary. May be repeated for credit. Pr.: Sophomore standing. 241-642-0-2205

**241 650. Topics in European History.** (3). 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. 241-650-0-2205

**241 655. Medieval Religion and Politics.** (3). 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. 241-655-0-2205

**241 657. European Culture in the Middle Ages.** (3). Medieval thought and education from the end of antiquity to the 14th century. The Latin Fathers and the leading scholars of the pre-Carolingian period, the Carolingian Renaissance, monastic biblical scholarship, the beginnings of secular schools, the Renaissance of the 12th century, the rise of universities, the influence of Aristotle, scholasticism, and the destruction of the medieval syntheses. Emphasis on individual men and ideas. Pr.: Sophomore standing. 241-657-0-2205

**241 660. Renaissance People and Ideas.** (3). The history of ideas in Western Europe during the Renaissance, approximately 1300-1600. Pr.: Sophomore standing. 241-660-0-2205

**241 668. European Diplomatic History I.** (3). 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. 241-668-0-2205

**241 669. European Diplomatic History II.** (3). The nature, evolution, and functions of the European diplomatic system from 1815 to the present. Includes a study of the personality and roles of prominent rulers, spies, and diplomats. Focuses on the Vienna settlement, Bismarckian diplomacy, international developments between the two World Wars, and the Cold War. Pr.: Sophomore standing. 241-669-0-2205

**241 677. Science and Society in the Eighteenth Century.** (3). Scientific thought and institutions in the late 17th and 18th centuries and their relation to technology, agriculture, medicine, exploration, religion and other social concerns. Pr.: Sophomore standing. 241-677-0-2205

**241 678. Science and Society in the Nineteenth Century.** (3). Scientific thought and institutions in the 19th century, emphasizing developments in astronomy, physics, chemistry, geology, biology, and evolutionary theory up to about 1870, and their relation to social concerns. Pr.: Sophomore standing. 241-678-0-2205

### Undergraduate And Graduate Credit

**241 701. South Asian History I.** (3). An introductory survey of the growth of Indo-Muslim civilization in South Asia covering the present territory of Bangladesh, India, Pakistan and Ceylon plus the mountain countries of Afghanistan, Nepal, Bhutan and Sikkim. Emphasis on the religions of South Asia (Hinduism, Buddhism, Islam and Sikhism), caste, and South Asian culture and the accomplishments of its ancient philosophy and great empires. No background in South Asia is required. Pr.: Sophomore standing. 241-701-0-2205

**241 702. South Asian History II.** (3). Examines the creation of the British Indian Empire with its unique imperial life-style, the development of South Asian culture—part Western and part traditional—the rise of anti-British nationalism and the competition among differing nationalist dreams that culminated in the creation of the new states of India, Pakistan, Bangladesh and Ceylon. The civilization of South Asia, imperialism, and anti-colonial nationalism. No background in South Asia is required. Pr.: Sophomore standing. 241-702-0-2205

**241 707. Topics in Non-Western History.** (3). On 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. 241-707-0-2205

**241 710. Theories and Methods of Psychohistory.** (3). 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. 241-710-0-2205

**241 717. History of American Culture.** (3). Main emphasis is on political, religious and social thought and ideology, 1620 to present. Pr.: Sophomore standing. 241-717-0-2205

**241 719. Science in America.** (3). 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. 241-719-0-2205

**241 720. The Scientific Revolution.** (3). The introduction of a new world view during the 16th and 17th centuries. Provides an appreciation and understanding of the old Medieval Aristotelian world view, the great changes in thought associated with Copernicus, Kepler, Galileo, Harvey, Bacon, Descartes, Newton, and others, and the effect of these changes on scientific and educational institutions, medicine, technology, and religion. Pr.: Sophomore standing. 241-720-0-2205

**241 721. American Ethnic History.** (3). The role of ethnic minorities in American history, emphasizing non-western-European immigrant groups. Pr.: Sophomore standing. 241-721-0-2205

**241 723. American Urban History.** (3). The role of the city in American history, emphasizing the process of urbanization. Pr.: Sophomore standing. 241-723-0-2205

**241 725. American Labor History.** (3). Labor as an institutional development (organized labor) and as a general theme in American history. Emphasis on the period after 1877 with focus on contemporary issues. Pr.: Sophomore standing. 241-725-0-2205

**241 728. Frontier America.** (3). Primary emphasis on the 19th century when Americans were rapidly spreading across the continent. Also examines the earlier developments of the frontier and considers the 20th-century role of the trans-Mississippi. Pr.: Junior standing or consent of instructor. 241-728-0-2205

**241 729. The Great Plains.** (3). Through concentration on the one-fifth of North America identified as the Great Plains, an effort is made to present the development of that region in historic times. Pr.: Junior standing or consent of instructor. 241-729-0-2205

**241 741. Technology and War.** (3). From the development of weapons to 1900 emphasizing problems of development in technology and their relationship to war, and military organization and the role of leadership. Pr.: Sophomore standing. 241-741-0-2205

**241 743. Peacekeeping.** (3). From the development of peacekeeping methods in the community to the 19th century. Then a systematic or thematic approach to peacekeeping worldwide. Emphasizes the role and contribution of the military as opposed to political and diplomatic history. Pr.: Sophomore standing. 241-743-0-2205



**241 745. History of Military Thought.** (3). The development of military thought and theory from Machiavelli to the present, to give the student a knowledge of classical military literature. Pr.: Sophomore standing. 241-745-0-2205

**241 758. Eighteenth-Century England.** (3). Crown, aristocracy and commons and their relations in society, economy, church and politics within the British Isles. Pr.: Sophomore standing. 241-758-0-2205

**241 760. Nineteenth-Century England.** (3). Change and permanence in domestic British affairs from 1801 onwards. Topics include the Industrial Revolution, strife over Ireland, the rise of modern political parties, the decay of religious values, etc. Pr.: Sophomore standing. 241-760-0-2205

**241 766. Modern Eastern Europe.** (3). Eastern Europe as an ethnically diverse region located between the Germanic lands and Russia emphasizing the impact of both external and internal forces upon the political, socio-economic, 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 or consent of instructor. 241-766-0-2205

**241 769. The Russian Revolutions and the Soviet System.** (3). 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 Destalinization: prospects for the Soviet system. Pr.: Junior standing or consent of instructor. 241-769-0-2205

**241 770. European Culture in the Nineteenth Century.** (3). Major developments in European thought in the 19th century concentrating on the origin and development of major ideologies. Topics include: Romanticism and the revolt against the enlightenment; liberalism; Hegel and the young Hegelians; Utopian socialism; Marxism; Darwin and Darwinism; racial thought; and positivism. Pr.: Sophomore standing. 241-770-0-2205

**241 771. European Culture in the Twentieth Century.** (3). Examines the new perceptions of man, society and the external world that have developed in the 20th century. Topics include: psychoanalysis; theories of the elite; cyclical theories of history; attacks on liberal values; 20th century Marxist theory; fascism and the intellectuals; existentialism; the revolution in science and 20th century theology. Pr.: Sophomore standing. 241-771-0-2205

**241 775. European and American Political and Social Movement.** (3). Selected revolutionary, reform, or conservative movements since the 1600s. The course transcends geographic and chronological boundaries in search of unifying themes. Pr.: Sophomore standing. 241-775-0-2205

**241 780. Rise and Fall of the House of Hapsburg.** (3). Analyzes 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 20th century. Pr.: Sophomore standing. 241-780-0-2205

**241 798. Readings In History.** (1-3). Students will read on a central theme, attend weekly discussions, and write a final report. 241-798-3-2205

**241 799. 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. 241-799-3-2205

## Graduate Credit

**241 801. 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. 241-801-0-2205

**241 808. Quantification in History.** (3). A course for graduate students in the methodology of research using computer techniques. Stress is placed on acquiring bibliographical expertise as well as familiarity with computer technology. Pr.: Stat. 330 or equiv. 241-808-0-2205

**241 899. Research in History, M.A. (Var.)** 241-899-4-2205

**241 901. 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. 241-901-4-2205

**241 919. Seminar in History of Christianity.** (3). 241-919-0-2205

**241 920. Seminar in American Social History.** (3). 241-920-0-2205

**241 921. Seminar in Latin American History.** (3). 241-921-0-2205

**241 922. Seminar in American Diplomatic History.** (3). 241-922-0-2205

**241 923. Seminar in the History of the American West.** (3). 241-923-0-2205

**241 924. Seminar in Colonial America.** (3). 241-924-0-2205

**241 926. Seminar in American Economic History.** (3). 241-926-0-2205

**241 927. Seminar in American Science and Technology.** (3). 241-927-0-2205

**241 928. Seminar in American History.** (3). 241-928-0-2205

**241 930. Seminar in Modern European History.** (3). 241-930-0-2205

**241 931. Seminar in German History.** (3). 241-931-0-2205

**241 932. Seminar in French History.** (3). 241-932-0-2205

**241 933. Seminar in European Diplomatic History.** (3). 241-933-0-2205

**241 935. Seminar in Modern Russian History.** (3). 241-935-0-2205

**241 936. Seminar in Renaissance and Reformation.** (3). 241-936-0-2205

**241 937. Seminar in British History.** (3). 241-937-0-2205

**241 940. Seminar in Military History.** (3). 241-940-0-2205

**241 950. Seminar in South Asian History.** (3). 241-950-0-2205

**241 979. Seminar in the History of Science.** (3). 241-979-0-2205

**241 980. Topics in European History.** (1-3). 241-980-0-2205

**241 981. Topics in Third World History.** (1-3). 241-981-0-2205

**241 982. Topics in the History of Science.** (1-3). 241-982-0-2205

**241 983. Topics in Military History.** (1-3). 241-983-0-2205

**241 984. Topics In American History.** (1-3). 241-984-0-2205

**241 985. Readings in History.** (1-3). 241-985-3-2205

**241 986. Problems in History.** (1-3). 241-986-3-2205

**241 999. Research in History, Ph.D. (Var.)** 241-999-4-2205

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## JOURNALISM AND MASS COMMUNICATIONS

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*Walter Bunge,\* Head of Department*

Professors Bunge\* and Howe;\* Associate Professors Applegate, Bontrager,\* Holt, Morris,\* and Oukrop;\* Assistant Professors Brown, Eaton, Fidler, MacFarland,\* and Shaver; Instructors Daly, Graf and Sparks.



The Department of Journalism and Mass Communications is one of 61 schools and departments in the United States accredited by the American Council on Education for Journalism and is a member of the American Association of Schools and Departments of Journalism. In addition to permanent faculty members, the department annually appoints a journalist to fill a visiting professorship.

### 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. (See page 91). Beyond this they develop individualized programs within the framework of a broad, liberal arts education in consultation with their advisers. Only one-quarter of a student's total course work is taken in the department. To earn a major in the department requires a minimum of 90 credit hours outside the department and a minimum of 30 credit hours and a maximum of 34 credit hours within the department.

Courses in the department are in two areas: (1) those which focus on the relationship of mass communications to society; and (2) those designed for professional training and skill development. Interest areas for majors include broadcasting (programming and production), news-editorial journalism, public relations, advertising, magazines and others.

Enrollment guides for majors are available in Kedzie Hall 104.

### General Journalism and Mass Communications Major

#### Required

289 275	Reporting I	3
289 285	Reporting II (Print)	3
289 330	Editing I	3
	Electives	

Twenty-one to 25 hours selected within the department according to the student's major and minor interests in journalism and mass communications, in consultation with adviser. Ninety hours outside Journalism and Mass Communications

### Radio-Television Major

#### Required:

290 240	Fundamentals of R-TV Production	3
290 250	Fundamentals of R-TV Performance	3
290 260	R-TV Continuity	3
289 275	Reporting I	3
290 330	Reporting II (R-TV)	3

Select courses from the following groups to meet minimum requirements in each group

#### Group I

290 355	KSDB-FM Participation	1
290 375	Cable TV Participation	1
290 640	Advanced Radio Production	3
290 650	Advanced Television Production	3

Students may take not more than 4 hours of participation courses and not more than 3 hours of either course. Minimum 4 hours, maximum, 7 hours

#### Group II

290 660	History of Broadcasting	3
290 665	R-TV Regulation and Responsibility	3
290 630	R-TV Programming	3
290 685	R-TV Management	3

Minimum 3 hours, maximum 9 hours

#### Group III

290 675	Broadcast Criticism	3
290 610	R-TV Drama Writing	3
290 615	R-TV Series Writing	3
290 620	R-TV Advertising	3

Minimum 3 hours, maximum 9 hours

#### Electives

Remaining hours in journalism and mass communications may include any 290 or 289 courses, provided the student does not exceed the maximum for Group I, II, or III. (Min 30 hrs, max 34 hrs within journalism and mass communications, 90 hrs outside journalism and mass communications)

### Agricultural Journalism Major

A specialized curriculum at the undergraduate level permits a student to earn a major in agricultural journalism by enrolling in the College of Agriculture and taking courses in the journalism department. See page 50 for details.

### Home Economics and Mass Communications Major

Students may enroll in the College of Home Economics and earn a major in home economics journalism by taking courses in the journalism department. See page 267 for details.

### Journalism Education

Students may satisfy requirements to teach journalism in public schools by either of the following programs: (1) B.A. or B.S. in the College of Arts and Sciences and teacher certification; (2) 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.

### Credit Through Quiz-Out

Any student may apply to test out of professional practice courses in journalism and mass communications by presenting to the department 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 department 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 Department of Journalism and Mass Communications will not honor an accumulation of credits in journalism and mass communications courses which consist of laboratory work only. The department 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 Reporting II, Editing I or Law of Mass Communications unless such work was taken at a college or university accredited in journalism by the American Council on Education for Journalism.

## Graduate Study

Graduate students in mass communications at Kansas State University may work toward the M.S. degree in journalism or the M.A. degree in radio-tv.

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 news-editorial, magazine, public relations, advertising and radio-tv production and management.

Many graduate students structure a specialized academic program which combines journalism or radio-tv with another interest area, such as agriculture, home economics, wildlife conservation or education.

Students whose undergraduate major is not in journalism or radio-tv may be admitted provisionally, with a requirement to complete basic undergraduate courses along with their graduate work. The number of remedial hours required varies. Previous course work and professional experience are considered. Students with no previous course work or professional experience may expect to take up to nine credit hours in the journalism program or 15 credit hours in the radio-tv program.

There are two options for completing the requirements for the master's degree in journalism or in radio-tv. The thesis option requires a total of 30 graduate credit hours, consisting of 24 graduate course credit hours and six credit hours for the thesis. The non-thesis option requires 36 hours of graduate course credits and written comprehensive examinations. Both options require a final oral examination.

The thesis option is primarily for students with a research interest or for students who enter the program after a number of years of professional experience. The non-thesis option is recommended for the student whose primary interest is professional practice or who does not have an undergraduate major in journalism or radio-tv.

Additional details are included in the department's "Guide to Graduate Study," available in the department office.

## Courses in Journalism

### Undergraduate Credit

**289 235. Survey of the Mass Media.** (3). Historical, social, legal and economic aspects of mass communications; current practices and responsibilities; role of newspapers, magazines, radio, television, motion pictures and other mass media in society, and their impact on world affairs. Not available for credit to junior and senior journalism majors. 289-235-0-0601

**289 250. 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 non-majors only. 289-250-1-0602

**289 275. Reporting I.** (3). Instruction in news gathering and reporting techniques. Pr.: Sophomore standing; ability to type 30 words a minute. 289-275-1-0602

**289 285. Reporting II (Print).** (3). Three hours rec. and six hours reporting for the **Kansas State Collegian** each week. Pr.: JMC 275. 289-285-1-0602

**289 310. Photography I.** (1-3). Basic camera and laboratory techniques of photography. 289-310-1-0602

**289 320. Principles of Advertising.** (3). An examination of the advertising field and its relationship to marketing and journalism. 289-320-0-0602

**289 330. Editing I.** (3). 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.: Consent of instructor or JMC 285. 289-330-1-0602

**289 335. Editing II.** (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 330 or consent of instructor. 289-335-1-0602

**289 355. Advertising Media.** (3). The selecting, scheduling, selling and buying of the various advertising media. Pr.: JMC 320. 289-355-0-0602

**289 360. 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. 289-360-2-0602

**289 399. Honors Seminar in Mass Communications.** (1-3). Pr.: Honors students only; consent of supervising instructor. 289-399-0-0601

### Undergraduate And Graduate Credit In Minor Field

**289 510. Yearbook Editing and Management.** (2). Planning, editing, layout, writing and financing a publication. 289-510-1-0602

**289 525. Journalism of Modern Living.** (3). Study of contemporary trends in community and family life reporting, emphasizing feature writing and creative editing. Pr.: JMC 275 or consent of instructor. 289-525-1-0602

**289 555. 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. 289-555-1-0602

**289 655. Photojournalism.** (3). II. The materials, principles and processes of photography directed toward visual reporting in newspapers, magazines and other media. The 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. 289-655-1-0602

### Undergraduate And Graduate Credit

**289 600. Public Affairs Reporting.** (3). Investigative reporting of local, state and national affairs. Pr.: JMC 285 or consent of instructor. 289-600-0-0602

**289 605. 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. 289-605-0-0602

**289 610. Interpretation of Contemporary Affairs.** (3). Critical questions of the day; interpretive articles and editorials which document and analyze the news; introduction to investigative reporting and research methods for depth reporting. Pr.: JMC 285 or consent of instructor. 289-610-0-0602



**289 615. Magazine Article Writing.** (3). Preparation of feature stories and articles; techniques of marketing, market analysis and publishing articles written in course. Pr.: JMC 285 or consent of instructor. 289-615-0-0602

**289 620. Magazine Production.** (3). The practical application of theory on the fields of writing, editing, graphic reproduction, layout, and management of magazines. Pr.: JMC 330 or consent of instructor. 289-620-0-0602

**289 625. Formation of Public Opinion.** (3). Role of interpersonal and mass communications information on public opinion. Practical survey experience. Pr.: Junior standing and consent of instructor. 289-625-0-0602

**289 630. Public Relations.** (3). Media, methods, principles, and practices of public relations. Pr.: Junior standing or consent of instructor. 289-630-0-0602

**289 635. Public Information Methods.** (3). Application of the principles of public relations to actual and hypothetical cases. Emphasis on communications techniques used in public relations. Pr.: JMC 630; consent of instructor. 289-635-0-0602

**289 640. Public Relations and Advertising Campaigns.** (3). The in-depth handling of an organization's public relations and advertising, including analyzing its situation, planning a program and developing the communications to be used. Pr.: JMC 320 or 630; senior standing; consent of instructor. 289-640-0-0602

**289 645. The Black Press in America.** (3). Consideration of the growth, development and current status of the Black press in the United States. 289-645-0-0602

**289 650. Newspaper Management.** (3). Relations of departments of a newspaper to one another; costs, statistics, advertising, news, and business methods in publishing. Pr.: 289-330. 289-650-0-0602

**289 660. 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 the social, economic and political forces. Pr.: Junior standing or consent of instructor. 289-660-0-0602

**289 665. Law of Mass Communications.** (3). A study of the legal system as it relates to the law of mass communications. Emphasis on defamation, privacy, copyright, obscenity, the courts, and other areas, as related to the mass media. Pr.: Senior standing or consent of instructor. 289-665-0-0601

**289 670. International Communications.** (3). Comparative study of world press systems and the role of communications in national development. 289-670-0-0601

**289 680. 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. 289-680-3-0602

**289 685. 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. 289-685-0-0602

**289 690. Problems in Mass Communications.** (1-4). Pr.: Background of courses needed for problem undertaken. 289-690-3-0602

**289 720. Seminar in the New Journalism.** (3). An examination of contemporary developments in reportage, counter culture journalism and other forms of alternative mass communications, with emphasis on new journalism practitioners and media outlets. Restricted to seniors and graduate students. 289-720-0-0602

**289 730. 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. Restricted to seniors and graduate students. 289-730-0-0601

**289 740. Colloquium in Mass Communications.** (1-3). Discussion of selected topics in mass communications research and practice. Restricted to seniors and graduate students. 289-740-0-0601

**289 750. Mental Health Information Seminar I.** (3). Survey of public attitudes toward mental illness and mass media's role in reporting. Pr.: For Fellows in Mental Health Mass Communications Program or consent of instructor. 289-750-0-0602

**289 755. Mental Health Information Seminar II.** (3). Examines specific issues in the mental health field (alcoholism, drug abuse, mental retardation, etc.) as they relate to the journalist in mental health communications. Pr.: For Fellows in Mental Health Mass Communications Program or consent of instructor. 289-755-0-0602

**289 760. Behavioral Science Reporting.** (3). Reporting and writing on problems of human behavior. Pr.: For Fellows in Mental Health Mass Communications Program or consent of instructor. 289-760-0-0602

**289 765. Communication Theory.** (3). An examination of major communication theories as they relate to individual, interpersonal, group and mass communications. 289-765-0-0601

**289 770. 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 285 or R-TV 330 and consent of supervising instructor. 289-770-2-0602

**289 780. Research Methods in Mass Communications.** (3). Survey of research methods used in the study of the mass media. 289-780-0-0602

#### Graduate Credit

**289 899. Research in Mass Communications.** (Var.) Pr.: Registration in the Graduate School and sufficient training to carry on the line of research undertaken. 289-899-4-0602

## Courses in Radio and Television

### Undergraduate Credit

**290 240. Fundamentals of Radio-Television Production.** (3). Basic training in radio and television production and the economic and social impact of the radio-television industry. Two hours lec. and two hours lab. per week. Required of all students with R-TV concentration. 290-240-1-0603

**290 250. Fundamentals of Radio-Television Performance.** (3). Basic training in non-dramatic radio and television performance. Includes study for FCC 3rd Class radio-telephone permit. Two hours lec. and two hours lab. per week. Required of all students with R-TV concentration. 290-250-1-0603

**290 260. Radio-Television Continuity.** (3). Study of forms and the preparation of non-dramatic scripts for various types of broadcast programs. Required of all students with R-TV concentration. Pr.: R-TV 240. 290-260-0-0603

**290 330. Reporting II (Radio-Television).** (3). Practical experience in gathering, writing, editing and presenting news for KSDB-FM and cable television, and study of current issues in radio-television news. Pr.: JMC 275, R-TV 240. Required of all students with R-TV concentration. 290-330-1-0603

**290 355. KSDB-FM Participation.** (1). Supervised performance in the operation of the University's student FM radio station. Pr.: R-TV 240, 250 or consent of instructor. 290-355-5-0603

**290 375. Cable Television Participation.** (1). Supervised participation in program origination for cable television. Pr.: R-TV 240, 250 or consent of instructor. 290-375-2-0603



## Undergraduate And Graduate Credit

**290 610. Radio-Television Drama Writing.** (3). Study of the principles and preparation of dramatized broadcast programs. Pr.: R-TV 240, 250 for JMC majors. 290-610-0-0603

**290 615. Radio-Television Series Writing.** (3). Development of complete scripts for series of documentary and anthology broadcast programs. Pr.: R-TV 240, 250 for JMC majors. 290-615-0-0603

**290 620. Radio-Television Advertising.** (3). Study of the principles and practices in broadcast advertising and development of radio-television promotion and advertising campaigns. Pr.: R-TV 240, 260 for JMC majors. 290-620-0-0603

**290 630. Radio-Television Programming.** (3). Study of the principles, planning and development of radio-television programs and schedules. Pr.: Junior or senior standing. 290-630-0-0603

**290 640. Advanced Radio Production.** (3). Theory and practice of radio remotes, automation and multi-channel recording and editing in the production of commercials, dramatic narrative and documentary programs. Pr.: R-TV 240, 260. 290-640-1-0603

**290 650. Advanced Television Production.** (3). Theory of computer-generated visuals, color television and specialized television recording techniques, and practice of dramatic production from the viewpoint of directors, producers and performers. Pr.: R-TV 240, and either R-TV 610, or R-TV 615 for JMC majors. 290-650-1-0603

**290 660. History of Broadcasting.** (3). History of the radio-television industry; its effects on American life; the economic, political and social significance of broadcasting. Pr.: Junior standing. 290-660-0-0603

**290 665. Radio-Television Regulation and Responsibility.** (3). A study of the major laws and legal decisions which affect broadcasting and cable. Primary attention given to the Communications Act and the Federal Communications Commission's Rules and Regulations; other laws relating to broadcasting and cable management considered. Pr.: Junior standing. 290-665-0-0603

**290 675. Radio-Television Criticism.** (3). Study of the principles and criteria of mass media criticism, with emphasis on those considerations unique to broadcasting. Pr.: Senior standing. 290-675-0-0603

**290 685. Radio-Television Management.** (3). Study of the practices and problems of broadcast station and cable facility management, with special attention to sales organization theory. Pr.: Senior standing, minimum of one hour each in R-TV 355, R-TV 375. 290-685-0-0603

**290 750. Radio-Television Research.** (3). Study and application of radio-television research, its literature and methodology. Pr.: Minimum of 15 hours of completed course work, or concurrent enrollment, in JMC; consent of instructor. 290-750-0-0603

## MATHEMATICS

*John E. Maxfield,\* Head of Department*

Professors Chawla,\* Dixon,\* Fuller,\* Hsu,\* Kirmser,\* Lee,\* Marr,\* Maxfield,\* T. Parker,\* Stamey,\* Stromberg,\* Yee,\* and Young,\* Associate Professors Burckel,\* Curtls,\* Dressler,\* Greechie,\* Logan,\* F. Miller,\* Pigno,\* Sloat, and Strecker,\* Assistant Professors Herman,\* Muenzenberger,\* W. Parker,\* Summerhill,\* and Williams.\* Emeritus: Professors Babcock\* and White,\* Associate Professors Janes and Mossman,\* Instructor Woldt.

## Undergraduate Study

For credit by examination in College Algebra, Trigonometry and Calculus, see page 7.

All mathematics majors are expected to take a course in Symbolic Logic in the Philosophy Department, Stat. 510 in the Statistics Department and Math. 220, 221, 222, and 240 or 225, 226, 250, and 251.

**The Pre-Graduate Program.** This degree will prepare students who intend to enter graduate school to work toward an advanced degree in either pure or applied mathematics.

(1) Major requirement of 21 hours in mathematics numbered 400 and above. The recommended courses to be included in these 21 hours are:

Math 512, 513	Intro. to Modern Algebra I, II	6
Math 601, 602	Elem. Topology I, II	6
Math 703	Intro. to Linear Algebra	3
Math 621, 622	Analysis I, II	6
		<hr/> 21

(2) In addition to the above at least 12 more hours numbered 600 and above are strongly recommended; Math 708, Set Theory and Math. 704, Introduction to the Theory of Groups, should be included if at all possible.

(3) The student should include Chemistry I and II and General or Engineering Physics I and II if interested in applied mathematics. The student should study at least one foreign language as a research tool for graduate work. These languages should be chosen from French, German, and Russian.

**The Mathematics Education Program.** This degree program is designed for students who want to become secondary school teachers and includes the requirements for the teaching certificate.

(1) Major requirement of 21 hours of courses in mathematics numbered 400 and above. The recommended courses to be included in these 21 hours are:

Math. 717	The Real Number System	3
Math. 511	Intro. to Algebraic Systems	3
or		
Math. 512	Modern Algebra I	3
Math. 572	Modern Geometry	3
Math. 619	Found. of Analysis	3
Math. 791	Topics in High School Math	3
		<hr/> 15

In addition, six hours of electives should be selected from:

Math. 513	Modern Algebra II	3
Math. 612	Finite Applications of Mathematics	3
Math. 590	History of Mathematics	3

For students who expect to enter a graduate school the following courses are appropriate to their program:

Math. 601, 602	Elementary Topology I, II
Math. 703	Intro. to Linear Algebra
Math. 704	Intro. to Theory of Groups
Math. 621, 622	Analysis I, II



(2) Each student should elect at least one course in physics as a part of the general education science requirement and one course in computer programming is recommended.

(3) The professional educational requirements to be certified to teach in the State of Kansas are to be completed as a part of this degree program. These are:

(a) Make application to and be accepted as part of the teacher training curriculum. (See College of Education for requirements.)

(b)

Psych. 110	General Psychology
A&F 215, 315	Educational Psychology I, II
C&I 451	Principles of Secondary Education
C&I 476	Methods of Training in Secondary Schools
C&I 586	Teaching Participation in Secondary Schools
A&I 611	Educational Sociology
C&I 316	Introduction to Instructional Media

(c) Complete general education requirements of the College of Education.

**Bachelor's Degree Program for Industry.** Students desiring to enter industry upon earning a bachelor's degree in mathematics should, in the lower division years, complete the calculus sequence (Math. 221-223, 240 or Math. 225, 226, 250, 251) and acquire some proficiency in computer programming. It is also recommended that students take a course in probability and statistics (Stat. 510) and a course in vector analysis (Math. 514). In the junior year, students should take advanced calculus (Math. 553, 554). To fulfill degree requirements, in upper division years the following courses are highly recommended:

Math. 550	Introduction to Complex Analysis	3
Math. 551	Applied Matrix Theory	3
Math. 552	Orthogonal Functions and Elementary Partial Differential Equations	3
Math. 555	Numerical Analysis	3
Math. 640-641	Ordinary Differential Equations I, II	6

For additional courses, or as substitutes to the courses in this list, the student may take the following courses:

Math. 512-513	Introduction to Modern Algebra I, II	6
Math. 621-622	Analysis I, II	6
Math. 703	Linear Algebra	3
Math. 713-714	Theory of Matrices I, II	6
Math. 761-762	Advanced Numerical Analysis I, II	6
Math. 780-781	Numerical Solutions to Ordinary and Partial Differential Equations I, II	6

It is recommended that the student also take at least six-hours upper division courses outside the Mathematics Department; these courses ought to be in the area, or areas, of applications in which the student is interested (e.g., engineering, physics, statistics, computer science, or others).

## Graduate Study

The Department of Mathematics offers work in mathematics which may lead to a master's or a doctor's degree. Admission as a graduate student does not imply admission to candidacy for 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. The general requirements for advanced degrees are given on page 32. Information on special requirements for an advanced degree may be obtained by writing to the Department of Mathematics.

Any course will be offered any term on the request of a sufficient number of students. Information concerning courses offered during the summer term may be obtained by writing to the department.

## Courses in Mathematics

### Undergraduate Credit

**245 010. Intermediate Algebra.** (3) I, II, S. Review of elementary algebra; topics preparatory to Math. 100. Pr.: One unit of high school algebra. 245-010-0-1701

**245 100. College Algebra.** (3) I, II, S. Pr.: Plane geometry and satisfactory placement test score in algebra. Students with 1 1/2 entrance units of algebra should normally be eligible for this course. 245-100-0-1701

**245 110. 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. 245-110-0-1701

**245 120. Elementary Cryptanalysis.** (3). An introduction to the standard ciphers and their solutions; consideration of historically important ciphers and messages. Pr.: Math. 100. 245-120-0-1701

**245 149. Functional Trigonometry.** (2). Interim sessions only. A special functional trigonometry course emphasizing trigonometric identities. The course is intended as special preparation for calculus. Pr.: 1 1/2 units of high school algebra. 245-149-0-1701

**245 150. Plane Trigonometry.** (3) I, II, S. Pr.: Plane geometry and 1 1/2 units of high school algebra. 245-150-0-1701

**245 210. Technical Calculus.** (5) I, II. A condensed course in analytic geometry, differential and integral calculus with an emphasis on applications. Pr.: Math. 100, 150, or two years of high school algebra and one semester of trigonometry. 245-210-0-1701

**245 220. Analytic Geometry and Calculus I.** (4) I, II, S. Analytic geometry, differential and integral calculus of polynomials. Pr.: Math. 100, 150, or two years of high school algebra and one semester of trigonometry. 245-220-0-1701

**245 221. Analytic Geometry and Calculus II.** (4) I, II, S. Cont. of Math. 220 to include transcendental functions. Pr.: Math. 220. 245-221-0-1701

**245 222. Analytic Geometry and Calculus III.** (4) I, II, S. Cont. of Math. 221 to include functions of more than one variable. Pr.: Math. 221. 245-222-0-1701

**245 224. Elements of Applied Linear Analysis.** (3) I, II, S. A survey of mathematical techniques useful in the solution of problems arising in engineering and scientific analysis. Pr.: Math. 221, co-requisite, Math. 222. 245-224-0-1703

**245 225. 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. 220-222. Pr.: Consent of department. 245-225-0-1701

**245 226. Analytic Geometry and Calculus II-S.** (6) II. Continuation of Math. 225 to include transcendental functions. Pr.: Math. 225. 245-226-0-1701



**245 240. Series and Differential Equations.** (4) I, II, S. Convergence of series, expansions in series, solutions of elementary differential equations, with applications. Pr.: Math. 222. 245-240-0-1701

**245 250. Linear Algebra and Differential Equations I.** (3) I. An integrated introduction to linear algebra and differential equations. Pr.: Math. 226 or consent of department. 245-250-0-1701

**245 251. Linear Algebra and Differential Equations II.** (3) II. Continuation of Math. 250. Pr.: Math. 250 or consent of department. 245-251-0-1701

**245 399. Seminar in Mathematics.** (Var.) On sufficient demand. Primarily for Honors Students. Pr.: Consent of instructor. 245-399-3-1701

**245 499. 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. 245-499-3-1701

### Undergraduate And Graduate Credit In Minor Field

**245 500. Introduction to Analytic Processes.** (3) I, II, S. Some topics in differentiation, integration, linear algebra, matrices and linear programming, with applications. Pr.: Two years high school or college algebra, elements of statistics. Not open to students having credit in Math. 220. 245-500-0-1701

**245 501. 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. 245-501-0-1701

**245 505. Mathematical Foundations for Economics.** (3) II. Geometric and algebraic theory behind the simplex method, the mathematical structure of the theory of networks and flows, and related topics. Pr.: Math. 500 or 501 or its equivalent. 245-505-0-1701

**245 506. Advanced Analytic Processes.** (3) I, II. Partial differentiation and maximum-minimum of functions of two variables with applications. Integration, matrices and matrix algebra with business application. Not open to students having credit in Math. 221. Pr.: Math. 500. 245-506-0-1701

**245 508. 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. 245-508-0-0833

**245 509. Intuitive Geometry.** (2) S. Measurement, triangles, quadrilaterals, nonmetric geometry, similarity, volumes, elementary coordinate geometry. Pr.: Consent of instructor. 245-509-0-1701

**245 511. 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. 245-511-0-1701

**245 512. Introduction to Modern Algebra I.** (3) I, II. Basic concepts in the theory of numbers, groups, rings, integral domains, and fields. Pr.: Math. 220 and 225 or graduate standing. 245-512-0-1701

**245 513. Introduction to Modern Algebra II.** (3) II. Cont. of Math. 512. Pr.: Math. 512. 245-513-0-1701

**245 514. 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. 245-514-0-1703

**245 550. 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. 245-550-0-1703

**245 551. Applied Matrix Theory.** (3) I, II. Matrix algebra, systems of linear equations, vector spaces and functions on vector spaces, approximation techniques for the eigenvalue problem and matrix inversion. Pr.: Junior standing. 245-551-0-1703

**245 552. Orthogonal Functions and Elementary Partial Differential Equations.** (3) I. Orthogonal functions, Fourier Series, boundary value problems in partial differential equations. Pr.: Math. 240 or 250. 245-552-0-1703

**245 553. Advanced Calculus I.** (3) I. Continuous functions, law of mean, functions of several variables, Riemann-Stieltjes integral, infinite series, uniform convergence, Fourier Series and integrals and applications. Pr.: Math. 222 or 226. 245-553-0-1701

**245 554. Advanced Calculus II.** (3) II. Continuation of Advanced Calculus I. Pr.: Math. 553. 245-554-0-1701

**245 555. Numerical Analysis.** (3) I, II. Solution of algebraic and transcendental equations, with emphasis on linear algebraic systems. Introduction to linear programming. Interpolation and curve fitting. Numerical differentiation and integration with an introduction to methods for solving ordinary differential equations. Pr.: Math. 240 or 250, 551. 245-555-0-1701

**245 570. History of Mathematics.** (3) II in alt. years. Cannot be used as part of the advanced mathematics needed by mathematics majors. Pr.: Math. 220 or 225. 245-570-0-1701

**245 572. Modern Geometry.** (3). Concepts of Euclidean geometry including distance and congruence, separation, geometric inequalities, congruence with distance, similarity, area, consistency of Euclidean geometry; brief treatment of Lebesgue and Riemannian geometries. Pr.: Math. 221 or 226. 245-572-0-1701

**245 575. 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. 245-575-0-1701

**245 601. Elementary Topology I.** (3) I. Introduction to axiomatic topology including a study of compactness, connectedness, local properties, cardinal invariants and metrizability. Pr.: Math. 240 or 250. 245-601-0-1701

**245 602. Elementary Topology II.** (3) II. Cont. of Math. 601. Pr.: Math. 601. 245-602-0-1701

### Undergraduate And Graduate Credit

**245 612. Finite Applications of Mathematics.** (3) S. Consideration of applications of set theory, matrix algebra, linear programming and graph theory that can be illustrated in the secondary school classroom. 245-612-0-1701

**245 619. 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. 245-619-0-1701

**245 620. Intermediate Analysis.** (3). A brief review of some of the properties of the real number system, limits of functions of a single real variable, theorems on continuity, Rolle's Theorem, mean value theorem with some of its consequences, and theorem on integration. Pr.: Math. 222 or 226. 245-620-0-1701

**245 621. 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. 245-621-0-1701

**245 622. Analysis II.** (3) I, II. Function spaces, Stone-Weierstrass Theorem, Ascoli Theorem, series, introduction to Lebesgue measure. Pr.: Math. 621. 245-622-0-1701



- 245 640. Ordinary Differential Equations I.** (3) On sufficient demand. First-order equations, second-order linear equations, autonomous systems, stability, Liapunov's method, Fuchsian equations, Sturm-Liouville equations and expansions in eigenfunctions, Green's Functions, Floquet theory, non-linear equations, perturbation techniques, the WKB and Langer asymptotic theory. Pr.: Math. 240, 550. 245-640-0-1703
- 245 641. Ordinary Differential Equations II.** (3) On sufficient demand. Continuation of Math. 640. Pr.: Math. 640. 245-641-0-1703
- 245 671. Projective Geometry.** (3) I. Affine spaces, Euclidean spaces, projective spaces, coordinizations, duality principle, geometric lattices, classifications, subgeometries of projective geometry (especially non-Euclidean geometries). Pr.: Math. 513. 245-671-0-1701
- 245 701. Set Theory and Logic.** (2-3). Basic set theory, cardinal and ordinal numbers, axiom of choice, transfinite induction, symbolic logic, tautologies, universal and existential quantifiers, propositional and predicate calculus, arguments, deductive systems. Pr.: Math. 511 or consent of department. 245-701-0-1701
- 245 703. 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. 245-703-0-1701
- 245 704. Introduction to the Theory of Groups.** (3) II. Introduction to abstract group theory; to include permutation groups, homeomorphisms, direct products, Abelian groups. Jordan-Holder and Sylow theorem. Pr.: Math. 513. 245-704-0-1701
- 245 706. Theory of Numbers.** (2-3) II in alt. years. Divisibility properties of integers, prime numbers, congruences, multiplicative functions. Pr.: Math. 221 or 226. 245-706-0-1701
- 245 708. Set Theory.** (3) I. Set theory; functions, relations and orderings; ordinal and cardinal numbers; transfinite induction; axiom of choice. Pr.: Math. 511 or consent of department. 245-708-0-1701
- 245 710. Introduction to Category Theory.** (3) II. Categories, duality, functors, natural transformations, functor categories, comma categories, universal arrows, products, limits, Yoneda's Lemma, Freyd's Adjoint Functor Theorem. Pr.: Consent of instructor. 245-710-0-1701
- 245 713. Theory of Matrices I.** (3). The algebra of vectors and matrices, functions of vectors and matrices, similarity and the eigenvalue problem, numerical methods associated with matrices and tensor algebra. Pr.: Math. 511 or 512 or graduate standing. 245-713-0-1701
- 245 714. Theory of Matrices II.** (3) II. Cont. of Math. 713. Pr.: Math. 713. 245-714-0-1701
- 245 717. 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. 245-717-0-1701
- 245 723. Analysis III.** (3) II in alt. years. Calculus on normed vector spaces, functions of several real variables, inverse and implicit function theorems, basic existence theorems for differential equations, multiple integrals. Pr.: Math. 621. 245-723-0-1701
- 245 724. Analysis IV.** (3) II in alt. years. Calculus on manifolds, differential forms, Stokes' Theorem, vector bundles, Riemannian metrics, differential operators. Pr.: Math. 723. 245-724-0-1701
- 245 740. 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. 622 or equivalent. 245-740-0-1701
- 245 750. Fourier Series.** (3) On sufficient demand. Trigonometric Fourier Series, general orthogonal expansions, convergence and summability, multiple Fourier series, Fourier integrals and transforms. Pr.: Math. 621, 622. 245-750-0-1701
- 245 752. Tensor Analysis.** (3) I every third year. Multilinear algebra, differentiable manifolds, differential forms and tensor fields, exterior differentiation, integration of forms and Stokes' theorem, Frobenius theorem, covariant differentiation, Riemannian connections. Pr.: Math. 513, 622. 245-752-0-1701
- 245 761. Advanced 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 552, 554. 245-761-0-1701
- 245 762. Advanced Numerical Analysis II.** (3) II. Continuation of Math. 761. Pr.: Math. 761. 245-762-0-1701
- 245 766. Partial Differential Equations of Mathematical Physics I.** (3) I. Derivation of the three types of linear second order partial differential equations of mathematical physics; the Cauchy-Kovalevsky theorem. The potential equation, the heat equation, and the wave equation, the hyperbolic equations and the hyperbolic systems, elliptic equations, and the parabolic equations. 245-766-0-1701
- 245 767. Partial Differential Equations of Mathematical Physics II.** (3) II. Continuation of Math. 766. Pr.: Math. 766. 245-767-0-1701
- 245 771. Transformation and Vector Geometry.** (3) I. Concepts of transformations and vectors and their applications to Euclidean Geometry. Pr.: Math. 572. 245-771-0-1799
- 245 772. 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. 245-772-0-1701
- 245 773. Foundations of Geometry.** (3). Euclid's parallel postulate, non-Euclidean geometries, incidence, affine geometries, order congruence, continuity. Pr.: Math. 572. 245-773-0-1701
- 245 780. Numerical Solution of Ordinary Differential Equations.** (2) I. (Concurrent with Computer Science 780). One-step and multi-step methods for initial value problems. Stability, consistency and convergence of these methods. Stiff equations and boundary value problems. Pr.: One C.S. Language Lab. and Math. 555 or C.S. 480, Math. 240 plus concurrent enrollment in C.S. 780. 245-780-0-1701
- 245 781. Differentiable Manifolds I.** (3). I in alt. years. Differentiable structures, tangent bundles, tensor bundles, vector fields and differential equations, integral manifolds, differential forms, introduction to Lie groups. Pr.: Math. 578, Math. 772, or consent of instructor. 245-781-0-1701
- 245 782. Differentiable Manifolds II.** (3). II in alt. years. Fibre bundles, theory or connections, linear and affine connections, Riemann manifolds, submanifolds of Riemann manifolds, complex manifolds. Pr.: Math. 781. 245-782-0-1701
- 245 785. Numerical Solution of Partial Differential Equations.** (2) II. (Concurrent with Computer Science 785). Formulation of difference equations and treatment of boundary conditions. Discretization and round-off errors. Stability. Relaxation, alternating direction, and strongly implicit iterative methods. Variational and projection methods. Pr.: Math. 780 and C.S. 780 plus concurrent enrollment in C.S. 785. 245-785-0-1701
- 245 791. 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. 245-791-0-0833



### Graduate Credit

**245 810. Higher Algebra I.** (3) I. Theory of groups, theory of rings and ideals, polynomial domains, theory of fields and their extensions. Pr.: Math. 513. 245-810-0-1701

**245 811. Higher Algebra II.** (3) II. Cont. of Math. 810. Pr.: Math. 810. 245-811-0-1701

**245 821. Real Analysis I.** (3) I. Measurability, integration theory, regular Borel measures, the Riesz representation theorem, and Lebesgue measure in Euclidean spaces. Pr.: Math. 622. 245-821-0-1701

**245 822. Real Analysis II.** (3) II. The LP-spaces, Banach spaces, and Hilbert spaces, complex measures and the Radon-Nikodym theorem, the Fubini theorem on double integration, and differentiation. Pr.: Math. 821. 245-822-0-1701

**245 825. 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. 245-825-0-1701

**245 826. Complex Analysis II.** (3) II. Analytic continuation, the Picard theorem, HP-spaces, elementary theory of Banach algebra, the theory of Fourier transforms, and the Paley-Wiener theorems. Pr.: Math. 825. 245-826-0-1701

**245 852. Functional Analysis I.** (3) I in alt. years. Topics to be selected from linear topological spaces, semi-normed 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. 245-852-0-1701

**245 853. Functional Analysis II.** (3) II in alt. years. Cont. of Functional Analysis I. May be repeated for credit. Pr.: Math. 852. 245-853-0-1701

**245 871. 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. 602. 245-871-0-1701

**245 872. 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. 245-872-0-1701

**245 889. Combinatorial Analysis.** (3) II in alt. years. Permutations, combinations, inversion formulae, generating functions, partitions, finite geometries, difference sets, and other topics. Pr.: Consent of instructor. 245-889-0-1701

**245 897. 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. 245-897-2-0833

**245 898. Topics In Mathematics.** (Var.) I, II, S. Pr.: Background of courses needed for topic undertaken and consent of instructor. 245-898-4-1701

**245 899. Thesis Topics.** (Var.) I, II, S. 245-899-4-1701

**245 900. Practicum In Mathematics.** (3) I, II. Techniques of presentation of mathematical material at the university level. May be repeated for credit. Pr.: Consent of department. 245-900-2-1701

**245 914. Lattice Theory I.** (3) I in alt. 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. 245-914-0-1701

**245 915. Lattice Theory II.** (3) II in alt. years. Cont. of Math. 914. Pr.: Math. 914. 245-915-0-1701

**245 925. Banach Algebra I.** (3) I in alt. years. Basic Gelfand Theory, function algebras, numerical range, \*-algebras,  $B^*$ - and von Neumann algebras. Pr.: Consent of instructor. 245-925-0-1701

**245 926. Banach Algebra II.** (3) II in alt. years. Continuation of Math. 925. Pr.: Math. 925. 245-926-0-1701

**245 971. Algebraic Topology I.** (3) I. Homotopy groups, covering spaces, fibrations, homology, general cohomology theory and duality, homotopy theory. Pr.: Math. 811 and 872. 245-971-0-1701

**245 972. Algebraic Topology II.** (3) II. Cont. of Algebraic Topology I. Pr.: Math. 971. 245-972-0-1701

**245 991. Topics in Algebra.** (3) On sufficient demand. Selected topics in modern algebra. May be taken more than once for credit. Pr.: Consent of instructor. 245-991-0-1701

**245 992. Topics in Analysis.** (3) On sufficient demand. Selected topics in modern analysis. May be taken more than once for credit. Pr.: Consent of instructor. 245-992-0-1701

**245 993. 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. 245-993-0-1701

**245 994. 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. 245-994-0-1701

**245 995. 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. 245-995-0-1701

**245 996. 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. 244-996-0-1701

**245 999. Research in Mathematics.** (Var.) I, II, S. Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor. 245-999-4-1701

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## MILITARY SCIENCE

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*Charley A. Carver, Head of Department*

Assistant Professors Cullen, Jones, McNeill, and Owens; Instructors Olmstead and Vovk.

The Army Reserve Officers Training Corps (AROTC) program is open to all university students. The military science courses are credit-awarding courses and credits are applicable to any degree as elective credits. Cadets may pursue any curriculum offered by the university.

The military science curriculum is separated into two elements: (1) a basic course, normally completed during freshman and sophomore years, and (2) an advanced course oriented toward junior and senior years. Students who satisfy prerequisites and requirements of the advanced course receive commissions as second lieutenants in the U.S. Army along with their baccalaureate degrees. Texts and other materials required in ROTC courses are provided without cost.

### Basic Course

Enrollment in the basic course permits an objective look at the army as a possible career or pre-career employment field without assuming any military obligation. Students receive one credit hour for each of four semesters offered. Class participation each week includes one hour of recitation and one hour of leadership laboratory.



### Advanced Course

Prerequisites for admittance to the advanced course may be satisfied in a number of ways: (1) completion of the basic course, (2) attendance at a basic course summer camp prior to enrollment as a junior, (3) three or more years of junior (high school level) ROTC, or (4) prior military service. Juniors accepted into the advanced course agree to complete the curriculum and to accept an army commission concurrently with the University degree. Each advanced course cadet receives \$100 per month during the school year in return for this agreement. Juniors and seniors attend three hours of recitation and one hour of leadership laboratory each week for which they receive three credit hours each semester. A six-week summer camp, with pay, is an integral part of the advanced course and normally is completed between the junior and senior years. Selected cadets are offered the option of substituting army ranger training for the regular summer camp. Parachute training is available to advanced course cadets on a voluntary basis.

### Summer Camp

A six-week basic course summer camp is available as part of the two-year program. This program is designed to allow ROTC participation by community college transfer students who were unable to take the basic course, and graduate degree candidates who require at least two years for post-graduate curriculum completion. Application for admittance to the two-year program should be made to the Military Science Department by sophomores early in the spring semester. Satisfactory completion of the basic course summer camp earns four hours of academic credit and meets all prerequisites for entry into the advanced course. The summer camp in itself does not incur any military obligation.

### Discharge of Duty

Current army regulations provide that ROTC graduates may discharge their military obligation in one of two ways: (1) three years active duty, or (2) three months active duty with a balance of five years and nine months (six years total) with Army Reserve or National Guard organizations. Preferences indicated by the graduate for a particular form of service are normally respected; however, existing needs of the army will prevail in event of conflict.

### Scholarships

The army provides one-, two-, three- or four-year scholarships to selected high school and college students. These scholarships provide full tuition and fees, up to \$150 a year for books and required supplies, and pay the student a subsistence of \$100 per school month. Four-year scholarships are available to high school seniors who apply during their fall semester. The remaining scholarships are available, on a competitive basis, to all students enrolled in ROTC. These scholarships, applied for during the spring semester, become effective the following fall.

### Extracurricular Organizations

The department sponsors a number of voluntary personal enrichment organizations which engage

primarily in professional or community service activities. A wide range of functions includes such things as competition and trick drill teams, traffic assistance at University sporting events, varsity and ROTC rifle teams, United Way campaign support and Bloodmobile support. Students desiring additional information on these organizations are invited to contact the department.

### Recommended Courses

In recognition of leadership's many facets, the department recommends but does not require students enrolled in ROTC to select from a number of University course offerings which complement the leadership program. These include: Computer Science 200; History 561, 562, 741, 743 and 745; Political Science 110; Psychology 435 and 550; Geography 100; and Business Administration 420. Scholarship cadets are required to complete History course 241 513, Battles and Leaders, as an additional elective. All non-scholarship cadets are encouraged to take this course.

### Basic Course

#### Undergraduate Credit

**249 100. Military Science 1A.** (1) I, II. Introduction to Army ROTC; history and mission of the Army; and customs and courtesies of the Army. One hour rec. and one hour leadership lab. each week; no prerequisites. 249-100-0-1801

**249 102. Military Science 1B.** (1) II. Basic riflery and introduction to small unit tactics. One hour rec. and one hour leadership lab. each week; no prerequisites. 249-102-0-1801

**249 200. Military Science 2A.** (1) I. Leadership theory, the leader, the group, needs, motivation, leadership lab. One hour rec. and one hour leadership lab. each week. Pr.: Completion of M.S. I or instructor's permission. 249-200-0-1801

**249 202. Military Science 2B.** (1) II. Military geography, map reading and aerial photograph reading, leadership lab. One hour rec. and one hour leadership lab. each week. Pr.: Completion of M.S. I or instructor's permission. 249-202-0-1801

**249 250. 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, meet the physical standards, and permission of the professor of military science. 249-250-0-1801

### Advanced Course

#### Undergraduate Credit

**249 300. Military Science 3A.** (3) I. Advanced leadership and management, methods of instruction, leadership lab. Three hours rec. and one hour leadership lab. each week. Pr.: Completion of M.S. I and M.S. II or acceptable equivalent. 249-300-0-1801

**249 302. Military Science 3B.** (3) II. Branches of the Army, military communications, small unit tactics, preparation for summer camp, leadership lab. Three hours rec. and one hour leadership lab. each week. Pr.: Completion of M.S. I and M.S. II or acceptable equivalent. 249-302-0-1801

**249 400. Military Science 4A.** (3) I. Administrative/staff operations and procedures, strategic analyses, leadership lab. Three hours rec. and one hour leadership lab. each week. Pr.: Completion of M.S. III. 249-400-0-1801

**249 402. Military Science 4B.** (3) II. Administrative/staff operations and procedures (cont.), military law, career planning, leadership lab. Three hours rec. and one hour leadership lab. each week. Pr.: Completion of M.S. III. 249-402-0-1801



## MODERN LANGUAGES

Robert L. Coon, Head of Department

Professor Coon;\* Associate Professors Beeson\* and Gonzalez-del-Valle;\* Assistant Professors Alexander, Bulmahn, Collins,\* Dehon,\* Kolonosky,\* McGraw, Mendenhall,\* C. Miller,\* Ossar,\* Shaw,\* Smith, and Tunstall; Instructor Driss. Emeritus: Professor Moore;\* Associate Professors Munro\* and Pettis.\*

### Undergraduate Study

All courses in the department are offered to non-majors on a credit or credit/no credit basis.

Students majoring in languages should enroll for the Bachelor of Arts degree.

For a minor, 18 hours in a single language at college level are required.

Within the modern language major, French, German, Spanish, and Linguistics 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 their chosen language, plus three literature courses above the level of 700.

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.

The attention of the student preparing for graduate school or for high school teaching is directed to the corollary courses: 681 and 780. Six hours of history in the country of the student's major language interest is 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 their 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.

### Graduate Study

In modern languages, the degree Master of Arts is offered in the fields of French, German, Spanish and Linguistics. General requirements for the Master of Arts degree can be found under the Graduate School section in 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 on page 95.

The Department of Modern Languages co-sponsors the *Journal of Spanish Studies: Twentieth Century*, a national literary journal, publishes *Studies in Twentieth Century Literature*, and is the home of *Anales de la novela de posguerra* and the Society of Spanish and Spanish-American Studies.

### Programs Abroad

The Department of Modern Languages sponsors summer study programs in both Paris and Mexico City, and cooperates in German programs in Eutin and Holzkirchen. All inquiries should be addressed to the head of the department.

## Courses with Readings and Lectures in English

### Undergraduate Credit

**253 250. 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 241 250. 253-250-0-1307

### Undergraduate And Graduate Credit In Minor Field

**253 501. Classical Literature in Translation.** (3). Selected readings in English from the works of such major classical authors as Homer, Euripides, Vergil, Horace and Terence. 253-501-0-1110

**253 502. 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. 253-502-0-1102

**253 503. 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. 253-503-0-1103

**253 504. Russian Literature in Translation: the 19th Century.** (3). Survey of principal writers of Tsarist Russia with emphasis upon Turgenev, Dostoevsky, Tolstoy and Chekhov. 253-504-0-1106

**253 505. 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. 253-505-0-1105

**253 507. European Literature in Translation.** (3). Selected readings in English from the major authors of Europe and the Spanish-speaking world. 253-507-0-1505

**253 508. Russian Literature in Translation: the Soviet Period.** (3). The development of Russian literature since the Revolution, with emphasis upon Mayakovsky, Sholokhov, Pasternak and Solzhenitsyn. 253-508-0-1106

**253 509. Religious Literature of South Asia.** (3). Readings in translation from ancient and medieval Hindu, Buddhist, Jain and other religious texts. 253-509-0-1113

**253 516. 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. 253-516-0-1102

## FRENCH

### Undergraduate Credit

**253 001. Orientation for Summer School Program in Paris.** (0). 253-001-0-1102

**253 101. French for Reading Knowledge I.** (3). The grammar and syntax of French and the reading of basic material from French texts in the humanities, sciences and social sciences. Not a prerequisite for Mod. L. 112. 253-101-0-1102

**253 102. French for Reading Knowledge II.** Continued reading of selected French texts. Not considered as prerequisite for Mod. L. 211. Pr.: Mod. L. 101 or equiv. 253-102-0-1102

**253 109. French II.** (1). Language laboratory. Optional for students taking French I. Concurrent enrollment in French I required. For credit/no credit only. 253-109-0-1102

**253 110. French III.** (1). Language laboratory. Optional for students taking French II. Concurrent enrollment in French II required. For credit/no credit only. 253-110-0-1102



**253 111. French I.** (4). Introduction to the structure of modern French, emphasizing the spoken language with practice in the language laboratory. 253-111-0-1102

**253 112. French II.** (4). Continuation of French I, completion of basic presentation of the structure of French. Emphasis on spoken language, use of language laboratory. Pr.: Mod. L. 111 or equiv. 253-112-0-1102

**253 113. Intensive French I, II.** (8). A concentrated study designed to provide the student with a basic working knowledge of French grammar and conversation in a single semester. Equivalent to French I and II. Pr.: Open to all students with consent of the instructor. 253-113-0-1102

**253 211. French III.** (4). Intensive review of the structure of the French language. Reading and discussion of French prose. Pr.: Mod. L. 112 or equiv. 253-211-0-1102

**253 212. Elementary French Conversation IIIA.** (2). Course not open to fluent speakers of French. Normally to be taken concurrently with French III. Pr.: Mod. L. 112 or equiv. 253-212-0-1102

**253 213. French IV.** (3). Reading and discussion of modern French prose and review of the more difficult points of French grammar. Pr.: Mod. L. 211 or equiv. 253-213-0-1102

**253 214. French Conversation IVA.** (2). Continued practice in conversational French. Not open to fluent speakers of French. Normally to be taken concurrently with French IV. Pr.: Mod. L. 211 or equiv. 253-214-0-1102

#### Undergraduate And Graduate Credit In Minor Field

**253 511. Survey of French Literature I.** (3). The reading and discussion of French literature from the Middle Ages to the end of the eighteenth century. Pr.: Mod. L. 213 or equiv. 253-511-0-1102

**253 512. Survey of French Literature II.** (3). The reading and discussion of French literature from the early nineteenth century to the present. Pr.: Mod. L. 213 or equiv. 253-512-0-1102

**253 513. French Composition and Conversation.** (3). Review in depth of the structure of the language. Intensive practice in written and conversational French. Pr.: Mod. L. 213 or equiv. 253-513-0-1102

**253 514. 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. 253-514-0-1102

**253 515. Literary Analysis in French.** (3). Introduction to methods of literary analysis by study in depth of chosen texts as representative of French literature. Pr.: Mod. L. 213 or equiv. 253-515-0-1102

**253 517. Commercial French.** (1). I. Designed for students wishing to learn French for business purposes. Emphasis on letter-writing and French business forms. Pr.: Mod. Lang. 213. 253-517-0-1102

**253 519. Special Studies in French.** (Var.) Pr.: Consent of department head and instructor involved. 253-519-3-1102

#### Undergraduate And Graduate Credit

**253 710. 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. 253-710-0-1102

**253 711. Seventeenth-Century French Literature I.** (3). The literature of the Baroque period. Pr.: 21 hours of college French or equiv. 253-711-0-1102

**253 712. Seventeenth-Century French Literature II.** (3). The literature of French Classicism. Pr.: 21 hours of college French or equiv. 253-712-0-1102

**253 713. Eighteenth-Century French Literature.** (3). Critical study of the literature of the Enlightenment. Pr.: 21 hours of college French or equiv. 253-713-0-1102

**253 714. Nineteenth-Century French Literature I.** (3). A study of Pre-romanticism and Romanticism. Pr.: 21 hours of college French or equiv. 253-714-0-1102

**253 715. Nineteenth-Century French Literature II.** (3). A study of Realism, Naturalism and Symbolism. Pr.: 21 hours of college French or equiv. 253-715-0-1102

**253 716. Twentieth-Century French Drama.** (3). Reading and analysis of the contemporary French theater from Cocteau through the Existentialist and Absurdist playwrights. Pr.: 21 hours of college French or equiv. 253-716-0-1102

**253 717. Twentieth-Century French Prose and Poetry.** (3). Readings in non-dramatic literature of the contemporary period. Pr.: 21 hours of college French or equiv. 253-717-0-1102

**253 718. The French Novel.** (3). The development of the novel from the 17th century to the present, seen through selected masterworks. Pr.: 21 hours of college French. 253-718-0-1102

**253 719. Advanced French Syntax.** (3). An intensive study of the syntax and structure of the language. Introduction to French stylistics. Pr.: 21 hours of college French or equiv. 253-719-0-1102

**253 720. Seminar in French.** (3) A seminar with variable topics. Pr.: Senior standing or consent of the instructor. 253-710-0-1102

**253 799. Problems in Modern Languages.** (Var.) 253-799-3-1101

#### Graduate Credit

**253 800. 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. 253-800-0-1101

**253 899. Research in Modern Languages.** (Var.) Pr.: 30 hours in one modern language or equiv. 253-899-4-1101

#### GERMAN

##### Undergraduate Credit

**253 002. Orientation for Summer School Program in Germany.** (0). 253-002-0-1103

**253 103. German for Reading Knowledge I.** (3). The grammar and syntax of German and the reading of basic material selected from modern German texts. Not considered as a prerequisite for Mod. L. 122. 253-103-0-1103

**253 104. German for Reading Knowledge II.** (3). Continued reading of material from modern German texts. Not considered as a prerequisite for Mod. L. 221. Pr.: Mod. L. 103 or equiv. 253-104-0-1103

**253 119. German II.** (1). Language laboratory. Optional for students taking German I. Concurrent enrollment in German I required. For credit/no credit only. 253-119-0-1103

**253 120. German III.** (1). Language laboratory. Optional for students taking German II. Concurrent enrollment in German II required. For credit/no credit only. 253-120-0-1103

**253 121. German I.** (4). Introduction to the structure of modern German. Practice of the spoken language with additional experience in the language laboratory. 253-121-0-1103

**253 122. German II.** (4). Continuation and conclusion of the introduction to modern German, reading of selected prose texts. Pr.: Mod. L. 121 or equiv. 253-122-0-1103

**253 123. Intensive German I, II.** (8). A concentrated study designed to provide the student with a basic working knowledge of German grammar and conversation in a single semester. Equivalent of German I and II. Pr.: Open to all students with consent of the instructor. 253-123-0-1101

**253 221. German III.** (4). Reading and discussion of a selection of modern German prose and review of the structure of German. Pr.: Mod. L. 122 or equiv. 253-221-0-1103



**253 222. Elementary German Conversation IIIA.** (2). Practice in beginning conversational German. Course not open to fluent speakers of German. Course normally taken concurrently with German III. Pr.: Mod. L. 122 or equiv. 253-222-0-1103

**253 223. German IV.** (3). Reading and discussion of modern German prose and review of the more difficult points of German grammar. Pr.: Mod. L. 221 or equiv. 253-223-0-1103

**253 224. German Conversation IVA.** (2). Continued practice in conversational German. Course not open to fluent speakers of German. Normally taken concurrently with German IV. Pr.: Mod. L. 221 or equiv. 253-224-0-1103

**253 225. Intensive German III, IV.** (7). A concentrated study allowing the student to do the work of the second year of German in a single semester. Reading and discussion of selections of modern German prose, review of German grammar, and extensive spoken practice. Pr.: Mod. Lang. 122 or 123 or equivalent competence. 253-225-0-1103

### Undergraduate And Graduate Credit In Minor Field

**253 521. 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.: Mod. L. 223 or equiv. 253-521-0-1103

**253 522. 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.: Mod. L. 223 or equiv. 253-522-0-1103

**253 523. German Composition.** (3). A study of German syntax and exercises in composition. Pr.: Mod. L. 223 or equiv. 253-523-0-1103

**253 529. Special Studies in German.** (Var.) Pr.: Consent of department head and instructor involved. 253-529-3-1103

**253 530. German Civilization.** (3). 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. 253-530-0-1103

### Undergraduate And Graduate Credit

**253 721. German Classicism.** (3) I. Reading and discussion of late eighteenth-century texts, including works by Goethe, Schiller, Hölderlin, etc. Pr.: 21 hours of college German or equiv. 253-721-0-1103

**253 722. 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. 253-722-0-1103

**253 723. Goethe and Faust.** (3) I. The writings of Goethe and his masterpiece, Faust. Pr.: 21 hours of college German or equiv. 253-723-0-1103

**253 724. 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. 253-724-0-1103

**253 725. Early Twentieth-Century German Literature.** (3) II. A study of the drama and lyric of Naturalism, Neo-Classicism, Neo-Romanticism, and Expressionism. Pr.: 21 hours of college German. 253-725-0-1103

**253 726. German Literature since 1945.** (3) I. A discussion of the post-war writings of the Gruppe 47, Swiss playwrights and others. Pr.: 21 hours of college German. 253-726-0-1103

**253 727. 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. 253-727-0-1103

**253 728. 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. 253-728-0-1103

**253 729. 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. 253-729-0-1103

**253 731. 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. 253-731-0-1103

**253 732. 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. 253-732-0-1103

**253 733. 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. 253-733-0-1103

**253 799. Problems in Modern Languages.** (Var.) 253-799-3-1101

### Graduate Credit

**253 800. 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. 253-800-0-1101

**253 899. Research in Modern Languages.** (Var.) Pr.: 30 hours in one modern language or equiv. 253-899-4-1101

### GREEK

#### Undergraduate Credit

**253 143. Greek I.** (4). Introduction to the grammar of classical Greek and reading of elementary prose. 253-143-0-1110

**253 144. Greek II.** (4). Completion of the grammar of classical Greek and continuation of the reading of elementary prose. Pr.: Mod. L. 143. 253-144-0-1110

**253 799. Problems in Modern Languages.** (Var.) 253-799-3-1101

### HONORS PROGRAM

#### Undergraduate Credit

**253 299. Honors Seminar in Modern Languages.** (1-3) I, II. Reading and discussion of selected masterpieces of European literature in English translation. Open to non-language majors in the Honors Program. 253-299-0-1101

### ITALIAN

#### Undergraduate Credit

**253 131. Italian I.** (4). Introduction to the structure of modern Italian. 253-131-0-1104

**253 132. Italian II.** (4). Continuation and completion of the study of modern Italian grammar, using the facilities of the language laboratory for audiolingual practice. Pr.: Mod. L. 131 or equiv. 253-132-0-1104

### LATIN

#### Undergraduate Credit

**253 141. Latin I.** (4). An introductory study of the structure of Latin. 253-141-0-1109

**253 142. Latin II.** (4). Continuation and completion of the study of the structure of Latin. Pr.: Mod. L. 141. 253-142-0-1109



**253 241. Latin III.** (4). Review of Latin grammar and reading of an anthology of Roman prose and poetry. Pr.: Mod. L. 142. 253-241-0-1109

**253 242. Latin IV.** (3). Continuation of the study of Latin syntax and grammar, based upon the reading of Roman prose and poetry. Pr.: Mod. L. 241. 253-242-0-1109

#### **Undergraduate And Graduate Credit In Minor Field**

**253 541. Vergil.** (3). A study of the Latin epic as exemplified by Vergil's poetry. Pr.: Mod. L. 542. 253-541-0-1109

**253 542. Cicero.** (3). A study of the versatility of Cicero as evidenced in various works. Pr.: Mod. L. 242. 253-542-0-1109

**253 543. Horace.** (3). A critical study of the major works of Horace. Pr.: Mod. L. 511. 253-543-0-1109

**253 549. Special Studies in Latin.** (Var.) Pr.: Consent of the department head and instructor involved. 253-549-3-1109

### **LINGUISTICS**

#### **Undergraduate And Graduate Credit In Minor Field**

**253 681. General Phonetics.** (3). Same as Speech 681 and Engl. 681. 253-681-1-1505

#### **Undergraduate And Graduate Credit**

**253 780. Introduction to Linguistics.** (3). Same as Speech 780 and Engl. 780. 253-780-0-1505

**253 781. Introduction to Historical Linguistics.** (3). Same as Speech 781 and Engl. 781. 253-781-0-1505

**253 782. Language Typology.** (3). Same as Speech 782 and Engl. 782. 253-782-0-1505

**253 783. Phonology I.** (3). Same as Speech 783 and Engl. 783. 253-783-0-1505

**253 784. Phonology II.** (3). Same as Speech 784 and Engl. 784. 253-784-0-1505

**253 785. Syntax I.** (3). Same as Speech 785 and Engl. 785. 253-785-0-1505

**253 786. Syntax II.** (3). Same as Speech 786 and Engl. 786. 253-786-0-1505

**253 787. Advanced Syntax.** (3). II. Same as Speech 787 and Engl. 787. 253-787-0-1505

**253 788. Advanced Phonology.** (3). Same as Speech 788 and Engl. 788. 253-788-0-1505

**253 789. Topics in Linguistics.** (3). Same as Speech 789 and Engl. 789. 253-789-0-1505

**253 791. Methods and Techniques of Learning a Second Language.** (3). Same as Speech 791. 253-791-0-1505

**253 792. Field Methods in Linguistics.** (3). Same as Speech 792 and Soc. and Anthro. 792. 253-792-0-1505

### **PORTUGUESE**

#### **Undergraduate And Graduate Credit In Minor Field**

**253 163. Portuguese I.** (4). I. Introduction to the structure of the Portuguese language, stressing Brazilian usage, and emphasizing oral and written skills. 253-163-0-1199.

**253 164. Portuguese II.** (4). II. Continuation of Portuguese I, completion of the basic presentation of structural and linguistic principles of the Portuguese language. Pr.: Mod. Lang. 163 or equivalent course. 253-164-0-1199

**253 265. 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.: Mod. Lang. 164 or equiv. 253-265-0-1199

**253 266. Portuguese IV.** (3). II. Reading and discussion of selections from contemporary prose, emphasizing Brazilian writings, and review of grammatical structures as needed. Pr.: Mod. Lang. 253-265 or equiv. 253-266-0-1199

**253 570. Special Studies in Portuguese.** (1-3). Pr.: 15 hours of Portuguese and consent of instructor. 253-570-0-1199

### **RUSSIAN**

#### **Undergraduate Credit**

**253 149. Russian IL.** (1). Language laboratory. Optional for students taking Russian I. Concurrent enrollment in Russian I required. For credit/no credit only. 253-149-0-1106

**253 150. Russian IIL.** (1). Language laboratory. Optional for students taking Russian II. Concurrent enrollment in Russian II required. For credit/no credit only. 253-150-0-1106

**253 151. 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. 253-151-0-1106

**253 152. Russian II.** (4). II. Continuation of the study of Russian grammar and oral communication. Pr.: Mod. L. 151 or equiv. 253-152-0-1106

**253 251. Russian III.** (4). I. Completion of the study of Russian grammar. Reading of selected prose on the intermediate level. Pr.: Mod. L. 152 or equiv. 253-251-0-1106

**253 252. Russian IV.** (3). II. Intensive review of Russian grammar. Exercises in reading selected modern Russian texts in the original. Pr.: Mod. L. 251 or equiv. 253-252-0-1106

#### **Undergraduate And Graduate Credit In Minor Field**

**253 551. Russian V.** (3). Reading of Russian short stories of the nineteenth and twentieth centuries, including works by Pushkin, Lermontov, Dostoevsky and Chekhov. 253-551-0-1106

**253 552. 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. 253-552-0-1106

**253 553. Russian Conversation and Composition.** (3). Discussion in Russian. Extensive practice in writing Russian compositions. 253-553-0-1106

**253 559. Special Studies in Russian.** (Var.) Pr.: Consent of department head and instructor involved. 253-559-3-1106

### **SPANISH**

#### **Undergraduate Credit**

**253 003. Orientation for Summer School Abroad Program in Mexico City.** (0). 253-003-0-1105

**253 159. Spanish IL.** (1). Language laboratory. Optional for students taking Spanish I. Concurrent enrollment in Spanish I required. For credit/no credit only. 253-159-0-1105

**253 160. Spanish IIL.** (1). Language laboratory. Optional for students taking Spanish II. Concurrent enrollment in Spanish II required. For credit/no credit only. 253-160-0-1105

**253 161. 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. 253-161-0-1105

**253 162. 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.: Mod. L. 161 or equiv. 253-162-0-1105

**253 261. Spanish III.** (4). An intensive review of syntax and a comprehensive structural review of Spanish, with emphasis on composition and conversation. Pr.: Mod. L. 162 or equiv. 253-261-0-1105

**253 262. 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 concurrently with Spanish III. 253-262-0-1105



**253 263. Spanish IV.** (3). Reading and discussion of selections from contemporary prose, and review of grammatical structures as needed. Pr.: Mod. L. 261 or equiv. 253-263-0-1105

**253 264. Elementary Spanish Conversation IVA.** (2). Continuation of Elementary Spanish Conversation IIIA. Should be taken concurrently with Spanish IV. 253-264-0-1105

### Undergraduate And Graduate Credit In Minor Field

**253 560. Business Spanish.** (1). Intensive practice in Spanish business correspondence and terminology. Pr.: Two years of college Spanish or equiv. 253-560-0-1105

**253 561. Spanish Literature I.** (3). Introduction to the verse, prose, and drama of Spain from the Middle Ages to 1700. Pr.: 18 hours of college Spanish or equiv. 253-561-0-1105

**253 562. Spanish Literature II.** (3). Verse, prose, and drama of Spain from 1700 to the present. Pr.: 18 hours of college Spanish or equiv. 253-562-0-1105

**253 563. Spanish-American Masterpieces.** (3). Reading and analysis of major works in Spanish-American literature, including Dario, Borges, Asturias, Neruda, Paz, Garcia Marquez and Fuentes. Pr.: 18 hours of college Spanish or equiv. 253-563-0-1105

**253 564. Advanced Spanish Composition and Conversation.** (3). A study of the grammar and syntax of modern Spanish. Pr.: Mod. L. 263 or equiv. 253-564-0-1105

**253 565. 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.: 18 hours of college Spanish or equiv. 253-565-0-1105

**253 566. Hispanic-American Civilization.** (3). I. Survey of Spanish-American culture and civilization from 1492 to the present. Pr.: 18 hours of college Spanish or equiv. 253-566-0-1105

**253 567. Spanish Masterpieces.** (3). Reading and analysis of major works in Spanish literature, including Cervantes, Lope de Vega, Galdos, Unamuno, Valle-Inclan, A. Machado, Ortega y Gasset, J.R. Jimenez and Garcia Lorca. Pr.: 18 hours of college Spanish or equiv. 253-567-0-1105

**253 568. Literary Analysis in Spanish.** (3). Introduction to literary analysis by study in depth of chosen texts representative of the many genres in Spanish and Spanish-American literatures. Pr.: Mod. L. 263 or equiv. 253-568-0-1105

**253 569. Special Studies in Spanish.** (Var.) Pr.: Consent of department head and instructor involved. 253-569-3-1105

### Undergraduate And Graduate Credit

**253 751. Spanish-American Narrative I.** (3). The reading and study of selected Spanish-American novels and short stories. Pr.: 21 hours of college Spanish or equiv. 253-751-0-1105

**253 752. Spanish-American Narrative II.** (3). Continuation of Spanish-American Narrative I, with emphasis on contemporary fiction. Works by such writers as Borges, Asturias, Garcia Marquez, Vargas Llosa, and Arguedas will be read. Pr.: 21 hours of college Spanish or equiv. 253-752-0-1105

**253 753. Spanish-American Drama, Essay, and Poetry I.** (3). An in-depth reading and discussion of works in each of these three genres, to include such authors as Sarmiento, Bello, Heredia, and Sanchez. Pr.: 21 hours of college Spanish or equiv. 253-753-0-1105

**253 754. Spanish-American Drama, Essay, and Poetry II.** (3). A continuation of Spanish-American Drama, Essay and Poetry I, with emphasis on such contemporary authors as Paz, Dragun, Usigli, Neruda, Mistral and Dario. Pr.: 21 hours of college Spanish or equiv. 253-754-0-1105

**253 755. Spanish Poetry.** (3). Reading and analysis of Spanish poetry from the Medieval period to our times, with emphasis on different critical approaches to poetry. Such authors as J. Manrique, Garcilaso de la Vega, J. de la Cruz, Lope de Vega, Gongora, Quevedo, Zorrilla, Espronceda, Becquer, Garcia Lorca and J. Guillen will be studied. Pr.: 21 hours of college Spanish or equiv. 253-755-0-1105

**253 756. 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. 253-756-0-1105

**253 757. The Generation of 1898.** (3). Reading and analysis of prose and poetry written by members of the Generation of 1898. Special attention will be given to Unamuno, Valle-Inclan, A. Machado, Azorin, and Baroja. Pr.: 21 hours of college Spanish or equiv. 253-757-0-1105

**253 760. Advanced Spanish Syntax.** (3). II. An intensive study of the syntax and structure of the language. Introduction to Spanish stylistics. Pr.: 21 hours of college Spanish or equiv. 253-760-0-1105

**253 767. Twentieth-Century Spanish Drama.** (3). Reading and analysis of such dramatists as Benavente, Garcia Lorca, Sastre and the Absurdist. Pr.: 21 hours of college Spanish or equiv. 253-767-0-1105

**253 768. Post-Civil War Spanish Novel.** (3). Reading and analysis of significant novels of the post-Civil War period. Pr.: 21 hours of college Spanish or equiv. 253-768-0-1105

**253 771. Spanish Novel of the Golden Age.** (3). Reading and analysis of Golden Age novels, including the Picaresque novel, Cervantes, and other works. Pr.: 21 hours of college Spanish or equiv. 253-771-0-1105

**253 773. Spanish Drama of the Golden Age.** (3). Reading and analysis of dramatists such as Lope de Vega, Tirso de Molina and Calderon de la Barca. Pr.: 21 hours of college Spanish or equiv. 253-773-0-1105

**253 775. 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. 253-775-0-1105

**253 779. Seminar in Spanish.** (3). A seminar with variable topics. Pr.: Senior standing or consent of the instructor. 253-779-0-1105

**253 799. Problems in Modern Languages.** (Var.) 253-799-3-1101

### Graduate Credit

**253 800. 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. 253-800-0-1101

**253 899. Research in Modern Languages.** (Var.) Pr.: 30 hours in one modern language or equiv. 253-899-4-1101

### SOUTH ASIAN LANGUAGES

#### Undergraduate Credit

**253 171. 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 every-day spoken style. Hindi is the dominant language of northern India. Urdu is the national language of Pakistan, also understood throughout the Hindi area. 253-171-0-1113

**253 172. Hindi/Urdu II.** (4). II. Continuation of Hindi/Urdu I with introduction of the Devanagari (Hindi and Sanskrit) script. Pr.: Mod. L. 171. 253-172-0-1113

**253 273. Hindi/Urdu III.** (4). I. Continuation of Hindi/Urdu II with gradual transition to more formal styles of language. Pr.: Mod. L. 172. 253-273-0-1113



**253 274. Hindi/Urdu IV. (4). II.** Continuation of Hindi/Urdu III. with readings in Hindi or Urdu literature according to needs of students. Pr.: Mod. L. 273. 253-274-0-1113

### **Undergraduate And Graduate Credit In Minor Field**

**253 575. 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.: Mod. L. 274. 253-575-0-1113

**253 578. Tamil I. (5).** The elementary study of the principal modern Dravidian tongue. Pr.: Some knowledge of another foreign language desirable. 253-578-0-1113

**253 579. Tamil II. (5).** Continuation of Tamil I. Pr.: Mod. L. 578. 253-579-0-1113

**253 582. Languages in South Asia. (3).** Survey of South Asian languages from genetic, sociological, descriptive, and comparative points of view. Pr.: Introduction to Linguistics desirable, not necessary. 253-582-0-1113

### **Undergraduate And Graduate Credit**

**253 799. Problems in Modern Languages. (Var.)** 253-799-3-1101

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## **MUSIC**

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*Robert A. Steinbauer,\* Head of Department*

Professors Brookhart,\* Steinbauer,\* Walker,\* and White;\* Associate Professors Flouer,\* Jackson,\* Langenkamp,\* Lilley,\* Semanitzky, Shull,\* Sidorfsky,\* Sloop, R. Walker;\* Assistant Professors Caine,\* R. Edwards,\* Hewett, Polich, Neumeyer,\* Sutton\* and M. Walker; Instructor Funkhouser; Assistant Instructors Bolan, Buster, J. Edwards, and Werner; Teaching Associates Rieger and Schwab.

### **Undergraduate Study**

The Department of Music is a member, with institutional accreditation, of the National Association of Schools of Music.

Curricula in applied music and music education with majors in theory and composition, voice, piano, organ, strings, woodwind 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 applied music do not require prerequisites for those not majoring in music; however, availability of instructor and fees for non-majors are factors in securing applied lessons. 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 applied music as an elective.

**Entrance Requirements for New and Transfer Students.** Preliminary placement examinations in piano, the applied 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.** 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 pre-professional requirements, and it thus may appeal to students whose professional goals transcend music. The minimum requirement in music is 48 hours, including Music 175, 176, 214, 215, 406 and 407 (24 hours of comprehensive musicianship); at least 8 hours of applied music; and at least 8 hours of history, theory or composition. Recital attendance and participation in an organization is required each semester. The major program of music leading to the degree Bachelor of Arts may be elected in one of these three fields: music literature, music theory, or applied music.

The music literature field requires eight hours of selected electives in music history and music literature. In addition, eight semester hours in a single applied area is required, of which half must be from the 400 level.

If the field is music theory, the program calls for Music 503, 521 (three hours), 615, 616, two semester hours elected in music literature, and eight semester hours of applied piano, of which half must be from the 400 level.

If the field is applied music, the program calls for Music 615, 616 (Music Theory) plus 16 hours of an applied instrument or voice, of which half must be from the 400 level.

Participation in a music organization (instrumental or choral, depending on the major applied area) is required each semester, and the piano proficiency requirement must be passed before graduation.

The major in music in the Bachelor of Arts degree is not intended to prepare students to teach in the public schools in Kansas.

**Bachelor of Music.** A four-year program in performance is offered in applied music with majors in voice, keyboard, strings, wind and percussion instruments.

The basic requirements for the program in Applied Music are these: Music 175, 176, 214, 215, 406, 407, 476, 477, 615, 616 (comprehensive musicianship and theory of music courses). Instrumental majors are required to take Music 503. Vocal majors must elect eight additional hours in music; instrumental majors, five hours. Requirements in general education are stated on page 92.

In the vocal program, 28 semester hours of voice, of which half must be from the 400 level, four semester hours of diction, four semester hours of piano, piano proficiency, and four semester hours of vocal ensemble and/or opera workshop is required.

In the instrumental program, 32 semester hours of the major instrument, of which half must be from the 400 level, four semester hours of Instrumental Ensemble (Music 288), and four semester hours of applied minor is required. If a keyboard instrument is not the major, one must be chosen as a minor.

For the program in theory and composition, the basic courses in general education for the instrumental major are required. In addition, the following courses are required: Piano (8 hours), Music 521 (4 hours), 804 (Theory of Music), music electives (9 hours), general electives (42 hours).

A minimum of eight hours in musical organizations is required in all the above programs. Recital At-



tendance (Music 050) is also required for each semester of the course.

Applied majors are required to present half recital during the junior year and a full recital during the senior year.

**Bachelor of Science in Music Education.** Specific music requirements are these: for instrumental and vocal options Music 175, 176, 214, 215, 406, 407, 417, 476, or 477, 503 (comprehensive musicianship courses; Music 412 and 413 (Music Education Methods).

Instrumental majors include three of the following (depending on specific major). Music 232, 233, 234, 235, (Beginning Techniques and Materials) and two of the following (depending on major) Music 427, 428, 429 (Advanced Techniques and Materials) and Music 514 (Music Education Methods). In addition, instrumental majors complete two hours of voice class and a minimum of two hours in piano class. (If the applied major is piano, two hours of another instrument is required.) Instrumental majors complete eight hours of a major applied instrument, of which four hours must be from the 400 level.

Vocal majors complete Music 232, 233, 234, 235 (Beginning Techniques and Materials) and Music 513 (Music Education Methods). In addition they complete four hours of Singers Diction and four hours of Applied Keyboard. (These eight hours are the minor applied.) Vocal majors complete eight hours of voice, of which four hours must from the 400 level.

Piano proficiency requirements must be passed before admission to student teaching for all music education majors. Participation in at least one musical organization in the major applied area is required during each semester until graduation. A maximum of eight semester hours for this participation is allowed toward degree requirement. Recital attendance is required each semester of the program.

Music Education majors will study in the private studio for at least seven semesters for eight hours credit. (Divisional policies may require eight semesters.) They are also required to give a half recital during the junior or senior year. Should a divisional faculty feel that the best interest of the music education student would not be served by public performance, the student may fulfill the recital requirement by giving a private performance for the divisional faculty. (The student may appeal this action.)

**General Regulations for All Applied Study.** Each student is required to perform at least once a semester either in a studio seminar or on a student recital.

As a part of applied music requirements, studio and divisional seminars are held regularly (once a week) as well as a monthly general student recital. (Recital attendance policy is explained elsewhere.) Attendance at the seminars is mandatory. Unexcused absences will result in lowering the semester grade.

All private study for credit will culminate in a jury exam each term (summer included).

Each division faculty reserves and maintains the right to advise students to discontinue applied study in that particular curriculum if the students have not demonstrated the necessary degree of progress.

For specific divisional requirements, each student should request and receive a written copy of divisional detailed policies.

**Required Recital Attendance.** Attendance at a minimum of 15 recitals per semester is required for graduation. Concert offerings include the following: student and faculty recitals, organization concerts; and all subscription series.

**Practice Rooms.** Practice room privileges are included in the fees for Music majors.

**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 required to take the advanced music test of the Graduate Record Examinations. While it is expected that the test will be taken early enough for the scores to be evaluated as part of the admission process, the applicant may, in some cases, be admitted with the understanding that the test is to be taken at the earliest opportunity.

Emphasis in the graduate program may be placed on music education, performance, theory and composition, or music history and literature. All areas of emphasis center around 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 (or 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, Kansas State University, Manhattan, KS 66506.

## Courses in Comprehensive Musicianship

### Undergraduate Credit

**257 100. Music Fundamentals.** (3) I, II, S. Elementary instruction in the Theory of Music. 3 hours rec. a week. 257-100-0-1004

**257 175. Styles I, Textures of Music.** (4) I, II, S. 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. Lecture and lab. meets six hours per week. Pr.: Music 100 or tested knowledge of basic Music Theory. 257-175-1-1004

**257 176. Styles II, Musical Styles of the Middle Ages and Renaissance.** (4) I, II, S. An in-depth study of the early music; monody, organum and modal counterpoint. Lecture and lab. meets six hours per week. Pr.: Music 175 (Textures of Music), or consent of instructor. 257-176-1-1004

**257 214. Styles III, Musical Styles of the Baroque Period.** (4) I, II. The beginnings of homophony as applied to a diatonic style. Procedures of harmonic counterpoint. Lecture and lab. meets six hours per week. Pr.: Music 176 or consent of instructor. 257-214-1-1006

**257 215. Styles IV, Musical Styles of the Classical Period.** (4) I, II. Common procedures of the late eighteenth century. Forms, modulatory procedures, basic orchestrational skills as applied to chamber ensembles. Lecture and lab. meets six hours per week. Pr.: Music 214 or consent of instructor. 257-215-1-1006



**257 390. Problems in Music.** (1-3) I, II, S. Offered on demand. Pr.: Background of courses needed for problems undertaken. 257-390-4-1004

**257 406. Styles V.** (4). I, II, S. Musical style of the Romantic Period. Chromatic harmony and impressionistic devices. Orchestration as applied to the large ensemble. Lecture and lab. Pr.: Music 215 or consent of instructor. 257-406-1-1006

**257 407. Styles VI.** (4). I, II, S. Musical style of the Modern Period. Modern music; contemporary practice and aesthetics; polytonality, serial techniques, electronic music. Lecture and lab. Pr.: Music 406 or consent of instructor. 257-407-1-1006

**257 417. Conducting.** (2) I, II, S. Required for the music education major before student teaching. Deals with additional techniques of the baton, gestures, signs, and cues as generally used in conducting choral and instrumental organizations. Includes additional technique and interpretation in both choral instrumental types of ensemble performance. May be an elective course for the applied major. 257-417-1-1004

**257 423. Music Form and Analysis I.** (2) I. Forms used in composition: the music of Bach, Haydn, Mozart, Beethoven, Schumann, Chopin, Brahms, Wagner and others. Pr.: Music (Theory) 215. 257-423-0-1004

**257 424. Music Form and Analysis II.** (2) II. Continuation of Music 423. Forms and compositional techniques as used by major composers of the 20th century. Pr.: Music (Theory) 423 or consent of instructor. 257-424-0-1004

**257 476. Styles VII.** (2-4). I, II, S. Problems in Musical Style. Individual projects relating to a specific style problem of the applied major or minor. Pr.: Music 407 or consent of instructor. 257-476-2-1004

**257 477. Styles VIII.** (2-4). I, II, S. Problems in Music Pedagogy. Individual projects relating to a specific pedagogical problem of the applied major or minor. Pr.: Music 476 or consent of instructor. 257-477-2-1004

**257 503. Instrumentation and Orchestration.** (3) II, S. Instruments of the band and orchestra studied with relation to range, function and tone color. Simple and more difficult familiar and non-familiar composition scored for ensembles, full orchestra and full band. One hour lab. each week as needed. Pr.: Music (Theory) 215. 257-503-1-1004

**257 521. Composition.** (Var.) I, II, S. Individual instruction in composition. Pr.: Consent of instructor. 257-521-3-1004

### Undergraduate And Graduate Credit

**257 615. Canon and Fugue.** (2) I, S. Counterpoint in 18th century style. Pr.: Music 215, consent of instructor. 257-615-0-1004

**257 616. Twentieth-Century Counterpoint.** (2) II, S. Contrapuntal devices used by twentieth-century composers; serial techniques. 257-616-0-1004

**257 631. 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. 257-631-0-1004

**257 632. Seminar in Electronic Musical Acoustics.** (2) Offered on demand. Techniques of modern experimental music; related music theory; voltage-controlled systems and computational synthesis. Individual projects. Pr.: Music 631. 257-632-3-1004

**257 711. Practical Composition and Arranging.** (2) Offered on demand. Explanation of styles and techniques applicable to contemporary commercial music. Practical arranging for the stage band. Pr.: Music 215 or consent of instructor. 257-711-0-1004

**257 714. Advanced Orchestration.** (2) Offered on demand. The study of contemporary (twentieth century) 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. 257-714-0-1004

**257 736. Advanced Music Score Reading.** (2) Alt. S. Score reading and preparation for the conductor, plus limited experience conducting choral and instrumental groups. Pr.: 20 hours music theory. 257-736-0-1004

**257 802. Seminar in Music Theory.** (3) I, alt. S. Comparison of major theoretical treatises and historical compositional practices; practical application for the modern musician. Pr.: 20 hours music theory. 257-802-0-1004

**257 804. Advanced Analysis.** (3) II, alt. S. An in-depth study of works by later Romantic and Modern composers: techniques and styles in relation to form. Pr.: 20 hours music theory. 257-804-0-1004

**257 857. Advanced Composition.** (Var.) I, II, S. Individual instruction in composition. Pr.: Music 521 and consent of instructor. 257-857-3-1004

## Courses in Music History and Literature

### Undergraduate Credit

**257 150. 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 and faculty artists. Limited to non-music majors. 257-150-1-1005

**257 243. The Symphony.** (2) Offered on demand. Survey of the history of the symphony with presentations of a number of the most important symphonies. The course is designed for students majoring in curricula other than music. 257-243-0-1005

**257 245. Program Music.** (2) Offered on demand. The presentation of a number of programmatic compositions with non-musical sources from which they are derived. This course is designed for students majoring in curricula other than music. 257-245-0-1005

**257 250. Appreciation of Music.** (2) I, II, S. A study of musical materials, forms and styles that will enable the listener to enjoy more fully music heard at concerts, in broadcasts, and on records. For non-music majors only. 257-250-1-1005

**257 421. History of Music I.** (2) I, alt. S. Chronological study of significant musical trends; the influence of cultural forces upon musical developments; the contributions of individual composers. Pr.: Consent of instructor. 257-421-0-1005

**257 422. History of Music II.** (2) II, alt. S. Continuation of Music 421. Pr.: Consent of instructor. 257-422-0-1005

**257 571. The Opera.** (3). Offered on demand. Survey of the history of the opera, with a review of a number of the most important operas. Offered jointly by the Departments of Music and Speech; same as Speech 571. 257-571-0-1006

### Undergraduate And Graduate Credit

**257 492. 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 the curriculum of Applied Music. Taught in divisions according to the major. Practical application through supervised studio teaching. 257-492-2-1004

**257 601. Western Music before 1750.** (3) II, alt. S. A survey of the development of Western music from early Greek civilization to 1750. Pr.: Music 215. 257-601-0-1006



**257 602. Western Music from 1750 to the Present.** (3) I, alt. S. The development of Western music from 1750 to the present. Pr.: Music 215. 257-602-0-1006

**257 613. Afro-American Music.** (3) II. Negro music of the new world viewed in a cultural-historical framework. Examination of the social conditions under which African and European music styles came into contact in the New World and the ways in which they blended to form the unique styles of calypso, blues, and jazz. Offered jointly by Anthropology and Music. Same as Anthro. 613. 257-613-0-1006

**257 704. 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.: Consent of instructor. 257-704-0-1006

**257 705. Chamber Music Literature.** (3) II, alt. years. A selected survey of masterpieces of small ensemble music from 1750 to the present. Special emphasis on the string quartet. Pr.: Consent of instructor. 257-705-0-1006

**257 706. Song Literature.** (3) II, alt. years. Survey, by historical period and national style, of major solo vocal works. Pr.: Consent of instructor. 257-706-0-1006

**257 708. Choral Literature.** (3) II, alt. years. A study of standard choral masterpieces in both large and small forms from 1450 to the present. Pr.: Consent of instructor. 257-708-0-1006

**257 737. Organ Literature.** (3) II, alt. years. A survey of significant compositions for organ from the Renaissance to the present, with emphasis on performance practice. Pr.: Consent of instructor. 257-737-0-1006

**257 738. Piano Literature.** (3) I, alt. years. Selective survey of music for piano from 1750 to the present. Pr.: Consent of instructor. 257-738-0-1006

### Graduate Credit

**257 765. Music of the Twentieth Century.** (3) II. The historical aspect in musical analysis of composition since the Romantic period. Pr.: Music 407. 257-765-0-1006

**257 766. 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. 257-766-0-1006

**257 803. 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. 257-803-0-1006

**257 828. Methods and Materials for the Studio.** (2) I, II, S. Methods of teaching fundamental techniques; selection of teaching materials outlining courses of study. For graduate students in Applied Music. Taught in divisions according to the major. Practical application through supervised studio teaching. 257-828-2-1004

**257 830. 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, or consent of instructor. 257-830-0-1006

**257 832. 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, or consent of instructor. 257-832-0-1006

**257 834. Seminar in Classical Music.** (3) II. In-depth investigation of a selected area or problem in Classical music. Emphasis on individual research. Pr.: Music 602, consent of instructor. 257-834-0-1006

**257 836. Seminar in Romantic Music.** (3) I. In-depth investigation of a selected area or problem in Romantic music. Emphasis on individual research. Pr.: Music 602, consent of instructor. 257-836-0-1006

## Courses in Music Education

### Undergraduate Credit

**257 405. 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. (Course open to elementary education majors only.) 257-405-0-0832

**257 412. Elementary School Music.** (3) II. The study of music as it contributes to child development in the elementary school. Principles of reading readiness applied to music with study of various music series. Pr.: Music major, junior standing. 257-412-0-0832

**257 413. Secondary School General Music.** (2) II. Objectives, organization, content, methods, materials involved in development and teaching of non-performance courses in secondary schools. Concentrated attention given to junior high school. Pr.: Music 412, or consent of instructor. 257-413-0-0832

**257 489. Workshop in Music.** (1-2) S. Specialized interest areas for undergraduate students only. Pr.: Consent of instructor. 257-489-2-0832

**257 512. Organization of School Music.** (1) I, II. Study of music education with reference criteria for evaluation of activities, methods, materials in a well-balanced program of music. Two classes weekly on the "block" during professional semester. Pr.: Music 412, 413. 257-512-2-0832

**257 513. Secondary School Vocal Music.** (2) I. Organization, administration, operation of vocal music programs in junior and senior high schools. Emphasis on voice-training, methods, ensemble development, techniques, selection of repertoire. 257-513-2-0832

**257 514. Secondary School Instrumental Music.** (2) I. Organization, administration, operation of instrumental music programs in junior and senior high schools. Emphasis on teaching music through performance, selection of literature; discussion and evaluation of marching and stage bands. 257-514-2-0832

**257 709. Survey of Choral Repertory.** (3) Alt. years. Repertoire of mixed, male and women's choral ensembles; techniques for effective program building. Pr.: Graduate standing or consent of instructor. 257-709-0-0832

**257 731. 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.: Junior standing. 257-731-1-0832

**257 770. Advanced Studies in Secondary School Choral Music.** (2-3) Offered on 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.: Consent of instructor. 257-770-0-0832

**257 772. Advanced Studies in Elementary School Music.** (2-3) Offered on demand. Individual and small group studies of special problems in the teaching of music to children. Pr.: Consent of instructor. 257-772-0-0832

**257 774. Advanced Studies in Secondary School General Music.** (2-3) Offered on demand. Individual and small group studies of special problems in teaching music classes in grades 7-12. Pr.: Consent of instructor. 257-774-0-0832

**257 776. Advanced Studies in Secondary School Instrumental Music.** (2-3) Offered on demand. Individual and small group studies of special problems in the training of instrumental ensembles in grades 7-12. Pr.: Consent of instructor. 257-776-0-0832

**257 806. Foundations of Music Education.** I (3) Offered on 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. 257-806-0-0832



**257 807. Foundations of Music Education. II.** (3) Offered on 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. 257-807-0-0832

**257 808. Analysis and Evaluation of Music Teaching and Learning.** (3) Offered on demand. A study of various techniques for analyzing teacher-student interaction in the music classroom and of ways of measuring and evaluating musical achievement. Pr.: Music 806 or 807. 257-808-0-0832

**257 809. Seminar in Music Education.** (3) Offered on demand. A seminar with variable topics. May be repeated once for credit when topic varies. Pr.: Graduate standing and six semester hours of graduate music education or consent of instructor. 257-809-0-0832

**257 814. Workshop in Music.** (1-2) S. Studies in specialized interest areas. Techniques and interpretations of styles of the various periods of music. 257-814-2-0832

**257 815. Workshop in Percussion Instruments.** (1-2) S. Survey and demonstration of the methods, materials and teaching techniques of percussion instruments. 257-815-2-0832

**257 816. Workshop in Woodwind Instruments.** (1-2) S. Survey and demonstration of the methods, materials and teaching techniques of woodwind instruments. 257-816-2-0832

**257 817. Workshop in Brass Instruments.** (1-2) S. Survey and demonstration of the methods, materials and teaching techniques of brass instruments. 257-817-2-0832

**257 818. Workshop in Stringed Instruments.** (1-2) S. Survey and demonstration of the methods, materials and teaching techniques of stringed instruments. 257-818-2-0832

**257 819. Workshop in Electronic Music.** (1-2) S. A practical and non-technical explanation of synthesizers, synchronous tape-recorders, and audio mixing devices. Applications for the classroom. Pr.: Consent of instructor. 257-819-2-0832

**257 820. Workshop in Marching Band.** (1-2) S. Survey of the methods, materials and the teaching techniques of marching band. 257-820-2-0832

**257 821. 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. 257-821-2-0832

**257 822. 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. 257-822-2-0832

**257 823. Workshop in Choral Music.** (1-2) S. Choral techniques and interpretation of Baroque, Classical, Romantic, and Modern styles. 257-823-2-0832

**257 824. Workshop in Instrumental Music.** (1-2) S. Teaching techniques, methods and materials for woodwind, brass, string, and percussion sections of bands and orchestras. 257-824-2-0832

**257 825. Workshop in Piano Pedagogy.** (1-2) S. Methods, materials and teaching techniques for all grade levels. 257-825-2-0832

**257 826. Workshop in Jazz Ensemble Techniques.** (V 1-2) S. Methods, materials and improvisational techniques for teaching Jazz in the public schools. 257-826-2-0832

## Courses in Performance

### Undergraduate Credit

**257 050. Recital Attendance.** (0) I, II. 257-050-0-0000

**257 055. Seminar in Applied Music.** (0) I, II, S. 257-055-0-0000

**257 111. Concert Choir.** (1) I, II. Membership by tryout. 257-111-5-1004

**257 115. Marching Band.** (1) I. Marching band during fall semester; performs for athletic and university events. Admission by audition. 257-115-5-1004

**257 116. Concert Band.** (1) II. Open to all interested wind and percussion performers without audition. 257-116-5-1004

**257 117. Symphonic Band.** (1) I, II, S. A select performing organization. Admission by audition only. 257-117-5-1004

**257 121. Collegiate Chorale.** (1) I, II, S. 257-121-5-1004

**257 125. K-State Singers.** (1) I, II. Membership by tryout. (Not open to Music majors.) 257-125-5-1004

**257 130. Symphony Orchestra.** (1) I, II, S. Membership by audition. 257-130-5-1004

**257 131. Theatre Orchestra.** (1) I, II. Membership by audition. 257-131-5-1004

**257 135. Men's Glee Club.** (1) I, II. Membership by tryout. 257-135-5-1004

**257 140. Women's Glee Club.** (1) I, II. Membership by tryout. 257-140-5-1004

**257 288. Instrumental Ensemble.** (1) I, II, S. Elective for selected students. 257-288-5-1004

**257 289. Concert Jazz Ensemble.** (1) I, II, S. Elective for selected students. 257-289-5-1004

**257 290. Vocal Ensemble.** (1) I, II, S. Elective for selected students. 257-290-5-1004

**257 291. Madrigal Singers.** (1) I, II. 257-291-5-1004

**257 292. Jazz Instrumental Ensemble.** (1) I, II, S. 257-292-5-1004

**257 293. String Ensemble.** (1) I, II, S. 257-293-5-1004

**257 294. Brass Ensemble.** (1) I, II, S. 257-294-5-1004

**257 295. Wind Ensemble.** (1) I, II, S. 257-295-5-1004

**257 350. Studio Accompanying.** (1) Offered on demand. Piano student assigned to studio instructor. Accompanies applied lessons for at least two hours per week. Ensemble credit for pianists. Pr.: Consent of instructor. 257-350-1-1004

**257 351. Recital Accompanying.** (1) Offered on demand. Piano student assigned to a music major preparing for graduation recital. Pianist accompanies student in his lessons and presents the formal public program as course requirement. Pr.: Consent of instructor. 257-351-1-1004

**257 400. Concert Choir.** (1) I, II. Membership by audition. 257-400-5-1004

**257 401. Concert Band.** (1) I, II, S. Open to all interested wind and percussion performers without audition. 257-401-5-1004

**257 402. Symphonic Band.** (1) I, II. A select performing organization. Admission by audition only. 257-402-5-1004

**257 403. Collegiate Chorale.** (1) I, II, S. Open to all interested singers. Audition determines membership in other choral organizations. 257-403-5-1004

**257 404. Symphony Orchestra.** (1) I, II, S. Membership by audition. 257-404-5-1004

**257 408. Men's Glee Club.** (1) I, II. Membership by audition. 257-408-5-1004

**257 409. Women's Glee Club.** (1) I, II. Membership by audition. 257-409-5-1004

**257 410. Concert Jazz Ensemble.** (1) I, II, S. Elective for selected students. 257-410-5-1004

**257 475. Opera Workshop.** (1-6) 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 Speech 475. 257-475-1-1004



**257 490. 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. 257-490-5-1004

**257 501. Half Recital.** (0) I, II, S. Public performance; vocal or instrumental with suggested performing time of 25 minutes. 257-501-1-1004

**257 502. Full Recital.** (0) I, II, S. Public performance; vocal or instrumental with suggested performing time of 50 minutes. 257-502-1-1004

## Courses in Applied Music

### Undergraduate Credit

**257 060. Piano Proficiency.** (0) I, II, S. Required for graduation of all music majors. 257-060-2-1004

**257 203. Voice Class I.** (1) I, II. (Not for voice majors). 257-203-1-1004

**257 204. Voice Class II.** (1). I, II. (Not for voice majors). 257-204-1-1004

**257 206. Piano Class I.** (1) I, II, S. For freshmen and transfer music students with no piano background. 257-206-1-1004

**257 207. 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. 257-207-1-1004

**257 208. Keyboard Improvisation.** (1) I, II, S. A survey of the basic principles of melodic, harmonic and rhythmic improvisation, including period and style imitation, transportation patterns, etc. Open to all music students who have passed the proficiency exam. 257-208-1-1004

**257 209. Piano Ensemble.** (1) I, II, S. A study of standard repertoire for Piano Ensemble culminating in a recital. Open to music students who have passed the Proficiency Exam—Music Education Majors given priority. 257-209-1-1004

**257 210. Voice Class III.** (1) I, II. (Not for voice majors). 257-210-1-1004

**257 211. Voice Class IV.** (1) I, II. (Not for voice majors). 257-211-1-1004

**257 212. Remedial Class Piano.** (1) I, II, S. For music majors who have completed Piano Class I and II, but have not yet passed the proficiency exam. 257-212-1-1004

**257 232. Woodwind Techniques and Materials.** (1) I, II, S. A beginning course designed to teach the fundamentals of playing and methods for teaching woodwind instruments. (For music majors only, and not open to Woodwind Music Majors.) 257-232-1-1004

**257 233. Brass Techniques and Materials.** (1) I, II, S. A beginning course designed to teach the fundamentals of playing and methods for teaching brass instruments. (For music majors only, and not open to brass music majors.) 257-233-1-1004

**257 234. String Techniques and Materials.** (1) I, II, S. A beginning course designed to teach the fundamentals of playing and methods for teaching stringed instruments. (For music majors only, and not open to string music majors.) 257-234-1-1004

**257 235. 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 music majors.) 257-235-1-1004

**257 251. Pre-Applied Study.** (Var.) I, II, S. For students who do not meet standards for regular applied study. 257-251-3-1004

The following undergraduate courses in Applied Music are offered each semester and summer. The student may earn 1 to 4 hours per semester, with a maximum of 16 hours in any one applicable to a degree.

### Lower Level Applied (Freshman-Sophomore)

**257 252. Baritone.** 257-252-3-1004

**257 254. Bassoon.** 257-254-3-1004

**257 256. Clarinet.** 257-256-3-1004

**257 258. Double Bass.** 257-258-3-1004

**257 260. Flute.** 257-260-3-1004

**257 262. French Horn.** 257-262-3-1004

**257 263. Harpsichord.** 257-263-3-1004

**257 264. Oboe.** 257-264-3-1004

**257 266. Organ.** 257-266-3-1004

**257 267. Harp.** 257-267-3-1004

**257 268. Percussion.** 257-268-3-1004

**257 270. Piano.** 257-270-3-1004

**257 272. Saxophone.** 257-272-3-1004

**257 275. Trombone.** 257-275-3-1004

**257 276. Trumpet.** 257-276-3-1004

**257 278. Tuba.** 257-278-3-1004

**257 280. Viola.** 257-280-3-1004

**257 282. Violin.** 257-282-3-1004

**257 284. Violoncello.** 257-284-3-1004

**257 286. Voice.** 257-286-3-1004

**257 285. Italian Diction.** (1) I. Rules for pronouncing and translating Italian vocal texts. (One semester required.) 257-285-0-1004

**257 287. German Diction.** (1) I. Rules for pronouncing and translating German vocal texts. (One semester required.) 257-287-0-1004

**257 306. Voice Class V.** (1) I, II. (Not for voice majors.) 257-306-1-1004

**257 307. Voice Class VI.** (1) I, II. (Not for voice majors.) 257-307-1-1004

**257 427. 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. 257-427-1-1004

**257 428. 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. 257-428-1-1004

**257 429. 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. 257-429-1-1004

The following undergraduate courses in Applied Music are offered each semester and summer. The student may earn one to four hours per semester, with a maximum of 16 hours in any one applicable to a degree.

### Upper Level Applied (Junior-Senior).

**257 432. Baritone.** 257-432-3-1004

**257 434. Bassoon.** 257-434-3-1004

**257 436. Clarinet.** 257-436-3-1004

**257 438. Double Bass.** 257-438-3-1004



- 257 440. Flute. 257-440-3-1004  
 257 442. French Horn. 257-442-3-1004  
 257 443. Harpsichord. 257-443-3-1004  
 257 444. Oboe. 257-444-3-1004  
 257 446. Organ. 257-446-3-1004  
 257 447. Harp. 257-447-3-1004  
 257 448. Percussion. 257-448-3-1004  
 257 450. Piano. 257-450-3-1004  
 257 452. Saxophone. 257-452-3-1004  
 257 454. Trombone. 257-454-3-1004  
 257 456. Trumpet. 257-456-3-1004  
 257 458. Tuba. 257-458-3-1004  
 257 460. Viola. 257-460-3-1004  
 257 462. Violin. 257-462-3-1004  
 257 464. Violoncello. 257-464-3-1004  
 257 465. French Diction I. (1) I. Rules for pronouncing and translating French vocal texts. 257-465-0-1004  
 257 466. Voice. 257-466-3-1004  
 257 467. French Diction II. (1) II. Rules for pronouncing and translating French vocal texts. Pr.: Music 465. 257-467-0-1004  
 257 480. Voice Class VII. (1) I. (Not for voice majors). This class is accompanying in a voice studio for piano majors (voice option). Pr.: Music 307. 257-480-1-1004  
 257 482. Voice Class VIII. (1) II. (Not for voice majors). This class is accompanying in a voice studio for piano majors (voice option). Pr.: Music 480. 257-482-1-1004

### Graduate Credit

**Performance:** Pr.: For all performance courses technical competence is determined by audition. Levels commensurate with standards expected in that field for the B.M. degree are required.

- 257 641. **Secondary Applied Study.** (1-2) For graduate students who do not meet standards for graduate level applied study, but who wish to study an instrument (or voice) other than the major applied instrument (or voice). 257-641-3-1004  
 257 840. **Ensemble.** (1) I, II, S. Performance and study with an established university organization or in a small ensemble. 257-840-5-1004  
 257 841. **Collegium Musicum.** (1) I, II, S. An ensemble devoted primarily to the performance of music written before 1700. Authentic instruments used when possible. 257-841-5-1004

The following courses in Applied Music offered each semester and summer carry from one to four hours credit per semester.

- 257 852. Baritone. 257-852-3-1004  
 257 854. Bassoon. 257-854-3-1004  
 257 856. Clarinet. 257-856-3-1004  
 257 858. Double Bass. 257-858-3-1004  
 257 859. Conducting. 257-859-3-1004  
 257 860. Flute. 257-860-3-1004  
 257 862. French Horn. 257-862-3-1004  
 257 863. Harpsichord. 257-863-3-1004  
 257 864. Oboe. 257-864-3-1004  
 257 866. Organ. 257-866-3-1004  
 257 868. Percussion. 257-868-3-1004  
 257 870. Piano. 257-870-3-1004  
 257 872. Saxophone. 257-872-3-1004  
 257 875. Trombone. 257-875-3-1004  
 257 876. Trumpet. 257-876-3-1004

- 257 878. Tuba. 257-878-3-1004  
 257 880. Viola. 257-880-3-1004  
 257 882. Violin. 257-882-3-1004  
 257 884. Violoncello. 257-884-3-1004  
 257 886. Voice. 257-886-3-1004  
 257 799. **Problems in Music.** (Var.) I, II, S. Individual guided work in a selected area. Pr.: Six hours graduate credit in music. 257-799-4-1004  
 257 801. **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. 257-801-0-1006  
 257 898. **Master's Report in Music.** (2) I, II, S. Independent directed research leading to Master's Report. Pr.: 16 hours graduate credit in music. 257-898-1-1006  
 257 899. **Research in Music.** (Var.) I, II, S. Independent research that may lead to Master's Thesis. Pr.: 16 hours graduate credit in music. 257-899-4-1006

**Fees for Private Music Lessons.** University students enrolled in the applied music or music education curriculum or the Bachelor of Arts degree 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 on page 15 of this catalog.

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## PHILOSOPHY

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*B.R. Tilghman, Head Department*

Professor Tilghman;\* Associate Professors Reagan\* and Scheer;\* Assistant Professors Exdell,\* Hamilton,\* O'Neil, and Smith. Emeritus: Professor Miller.

The program in philosophy is designed to give the student a broad knowledge of philosophy, its history, problems, and methods. Philosophy is the study of the conceptual foundations of virtually every area of human thought and activity, art, science, religion, moral conduct, politics, etc., and anyone who engages in any kind of reflective thinking about these areas of thought and activity is bound to encounter problems of a philosophical nature. Courses in philosophy are intended to teach students to identify these problems and to deal with them in an intelligent and informed manner.

While at the present time the only professional opportunities for trained philosophers are in college and university teaching, philosophy is recommended as a highly suitable major for undergraduates desiring general training in the liberal arts, as excellent preparation for specialized graduate study in a number of other disciplines, and as preparation for professional training in such fields as law, ministry, and government service.

### Undergraduate Study

A major in philosophy requires 36 hours in philosophy and must include the following courses: Phil. 220, 300, 301 and 440. The remaining eight courses may be taken in accordance with one of the two program options:



A. Philosophy concentration: eight courses in philosophy of which six must be at or above the 400 level.

B. Interdisciplinary option: four courses in a related discipline of which three must be at or above the 400 level; and four courses in philosophy of which three must be at or above the 400 level. Due to the flexibility of this option, each major selecting it must develop a program in consultation with the department's undergraduate adviser. The program must then be approved by the department. Some examples of related disciplines are: psychology, political science, pre-law, linguistics, mathematics, history, and religion.

## Courses in Philosophy

### Undergraduate Credit

**259 100. Introduction to Philosophy.** (3) I, II, S. An introduction to the main problems of philosophy based on the study of selected writings of important philosophers, both classical and contemporary. Not open to juniors and seniors. 259-100-0-1509

**259 101. Honors Introduction to Philosophy.** (4) I, II. An introduction to the main problems of philosophy. For freshmen and sophomores in the Honors Program. 259-101-0-1509

**259 110. Introduction to Logic.** (3) I, II, S. An introduction to both deductive and inductive logic. A study of elementary formal logic and problems about the nature of knowledge and scientific method. 259-110-0-1509

**259 120. Introduction To Aesthetics.** (3) I or 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. 259-120-0-1509

**259 200. Introduction to the Philosophy of Religion.** (3) I. A course designed to acquaint the student with the nature of religious experience, the central concepts of religion, and to examine critically the language and literature of religion. 259-200-0-1509

**259 205. Introduction to the Philosophy of Science.** (3) I, II, S. An introduction to philosophy with special attention paid to problems in scientific method and inquiry. Considers such topics as the distinction between formal and empirical science, the nature of evidence and the distinction between genuine and pseudo-science. 259-205-0-1509

**259 210. Introduction to Ethics.** (3) I, II, S. An introduction to philosophy and techniques of philosophical inquiry with special attention paid to the problems of moral philosophy. Considers problems concerning the nature of moral values and the justification of moral decisions. 259-210-0-1509

**259 220. Symbolic Logic I.** (3) I, II, S. A systematic introduction to modern logic. Truth-functions, truth tables, and calculus of propositions, classes and relations. 259-220-0-1509

**259 300. 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. 259-300-0-1509

**259 301. History of Modern Philosophy.** (3) II. The development of philosophical ideas from the Renaissance to the nineteenth century. 259-301-0-1509

**259 310. 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. 259-310-0-1509

**259 397. Experimental Studies in Philosophy.** (1-6). I, II. Experimental and interdisciplinary studies in philosophy. Topics selected in consultation with instructor. Pr.: Permission of instructor. 259-397-0-1509

**259 398. Honors Colloquium.** (Var.) I or II. Open only to juniors in the Arts and Sciences Honors Program. 259-398-0-1509

**259 399. Honors Seminar in Philosophy.** (Var.) I or II. 259-399-0-1509

**259 400. 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. 259-400-0-1509

**259 410. Social-Political Philosophy.** (3) I or II and alt. 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. 259-410-0-1509

**259 415. 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. 259-415-0-1509

**259 425. 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. 259-425-0-1509

**259 430. Existentialism.** (3) I or II. A study of prominent thinkers in the existentialist tradition. Pr.: One course in philosophy or permission of instructor. 259-430-0-1509

**259 440. 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. 259-440-0-1509

### Undergraduate And Graduate Credit In Minor Field

**259 500. 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. 259-500-0-1509

**259 505. The Philosophy of Science.** (3) I or II. Philosophical problems concerning science, its methods, laws and theories. Pr.: One course in philosophy. 259-505-0-1509

**259 510. Symbolic Logic II.** (3) I. An advanced study of logical systems and problems in logical theory. Pr.: Phil. 220. 259-510-0-1509

**259 520. 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. 259-520-0-1509

**259 530. Epistemology.** (3) I. An examination of philosophical problems about the nature of our knowledge of the world. Pr.: One course in philosophy. 259-530-0-1509

**259 540. 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. 259-540-0-1509

**259 550. 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. 259-550-0-1509



**259 560. Advanced Ethics.** (3) I or II in alt. years. Detailed examination of selected topics in contemporary ethical theory. Pr.: Phil. 440. 259-560-0-1509

**259 570. Recent Aesthetic Theory.** (3) II. A study of selected work of current importance in the philosophy of art. Pr.: Phil. 420. 259-570-0-1509

### Graduate And Undergraduate Credit

**259 600. Studies in Ancient Philosophy.** (3) I. A detailed study of a selected philosopher or movement in the history of Greek and Roman philosophy. Pr.: Phil. 300. 259-600-0-1509

**259 605. Studies in 17th and 18th Century Philosophy.** (3) II. A detailed study of a selected philosopher, school, or problem drawn from the history of philosophy in the 17th and 18th centuries. Pr.: Phil. 301. 259-605-0-1509

**259 610. Recent European Philosophy.** (3) I or II. An examination of important issues and movements in 20th century European philosophy. Emphasis upon existentialism and phenomenology. Pr.: One course in philosophy. 259-610-0-1509

**259 620. The Development of Analytical Philosophy.** (3) I. The history of analytical philosophy in the first four decades of the 20th century. A study of the work of Moore, Russell, the early Wittgenstein, and the logical positivists. Pr.: One course in philosophy. 259-620-0-1509

**259 630. 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. 259-630-0-1509

**259 680. Problems in Philosophy.** (Var.) I, II, S. Independent study for qualified students. Pr.: Background of courses required for problem undertaken. 259-680-3-1509

**259 701. Topics in Metalogic.** (3) I or II. Selected topics in the analysis of first-order theories and the foundations of mathematics. Pr.: Phil. 510 or Math. 511. 259-701-0-1509

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## PHYSICS

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*Charles Hathaway,\* Head of Department*

Professors Bark,\* Bhalla,\* Cumutte,\* Dale,\* Dragsdorf,\* Ellsworth,\* Gray,\* Hathaway,\* Legg,\* Macdonald,\* Richard,\* Wiener-Avneer (visiting), and Williams;\* Associate Professors Cocke,\* Eck,\* Folland,\* Lee,\* Manney,\* McGuire,\* Rosenkilde,\* Spangler,\* and Weaver;\* Assistant Professors Chandra (visiting), Compaan,\* Endal (visiting), Jack,\* Lin (visiting), Paske (visiting), Sorensen, and Zollman;\* Research Associates Brown, Doyle, Meade, Pinkley, Schiebel, A. Schmiedekamp, C. Schmiedekamp, Sethna, and Soono Emeritus: Professor Cardwell;\* Associate Professors Avery,\* Chapin,\* and 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 always 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. This is a continuing process in which the only limitations are the minds of men and nature's willingness to divulge its secrets.

### Undergraduate Study

A major in physics equips a liberal arts student with a broad education which is uniquely adapted to our time. The program for majors is designed for individuals who will apply their knowledge in interdisciplinary research, in applied research and management, in basic research or in teaching. The physics curriculum provides a broad science background suitable for the creative application of science and mathematics to interdisciplinary problems which will be of increasing importance to society and the individual. 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, 150, 213, 214, 506, 522, 532, 551, 636; Chem. 210, 230; Math. 220, 221, 222, 240, and nine additional hours of science electives.

The nine hours of science electives may be selected with approval of the physics department undergraduate adviser 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.

Students who plan to teach physics in college should consider a program administered by the College of Education leading to the degree, Doctor of Philosophy in education with a specialty in college physics teaching. Courses are taken in both physics and education and a student's thesis research may involve work in either area.



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 their 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" on page 19.

## Courses in Physics

**265 017. Colloquium in Physics.** (0) I, II. Required of graduate majors and undergraduate majors.

### Undergraduate Credit

**265 100. Undergraduate Physics Seminar I.** (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. 265-100-2-1902

**265 101. Man's Physical World I.** (3) I, II, S. The courses Man's Physical World I and II are designed to present a non-mathematical overview of the physical science for students who have little or no previous physical science. Man's 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. 265-101-0-1901

**265 102. Man's Physical World II.** (3) I, II, S. Cont. of Phys. 101. Man's 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. 265-102-0-1901

**265 103. Man's Physical World I Laboratory.** (1) I, II, S. Two hours lab. a week. Pr. or conc.: Phys. 101. 265-103-1-1901

**265 104. Man's Physical World II Laboratory.** (1) I, II, S. Two hours lab. a week. Pr. or conc.: Phys. 102. 265-104-1-1901

**265 107. 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. 265-107-0-1901

**265 113. General Physics I.** (4) I, II, S. Mechanics, heat, electricity and magnetism. Two hours lec., one hour rec., one hour quiz and two hours lab. a week. Pr.: Math 150. 265-113-1-1902

**265 114. General Physics II.** (4) I, II, S. Wave motion, light, and modern physics. Two hours lec., one hour rec., one hour quiz, and two hours lab. a week. Pr.: Phys. 113. 265-114-1-1902

**265 115. 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. 265-115-1-1902

**265 125. Physics for Musicians.** (3) II. Selected topics applied to the physics of music and musical instruments. 265-125-0-1902

**265 150. Undergraduate Physics Seminar II.** (1) II. Continuation of Phys. 100. 265-150-2-1902

**265 191. Descriptive Astronomy.** (3) I, S. A qualitative study of the sun and planets, stars and galaxies; a survey of what is known and how it is known. Occasional planetarium and telescopic observing sessions. 265-191-0-1911

**265 192. Descriptive Astronomy Laboratory.** (1) I, II, S. Two hours laboratory a week; use of telescopes, planetarium and laboratory equipment in astronomy; open to interested students without concurrent enrollment in Phys. 191 by consent of instructor. 265-192-1-1911

**265 193. Descriptive Meteorology.** (3) I. Nontechnical treatment of the fundamentals of modern meteorology and associated physical processes. 265-193-0-1913

**265 213. Engineering Physics I.** (5) I, II, S. Mechanics, heat and sound; for technical students. Two hours lec., two hours rec., one hour quiz, and two hours lab. a week. Pr. or conc.: Math. 221. 265-213-1-1902

**265 214. Engineering Physics II.** (5) I, II, S. Magnetism, electricity, and light; for technical students. Two hours lec., two hours rec., one hour quiz, and two hours lab. a week. Pr.: Phys. 213, Math. 221. 265-214-1-1902

**265 300. Physics in Relation to Other Disciplines.** (1-3) On demand. A course of variable content, offered only by pre-arrangement 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. 265-300-3-1902

**265 301. Junior Honors Colloquium.** (Var.) Open only to juniors in the Arts and Sciences Honors Program. 265-301-0-1902

**265 400. Independent Study in Physics.** (1-3) I, II, S. Independent theoretical or experimental investigation of a topic for physics majors. May be repeated for credit up to a maximum of six hours. Pr.: Junior standing and consent of instructor. 265-400-3-1902

**265 401. Dialogues in Physics.** (2) On sufficient demand. Discussion of current research topics such as fusion power, laser development, superconductivity, radiation effects, quasi-stellar objects. Offered for non-science students. Topics covered will vary each semester depending on current developments and interests. Classes will include both discussions and demonstrations, and occasional special lectures by visiting scholars. Lay scientific literature will be used as resource material. Pr. or conc.: Phys. 102. This course may not be repeated. 265-401-0-1902

**265 435. Introduction to Holography.** (2) A presentation of the concepts on which Holography (a technique for the recording of three dimensional information or images on film by using light interference) is based, with practice of the technique. One hour of lecture and one-two hour lab. each week. Pr. Phys. 101 or 115. 265-435-1-1901

**265 451. Modern Physics.** (3) I. A qualitative introduction to contemporary theories and problems in physics. Pr.: Phys. 114 or consent of instructor. 265-451-0-1902

**265 460. Undergraduate Topics in Physics.** (1-6). Special topics in physics not completely treated in other courses. Offered on sufficient demand. Pr.: Phys. 114 or equiv. 265-460-0-1902

### Undergraduate And Graduate Credit In Minor Field

**265 506. Physics Laboratory I.** (3) I. See Phys. 616. One hour rec. and six hours lab. a week. Pr.: One year of college physics. 265-506-1-1902



**265 515. Physics for Science Teachers.** (2-3) S. 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 sub-nuclear particles, relativity, or the historical development of some physical concept. May be repeated for a maximum of six hours credit. Pr.: One year of college physics. 265-515-0-1902

**265 516. Physics Laboratory II.** (3) II. Cont. of Phys. 506. See Phys. 616. One hour rec. and six hours lab. a week. Pr.: Phys. 506. 265-516-1-1902

**265 521. Intermediate Physics I.** (3) The application of analytic geometry, calculus, vector analysis, and elementary differential equations to the description of physical phenomena and the solution of physical problems in mechanics, electricity, and magnetism. Pr.: Phys. 114 or 214. Math. 222 or conc. enrollment. 265-521-0-1902

**265 522. Mechanics I.** (3) I. Principles of statics and dynamics of particles and rigid bodies by the methods of the calculus. Pr.: Phys. 214 or 521; Math. 240 or conc. enrollment. 265-522-0-1902

**265 523. Mechanics I Recitation.** (2) I. Discussion section for problems presented in Phys. 522. Pr.: Students must be concurrently enrolled in Phys. 522. 265-523-0-1902

**265 525. 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. 265-525-0-1901

**265 531. Intermediate Physics II.** (3) Cont. of Phys. 521. Pr.: Phys. 521. 265-531-0-1902

**265 532. 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 or 521; Math. 240 or conc. enrollment. 265-532-0-1902

**265 535. Fundamentals of Holography.** (3) A presentation of the concepts on which holography (a technique for recording three dimensional information or images on film by using light interference) is based, with practice of the technique. This course, parallel to Phys. 435, is for students with a science and engineering background. Two hours of lecture and one-two hour laboratory each week. Pr.: Phys. 214 or Phys. 114 and Math. 221. 265-535-1-1901

**265 546. Radioactive Tracer Techniques.** (3). (See Chem. 546.) Physics and chemistry of radioactive substances in the fields of biological and physical science. Two hours rec. and three hours lab. a week. Taught in cooperation with the Department of Chemistry. Pr.: Chem. 230, Phys. 114 or equiv. 265-546-1-1902

**265 551. Atomic Physics.** (3) II. An introduction to contemporary theories and problems in physics. Pr.: Phys. 214; Math. 222. 265-551-0-1902

**265 552. Instrumental Optics.** (3) The application of the fundamentals of geometrical and physical optics to optical instruments. Phenomenology of the interaction of light and matter. Characteristics of light sources, filters, and detectors. Measurement of light and radiation. Pr.: Phys. 114 or equiv. 265-552-0-1902

**265 553. Introduction to the Physics of Lasers.** (3) II. A study of the physics of lasers. Survey of current laser systems. Technological applications. Pr.: Phys. 114 or 214. 265-553-0-1902

**265 561. Geophysics.** (3) II alt. years. Principles and methods of exploration geology by physical methods. Pr.: Phys. 114 or 214; Math. 221. 265-561-0-1916

**265 595. Astronomy.** (3) A quantitative and qualitative survey of the universe primarily for the science major. Occasional planetarium and telescopic observation sessions. Pr.: One year of college physics. 265-595-0-1911

### Undergraduate And Graduate Credit

**265 611. Introductory Quantum Mechanics I.** (3) I. Methods of quantum mechanics and solution of selected problems in atomic, molecular, solid-state and nuclear physics. Special theory of relativity. Pr.: Phys. 522, 551; Math. 240. 265-611-0-1902

**265 612. Introductory Quantum Mechanics II.** (3) II. Cont. of Phys. 611. Pr.: Phys. 611. 265-612-0-1902

**265 616. Advanced Physics Laboratory.** (1-3) I, II. The courses Phys. 506, 516 and 616 are designed to give the advanced student an opportunity to perform experiments of historical and current significance and to develop skill in making precise physical measurements involving the use of high-grade mechanical, optical, electrical, and thermal instruments. Pr.: Phys. 506 or equiv. 265-616-0-1902

**265 621. Mechanics II.** (3) II. Cont. of Phys. 522. Pr.: Phys. 522. 265-621-0-1902

**265 631. Electricity and Magnetism II.** (3) I. Cont. of Phys. 532. Pr.: Phys. 532. 265-631-0-1902

**265 635. Plasma Physics.** (3) I. (see Nuclear Engineering 635) 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. each week. Pr.: Phys. 532 or E.E. 557, and Phys. 621. 265-635-0-1902

**265 636. 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 of lec. and six hours of lab. each week. Pr.: Phys. 214. 265-636-1-1902

**265 641. Nuclear Physics.** (3) II. Modern theories of nuclear physics. Pr.: Phys. 611. 265-641-0-1904

**265 651. Introduction to Optics.** (3) I. Introduction to modern concepts in the study of optics: electromagnetic waves, interference, coherence, Fraunhofer and Fresnel diffraction, holography, non-linear optics, lasers, photon counting. Three hours lec. each week. Students desiring simultaneous laboratory experience with the phenomena discussed should enroll for one or two hours in Phys. 616. Pr.: Phys. 532 or E.E. 557. 265-651-0-1902

**265 671. Thermodynamics and Statistical Physics.** (3) II. Pr.: Phys. 522; Math. 240. 265-671-0-1902

**265 681. Semiconductor Physics.** (3) I alt. years. The physics of conduction in homogeneous semiconductors and semiconductor device structures. Pr.: At least senior standing in physics or electrical engineering. 265-681-0-1902

**265 691. Astrophysics.** (3) A quantitative study of the sun and stars; structure and evolution; intrinsic properties; solar activity; galaxies; chemical evolution. Pr.: Phys. 522, 532. 265-691-0-1912

**265 701. Journal Club.** (Var.) I, II. Seminar in current topics in physics. Pr.: Graduate standing in physics. 265-701-2-1902

**265 707. 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. 265-707-3-1902

**265 711. Introduction to Theoretical Physics.** (3) I. Pr.: Phys. 621. 265-711-0-1902



**265 731. Electrodynamics I.** (3) II. Pr.: Phys. 631. 265-731-0-1902

**265 751. Atomic Spectra.** (3) I. Atomic energy levels and the origin of spectra. Pr.: Phys. 611. 265-751-0-1902

**265 752. Molecular Spectra.** (3) II. Molecular energy levels and the origin of spectra. Pr.: Phys. 611. 265-752-0-1903

**265 781. X-ray and Crystal Physics.** (3) I alt. years. Pr.: Phys. 532. 265-781-0-1902

**265 782. Introduction to Solid State Physics.** (3) II. Pr.: Phys. 611. 265-782-0-1902

**265 786. X-ray Laboratory.** (1) I alt. years. Three hours lab. a week. Pr. or conc.: Phys. 781. 265-786-1-1902

### Graduate Credit

**265 800. 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. 265-800-3-1902

**265 808. 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. 265-808-3-1902

**265 811. Quantum Mechanics I.** (3) I. Pr.: Phys. 611, 711, 821. 265-811-0-1902

**265 821. Advanced Dynamics.** (3) II. Pr.: Phys. 711. 265-821-0-1902

**265 899. Research in Physics.** (Var.) I, II, S. Master's level research. Pr.: Consent of instructor. 265-899-4-1902

**265 910. 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. 265-910-3-1902

**265 911. Quantum Mechanics II.** (3) II. Pr.: Phys. 811. 265-911-0-1902

**265 912. Advanced Quantum Mechanics.** (3) I. Relativistic quantum mechanics; scattering theory; second quantization and the many-body problem; introduction to quantum electrodynamics. Pr.: Phys. 911. 265-912-0-1902

**265 913. Advanced Topics in Mathematical Physics.** (3) II. Critical studies of selected advanced topics. May be repeated once for credit. Pr.: Phys. 711. 265-913-0-1902

**265 914. Quantum Field Theory.** (3) Offered on sufficient demand. Pr.: Phys. 811. 265-914-0-1902

**265 931. Electrodynamics II.** (3) I. Pr.: Phys. 731. 265-931-0-1902

**265 941. Advanced Nuclear Physics I.** (3) I. Pr.: Phys. 641, 811. 265-941-0-1904

**265 942. Advanced Nuclear Physics II.** (3) II. Cont. of Phys. 941. Pr.: Phys. 941. 265-942-0-1904

**265 943. Advanced Topics in Nuclear Physics.** (3) I. Critical studies of selected advanced topics. May be repeated once for credit. Pr.: Phys. 641. 265-943-0-1904

**265 951. Advanced Topics in Molecular Spectroscopy.** (3) I. Critical studies of selected advanced topics. May be repeated once for credit. Pr.: Phys. 752. 265-951-0-1903

**265 952. Advanced Topics in Optics.** (3) II. Critical studies of selected advanced topics. May be repeated once for credit. Pr.: Phys. 651. 265-952-0-1902

**265 953. Advanced Topics in Atomic Interactions.** (Var.) Critical studies of advanced topics in atomic interactions. Pr.: Phys. 612. 265-953-3-1904

**265 971. Statistical Mechanics.** (3) I. Pr.: Phys. 611, 671, 821. 265-971-0-1902

**265 981. Solid State Physics.** (3) I. Pr.: Phys. 782, 971, 911 or conc. enrollment. 265-981-0-1902

**265 982. Advanced Topics In Solid State Physics.** (3) II. Critical studies of selected advanced topics. May be repeated once for credit. Pr.: Phys. 782. 265-982-0-1902

**265 983. Advanced X-ray Physics.** (3) Offered on sufficient demand. Pr.: Phys. 781, Math. 240. 265-983-0-1902

**265 999. Research in Physics.** (Var.) I, II, S. Doctoral level research. Pr.: Consent of instructor. 265-999-4-1902

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## POLITICAL SCIENCE

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*Michael W. Suleiman,\* Head of Department*

Professors Douglas\* and Suleiman;\* Associate Professors Althoff,\* Gustafson,\* Hajda,\* Lynn,\* Richter,\* and Williams;\* Assistant Professors Iyengar,\* Linford,\* and Sloan.\*

### 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 is intended to equip the student with the skills necessary to choose among a wide variety of careers in public service, both national and international, 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, such as economics, history, psychology, sociology, anthropology, and geography. The political scientist should also develop awareness of the intimate relationships between social and physical science. In addition, the major will find familiarity with statistics and mathematics is indispensable in using the tools now available for describing and explaining political phenomena.

**Advisory Services.** A pre-law program also may be pursued through a major in political science. A pre-law adviser helps the student select an appropriate course of study leading toward a career in law, and offers individual assistance in selecting a law school.

A selection of courses for those interested in public administration is available, and an adviser for this field is available through the head of the department.

Several members of the department have backgrounds in non-academic careers—including national and international government service, business, party politics, and journalism—besides their professional training in political science. Students contemplating careers in these and other fields will find non-academic perspectives available to help them in their choices.

**Specialized Curricula.** The department takes part in several interdepartmental programs whereby students can coordinate their course work around a specific set of phenomena. Two such firmly established programs include:



**South Asia Area Studies.** The department participates in the University-wide South Asia area studies (see detailed information under South Asia center, page 95).

**Armed Forces and Society.** Political science and several other departments offer coordinated coursework 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.

**Requirements for the Major.** A major consists of a minimum of 27 credit hours in political science, distributed as follows: Introduction to Political Science (269 110 or 269 111) or U.S. Politics (269 325) or both. And a minimum of 18 hours from courses numbered 500 and above, including at least one 700-level course in each of the following four areas of political science: American government and politics, comparative government and politics, international relations, and political thought.

**Information for Non-Majors.** To encourage the widest possible undergraduate involvement in systematic political analysis, most political science courses numbered 100 through 799 are open to non-majors without prerequisite courses and without prejudice to non-majors. As a discipline, the study of politics is expansive enough to permit intraclass adjustments to different backgrounds and objectives, while maintaining the rigorous inquiry of social science.

Introduction to Political Science (269 110) is designed for freshmen and sophomore majors and non-majors. United States Politics (269 325) and World Politics (269 333) are not normally open to juniors and seniors. Non-majors with questions about opportunities and requirements for non-majors in political science courses should consult the head of the department or faculty members concerned. The Political Science Club, a student group of majors, also is a source of information and guidance for undeclared majors and non-majors. The undergraduate advisory committee is available to non-majors as well as majors.

### Graduate Study

In accordance with Graduate School requirements, an M.A. degree in political science consists of a minimum of 30 semester hours of which at least 24 shall be in political science (i.e., a maximum of six credits in other disciplines may be applied toward the degree). Each candidate must take Political Science 800, Seminar: Scope and Methodology of Political Science; at least two basic field seminars from among the following: American Government (269 805); International Politics (269 811); Political Thought (269 821); and Comparative Politics (269 841). The remaining minimum requirements of 15 hours coursework (thesis option) or 19 hours coursework (report option) should be selected in consultation with the adviser and should emphasize seminar (800-level) offerings. The report option is possible only if approved by the student's adviser.

Facilities for research include the resources of the University and departmental libraries, the computer center, and, in the vicinity of the University, Eisenhower and Truman Libraries, the State Historical Library and other research centers.

There is a Graduate Political Science Association and a departmental graduate adviser. A limited number of assistantships is available for qualified students.

**Career Opportunities in Political Science.** A major in political science prepares a student for a wide range of career opportunities. Among the careers frequently chosen by our majors are law, teaching, public administration, business, and journalism. Today governments at all levels are the largest employers in the USA. A political science major prepares a student for a variety of positions with governmental agencies at the local, state, regional, national, and international levels. In addition, it prepares students for a wide range of political and policy-related careers.

## Courses in Political Science

### Undergraduate Credit

**269 110. Introduction to Political Science.** (3). 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. 269-110-0-2207

**269 111. 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. 269-111-0-2207

**269 321. 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. 269-321-0-2207

**269 325. United States Politics.** (3). The national government with emphasis on constitutional principles, basic structure, functions, and the political process. 269-325-0-2207

**269 333. World Politics.** (3). 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. 269-333-0-2207

**269 344. 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. 269-344-0-2207

**269 355. Contemporary Issues.** (3). Study and analysis of selected political topics of immediate relevancy and concern. May be repeated only one time. 269-355-0-2207

**269 366. Practical Politics.** (3). Strategies and techniques of running for office, organizing a campaign, mobilizing community resources, direct action lobbying, related practical aspects of local level citizen politics. Open to all students, but not applicable to the political science major. 269-366-0-2207

**269 399. Honors Seminar in Political Science.** (1-3). 269-399-0-2207

**269 401. Topics in Politics.** Different subject areas in politics are selected for intensive study. May be repeated for a total of six hours with adviser's approval. 269-401-0-2207



### Undergraduate And Graduate Credit In Minor Field

**269 501. 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.: Pol. Sci. 110 or 325 or sophomore standing. 269-501-0-2207

**269 505. Introduction to the Civilization of South Asia I.** (3). An interdisciplinary survey of the development of civilization in South Asia, 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, Soc. 505, Anthro. 505). 269-505-0-2207

**269 506. Introduction to the Civilization of South Asia II.** (3). Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Ceylon, Nepal, 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, Soc. 506, Anthro. 506). 269-506-0-2207

**269 507. 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.: Pol. Sci. 110 or 325 or Econ. 110. 269-507-0-2207

**269 511. 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. 269-511-0-2207

**269 520. 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.: Pol. Sci. 110 or 325 or sophomore standing. 269-520-0-2207

**269 521. Agricultural Politics.** (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 placed upon the nature of politics shaping the present and future of rural and small town Kansas. Pr.: Pol. Sci. 110 or 325 or sophomore standing. 269-521-0-2207

**269 545. The Politics of Developing Nations.** (3). Comparative analysis of politics in emergent states with emphasis on processes of modernization and nation building. Pr.: Pol. Sci. 110 or 344 or sophomore standing. 269-545-0-2207

**269 555. Senior Honors Seminar.** (3). Open to senior majors who have attained a 3.0 grade point average in political science. 269-555-0-2207

### AMERICAN GOVERNMENT AND POLITICS

#### Undergraduate And Graduate Credit

**269 702. Political Sociology.** (3). An introduction to the principles of political sociology; theories of politics and sociology; processes of political sociology; participation within and outside established organizational channels, recruitment of elites, communication and influence, power, decision-making and policy outputs. Data will be presented from a cross-national perspective. Pr.: Soc. 211; Pol. Sci. 110 and junior standing or consent of instructor. (Same as Soc. 702). 269-702-0-2207

**269 703. 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. 269-703-0-2207

**269 704. Political Polls and Public Opinion.** (3). Group theory and politics. Structure, internal politics, and techniques of interest groups and their impact on public policy. Analysis of formation and measurement of political data, and utilization of computers in political research. 269-704-0-2207

**269 705. The American Presidency.** (3). The presidency as an institution, its evolution, Congressional relationships, executive organization. 269-705-0-2207

**269 706. 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. 269-706-0-2207

**269 707. Research Methods in Political Science.** (3). Principles of research design, measurement of political phenomena, methods for collecting and analyzing political data, and utilization of computers in political research. 269-707-0-2207

**269 711. 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. 269-711-0-2207

**269 713. The Judicial Process.** (3). Values of the rule of law and how they are maintained in Western democracies; general significance of the legal order; private rights and public duties; nature of the judicial process. 269-713-0-2207

**269 714. Constitutional Law I.** (3). Legal foundations of the American political system as defined by constitutional provisions and judicial interpretation. Pattern of governmental power; federalism, separation of powers, judicial review. Constitution as a positive instrument of government; the commerce of power. 269-714-0-2207

**269 715. Constitutional Law II.** (3). Constitution as a positive instrument of government: fiscal powers over foreign affairs. Constitution as a negative restraint on government: substantive and procedural limitations. 269-715-0-2207

**269 716. Civil Liberties.** (3). History, theory, and development of Constitutional liberties in the Bill of Rights and the Fourteenth Amendment. 269-716-0-2207

**269 717. 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. 269-717-0-2207

**269 718. Urban Politics.** (3). Fundamental problems of political power and decision-making in urban-suburban governmental settings. 269-718-0-2207

**269 719. 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. 269-719-0-2207

### COMPARATIVE GOVERNMENT AND POLITICS

**269 721. European Political Systems.** (3). Comparative analysis of British democracy, totalitarianism, and contemporary Continental European political systems. 269-721-0-2207



**269 722. 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. 269-722-0-2207

**269 723. South Asian Political Systems.** (3). Analysis of selected political systems of South Asia. 269-723-0-2207

**269 724. Middle Eastern Political Systems.** (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. 269-724-0-2207

**269 725. Southeast Asian Political Systems.** (3). Comparative analysis of selected political systems in Southeast Asia including consideration of problems of nationalism and political development. 269-725-0-2207

**269 726. African Political Systems.** (3). Comparative analysis of selected political systems of sub-Saharan Africa, including consideration of problems of nationalism and political development. 269-726-0-2207

**269 727. The Soviet Political System.** (3). Government and politics of the Soviet Union. 269-727-0-2207

**269 728. 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 organizations. 269-728-0-2207

**269 729. 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. 269-729-0-2207

## INTERNATIONAL RELATIONS

**269 741. International Relations.** (3). Analysis of the nature of international relations with emphasis on contemporary theories explaining the international behavior of states. 269-741-0-2207

**269 743. 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. 269-743-0-2207

**269 745. 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. 269-745-0-2207

**269 747. International Law.** (3). Theories of international law, and general problems, such as: recognition, responsibility, war crimes, sources, evidence, codification, and settlement of disputes. 269-747-0-2207

**269 749. 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. 269-749-0-2207

**269 751. International Organization.** (3). Structure, functions, values, and effectiveness of international organizations with emphasis on the United Nations, Common Market and other regional arrangements. 269-751-0-2207

**269 752. International Politics of South Asia.** (3). Consideration of regional problems of the South Asian area and international roles and foreign policies of South Asian states. 269-752-0-2207

**269 753. International Politics of the Middle East.** (3). 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. 269-753-0-2207

**269 754. 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. 269-754-0-2207

## POLITICAL THOUGHT

**269 761. Political Thought: Classical to 16th Century.** (3). Systematic study of ideas about law, politics, and government of great philosophers of Western civilization from Greek antiquity to the 16th century. 269-761-0-2207

**269 763. Political Thought: Since the 16th Century.** (3). Study of the development of Western political thought from the 16th century to the 20th century. 269-763-0-2207

**269 767. American Political Thought.** (3). Political ideas underlying the American union, including the doctrine of rights, the nature of union, liberty, property, and democracy. 269-767-0-2207

**269 771. Modern Political Thought.** (3). Study of contemporary political ideas and social thought. 269-771-0-2207

**269 775. 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. 269-775-0-2207

**269 776. 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. 269-776-0-2207

## READINGS AND PROBLEMS

**269 784. Internship in Government, Public Administration, and Politics.** (1-3). Supervised field work at the international, national, state and local level of government or with political parties or other politically-oriented voluntary organizations. May be repeated once. Pr.: Consent of the instructor and a minimum of two courses in political science, at least one of which must be relevant to the internship area. 269-784-3-2207

**269 785. Readings in Political Science.** (1-3). Students will undertake directed reading and discussion of a selected topic in political science. 269-785-3-2207

**269 790. 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. 269-790-3-2207

**269 799. 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. 269-799-0-2207

## Graduate Credit

**269 800. 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. Required of all graduate students in political science. 269-800-0-2207

**269 801. Advanced Research Methods I: Research Design.** (3). Analysis of the different types of research designs used by political scientists. Pr.: Stat. 703. 269-801-0-2207

**269 802. Advanced Research Methods II: Data Analysis.** (3). A variety of applied statistical techniques employed by political scientists. Pr.: Stat. 703. 269-802-0-2207



- 269 804. Seminar: Public Policy and Decision Making. (3). 269-804-0-2207
- 269 805. Seminar: American Government Problems. (3). 269-805-0-2207
- 269 811. Seminar: International Politics. (3). 269-811-0-2207
- 269 813. Seminar: International Political Communication. (3). 269-813-0-2207
- 269 821. Seminar: Political Thought. (3). 269-821-0-2207
- 269 831. Seminar: Public Administration. (3). 269-831-0-2207
- 269 841. Seminar: Comparative Politics. (3). 269-841-0-2207
- 269 842. Seminar: Comparative Ideologies. (3). 269-842-0-2207
- 269 845. Seminar: South Asian Politics. (3). 269-845-0-2207
- 269 851. Seminar: Public Law. (3). 269-851-0-2207
- 269 861. Seminar: Political Organization and Behavior. (3). 269-861-0-2207
- 269 898. Master's Report. (2). 269-898-4-2207
- 269 899. Master's Thesis. (6). 269-899-4-2207

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## PSYCHOLOGY

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*E. Jerry Phares,\* Head of Department*

Professors Cowan,\* Danskin,\* Griffitt,\* Hoyt,\* Mitchell,\* Perkins,\* Phares,\* Rappoport,\* Rohles,\* Samelson,\* Sinnett,\* and Thompson;\* Associate Professors Frieman,\* Shanteau,\* and Uhlarik;\* Assistant Professors Barnett,\* Bauer,\* Harris,\* Matthews,\* and Saal.\* Emeritus: Professor Langford.

### Undergraduate Study

The undergraduate program at Kansas State University is designed to serve the needs of several different types of students. It is a versatile program which is 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: (1) to give the student, as a part of a liberal education, some familiarity with the principles, methods, and findings of psychology; (2) to provide knowledge and skills requisite for advanced study at the graduate level; (3) to offer valuable background for students preparing to work in a variety of professions and jobs, such as medicine, law, theology, business, teaching, engineering, etc.; (4) to provide academic work that will prepare the students to pursue a career as a psychological technician in such facilities as mental hospitals, mental health agencies, community agencies, psychological research laboratories, etc.

**The Core.** The undergraduate major requires Stat. 330 and an additional 22 hours of course work, including Psych. 110, 250, and either Psych. 460, 475, or 480, and either Psych. 605 or 620. An additional 9 hours of psychology electives should be chosen in consultation with the student's adviser. A no-credit orientation, Psych. 015, also is required.

The foregoing core of 25 hours constitutes the minimum psychology major. This, along with fulfillment of the general College of Arts and Sciences requirements, will enable students to obtain either the B.S. or B.A. degree, depending upon their interests and goals.

**The General Education Option.** For students interested mainly in a liberal education the above core program will be sufficient. In consultation with their adviser, they may wish to choose several other psychology courses beyond the required 25-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 25 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 advisers in the College of Education.

**The Graduate Study 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 25 hours is contained within the following recommendations): Stat. 330, Math. 501, Comp. Sci. 200 and 201, Psych. 110, 250, 460-61, 475-76, 480-81, 505, 570, 605, 620-21, and 775. Depending upon their more specialized goals, students may wish also to take Psych. 598, 616, 575, etc. Students oriented toward physiological psychology will want to ensure they also have appropriate background in biology, chemistry, etc. These matters should be worked out in consultation with an adviser. 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. The psychological technician often assists in such activities as testing, behavior change, community organization, agency management (budgets, referrals, scheduling), research, data collection and statistical analysis, etc. Technicians and paraprofessionals are playing an increasingly prominent role in agencies, clinics, hospitals, and research settings.

The professional role of psychological technicians is just emerging and the extent of its projected growth and acceptance is still uncertain. However, the academic requirements and, in particular, the field experience requirements will provide a background in human relations that a variety of potential employers in business, industry, government, etc. will 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 25 hours is required. In addition, the following courses are required: Psych. 440, 505, 598, and 599. Additional required courses will depend on student interests and will be worked out in consultation with a psychological technician adviser. An integral part of the program is supervised field experience in an applied setting. Arrangements for such experience will be worked out individually with each student as regards the exact number of hours (Psych. 790) and the location (hospital, agency, research laboratory, etc.).

### 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 areas of general-experimental and personality-social psychology. These areas are: sensation and perception, physiological psychology, animal learning and behavior, human learning, social psychology, personality and cognitive processes.

At the master's level, students may specialize in most of the traditional areas of psychology. However, primary emphasis is placed on work leading to the doctoral degree. Students who complete the doctoral program are thus 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—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 can 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

### Undergraduate Credit

**273 015. Orientation to Psychology.** (0) I. To acquaint psychology majors with psychology as a profession, and with the various options available to them at various levels of training. Discussion of professional, research, and educational methods and objectives in psychology. Should be taken during second semester of sophomore year or first semester of junior year. 273-015-0-2099

**273 110. General Psychology.** (3) I, II, S. An introduction to the study of behavior, with emphasis on human behavior. A survey of the methods, data, and principles of psychology. 273-110-0-2001

**273 115. General Psychology (Honors).** (4) I, II, S. An introduction to the study of behavior. Pr.: Participation in Honors Program. 273-115-0-2001

**273 200. Applications of Research to Human Behavior.** (2) Interim Sem. Applications and evaluation of psychological research findings in such areas as education, psychotherapy, psychopathology, child rearing, etc. Pr.: Psych. 110. 273-200-0-2001

**273 202. Drugs and Behavior.** (2) Interim Sem. 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. 273-202-0-2001

**273 250. Experimental Methods in Psychology.** (4). Laboratory investigation of learning, motivation, social-personality processes, and perception and sensation. Includes two hours rec. and four hours lab. per week. Pr.: Psych. 110. 273-250-1-2002

**273 280. Psychology of Childhood and Adolescence.** (3). Survey of behavioral development from birth through adolescence. Pr.: Sophomore standing; Psych. 110. 273-280-0-2009

**273 290. 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. 273-290-2-2001

**273 299. Honors Seminar in Psychology.** (1-3). Selected topics. Open to non-majors in the Honors Program. 273-299-0-2001

**273 400. Personalized Instruction in General Psychology.** (1-3) 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.: Psych. 110. 273-400-2-2001

**273 425. Problem Solving and Decision Making.** (3). I. 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.: 273-110. 273-425-0-2099

**273 440. Psychology of Individual Differences.** (3) I. Introduction to principles and methods of psychological testing; discussion of problems and findings in the study of individual and group difference in behavior; role of biological and social factors. Pr.: Psych. 110. 273-440-0-2006

**273 460. Information Processing and Memory.** (3). A survey of the manner in which people extract and utilize 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. 250. 273-460-0-2002

**273 461. Laboratory in Cognitive Processes.** (1) I. May be taken only in conjunction with Psych. 460. Supervised experimentation in cognitive processes. Pr.: Conc. enrollment in Psych. 460. 273-461-1-2002

**273 475. Principles of Learning and Motivation.** (3) Introduction to the study of learning and motivation in both animals and humans. Pr.: Psych. 250. 273-475-0-2002

**273 476. Laboratory in Learning and Motivation.** (1) May be taken only in conjunction with Psych. 475. Supervised experimentation in learning. Pr.: Conc. enrollment in Psych. 475. 273-476-1-2002

**273 480. Fundamentals of Perception and Sensation.** (3) I. Empirical and theoretical approaches to phenomena of sensation and perception. Pr.: Psych. 250. 273-480-0-2002

**273 481. Laboratory in Perception and Sensation.** (1) I. May be taken only in conjunction with Psych. 480. Supervised experimentation in perception and sensation. Pr.: Conc. enrollment in Psych. 480. 273-481-1-2002

### Undergraduate And Graduate Credit In Minor Field

**273 505. Abnormal Psychology.** (3). An introductory study of behavior pathologies, with emphasis on their etiology and treatment. Pr.: Junior standing; Psych. 110. 273-505-0-2099



**273 520. Personality Development.** (3). Introduction to developmental and psychodynamic views of personality, emphasizing psychoanalytic and social learning theories, and empirical studies of personality development from adolescence to old age, supplemented by case material; considers origins of personality in heredity and early experience, socialization practices, conflict, and defense mechanisms. Pr.: Psych. 110; sophomore standing. 273-520-0-2009

**273 535. Social Psychology.** (3). Psychology of the individual in society: social attitudes and behavior (e.g., voting, prejudice), their measurement, development and change in relation to individual personality and social influence. Pr.: Psych. 110. 273-535-0-2009

**273 545. Consumer Psychology.** (3) II. 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. 273-545-0-2008

**273 550. Group Dynamics.** (3). Behavior in small groups, including a consideration of communication, the development of standards, the effect of pressures, the characteristics of leadership. Pr.: Six hours in psychology. 273-550-0-2005

**273 560. Industrial Psychology.** (3). II. Survey of human behavior and psychological principles in an industrial/organizational context. Topics include: personnel selection, performance appraisal, work motivation, job satisfaction, training, leadership, and social behavior within organizations. Pr.: 273-110. 273-560-0-2008

**273 565. 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. 273-565-0-2001

**273 570. Psychobiology.** (3). Human and animal behavior from viewpoints of psychology, physiology, and zoology. Includes neurophysiology, control of behavior by simple "brains," homeostasis in mammals, and the regulation of behavior by internal and external events. Pr.: Biol. 198, Psych. 110. 273-570-0-2010

**273 575. Environmental Psychology.** (3) I. Introduction to the study of man's behavior in relation to his physical setting. Definitions of man-environment system, behavior settings, methods of environmental research, and 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. 273-575-0-2008

**273 580. Psychology of Sexual Behavior.** (3) 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. 273-580-0-2005

**273 590. Experimental Psychology Seminar.** (2-3). Intensive discussion of selected topics. May be repeated. Pr.: Either Psych. 460, 475, or 480. 273-590-0-2002

**273 595. Personality-Social Seminar.** (2-3). Intensive discussion of selected topics. May be repeated. Pr.: Either Psych. 605 or 620. 273-595-0-2003

**273 598. Basic Concepts in Clinical Psychology.** (3). 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. 250 and 505. 273-598-0-2003

**273 599. Laboratory in Clinical Concepts.** (2) II. May be taken only in conjunction with Psych. 598. Supervised practice in, demonstration of, and orientation to selected psychological techniques and practices. Pr.: Conc. enrollment in Psych. 598. 273-599-1-2003

## Undergraduate And Graduate Credit

**273 605. Foundations of Social Behavior.** (3) II. Selected empirical and theoretical approaches to such areas as attitudes, social influence, and the social bases of human behavior. Pr.: Psych. 435 and either Psych. 460, 475 or 480. 273-605-0-2005

**273 606. Laboratory in Social Behavior.** (1) II. May be taken only in conjunction with Psych. 605. Supervised research in social behavior phenomena. Pr.: Conc. enrollment in Psych. 605. 273-606-1-2005

**273 616. Comparative Psychology.** (3). Behavior at different phylogenetic levels as an aid to the clarification of behavioral principles. Pr.: Consent of instructor. 273-616-0-2010

**273 620. Psychology of Personality.** (3). Discussion of different approaches to the study of personality. Pr.: Any of the following: either Psych. 460, 475 or 480. 273-620-0-2099

**273 621. Laboratory in Personality Research.** (1). May be taken only in conjunction with Psych. 620. Supervised research in personality phenomena. Pr.: Conc. enrollment in Psych. 620. 273-621-1-2099

**273 622. 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 Educ. 405 215. 273-622-0-2009

**273 625. Engineering Psychology.** (3). The role of behavioral factors in the design and operation of machines and equipment. Pr.: Psych. 110, Stat. 330 or 707. 273-625-0-2008

**273 710. 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. 273-710-0-2005

**273 750. 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 250. 213-750-0-2002

**273 775. 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. 273-775-0-2001

**273 790. Topics in Psychology.** (Var.) I, II, S. Pr.: Psych. 110 and consent of instructor. 273-790-3-2001

**273 799. Problems in Psychology.** (Var.) I, II, S. Pr.: Psych. 110 and consent of instructor. 273-799-3-2001

## Graduate Credit

**273 801. 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. 250 or equiv. 273-801-0-2002

**273 802. Quantitative Methods in Psychology.** (3). Examination of the nature of statistical inference in psychological research: hypothesis testing and statistical estimation, including a survey of non-parametric methods; consideration of correlational techniques useful with different kinds of psychological data. Pr.: Stat. 330 or equiv. 273-802-0-2007



**273 803. Introduction to Physiological Psychology.** (3). A survey of basic concepts and experiments in the study of physiological correlates of behavior, including sensory and motor processes, learning, motivation and emotion. Pr.: Biol. 198 and Psych. 110. 273-803-0-2010

**273 804. Laboratory in Physiological Psychology.** (1). May be taken only in conjunction with Psych. 803. Supervised research in physiological correlates of behavior. Pr.: Conc. enrollment in Psych. 803. 273-804-1-2010

**273 805. Experimental Design in Psychology.** (3). Introduction to techniques of research planning and experimental design, including critical evaluation of selected experiments. Pr.: Psych. 802. 273-805-0-2007

**273 806. Psychological Measurement.** (4). A review of the logic and methodology underlying the construction of psychological measuring instruments from the psychophysical estimate of threshold to the scaling of complex psychological variables. Three hours rec. and two hours lab. a week. Pr.: Psych. 110 and Stat. 330. 273-806-0-2006

**273 810. Motivation and Learning.** (3). Experimental study of learning and motivation, with emphasis on recent developments in the field. Pr.: Psych. 250 or equiv. 273-810-0-2002

**273 812. 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. 250 or equiv. 273-812-0-2002

**273 814. Human Learning and Retention.** (3). Analysis of processes involved in human learning, transfer and retention, with emphasis on current developments in the field. Pr.: Psych. 250 or equiv. 273-814-0-2002

**273 820. 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. 273-820-0-2099

**273 825. Judgmental Processes.** (3). Examination of empirical findings and theoretical approaches to decision making and judgment with emphasis on higher cognitive processes. Pr.: Psych. 250 and 802. 273-825-0-2002

**273 830. 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. 435. 273-830-0-2005

**273 860. Practicum in Counseling Psychology.** (Var.) Supervised practical experience in counseling. Pr.: Consent of instructor. 273-860-2-2004

**273 875. Industrial Psychology: Personnel Training.** (3) II. An examination of the training of personnel in an organization. Relevant 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.: 273-560 or equivalent. 273-875-0-2008

**273 899. Research in Psychology (M.S.).** (Var.) Pr.: Consent of supervisory committee. 273-899-4-2001

**273 908. Advanced Physiological Psychology.** (3). A study of the neural and endocrinological correlates of behavior. Pr.: Psych. 803. 273-908-0-2010

**273 909. Sensory Processes.** (3). Experimental study of sensory and perceptual processes, with emphasis on recent developments in the field. Pr.: Psych. 250 or equiv. 273-909-0-2002

**273 911. Vision.** (3). Principal facts of space and color perception, with emphasis on specification and measurement of stimulus conditions; the constancies; elementary principles of refraction; color blindness and other visual anomalies. Lectures and demonstrations. Pr.: Psych. 250 or 909. 273-911-0-2010

**273 915. Experimental Analysis of Behavior.** (3) Every other year or on sufficient demand. The use of operant conditioning techniques in the study of sensory processes, chaining, stimulus control and punishment; applications to psychopharmacology, unusual environments, and psychotherapy. Pr.: Psych. 810. 273-915-0-2002

**273 919. Advanced Measurement.** (3). The logic of measurement, scaling theory, psychophysics and psychometrics, and problems in classification and prediction. Pr.: Psych. 806. 273-919-0-2006

**273 921. 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. 273-921-0-2099

**273 922. Psychopathology.** (3). A systematic review of behavior disorders, their etiology and treatment. Pr.: Psych. 505 and 620. 273-922-0-2099

**273 925. 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. 273-925-0-2009

**273 931. Advanced Social Psychology.** (3). Intensive examination of the social determinants of behavior, with emphasis upon problems of current professional interest. May be repeated. Pr.: Psych. 830. 273-931-0-2005

**273 951. Seminar in Physiological Psychology.** (1-3). Selected topics in physiological psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. 273-951-0-2010

**273 952. Seminar in Sensory Processes.** (1-3). Selected topics in sensory psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. 273-952-0-2002

**273 953. 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. 273-953-0-2099

**273 954. 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 909, or consent of instructor. 273-954-0-2002

**273 955. Seminar in Animal Behavior.** (1-3). Discussion of selected topics of current experimental interest in the areas of animal learning and/or comparative psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. 273-955-0-2002

**273 956. 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. 273-956-0-2006

**273 957. 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. 273-957-0-2002

**273 958. 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. 273-958-2-2001

**273 959. 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. 273-959-0-2005



**273 968. 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. 273-968-0-2001

**273 970. Seminar in Human Performance.** (1-3). Discussion of current professional problems in psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. 273-970-0-2008

**273 990. Internship in Psychology.** (Var.) Pr.: Consent of the supervisory committee. 273-990-2-2001

**273 999. Research in Psychology (Ph.D.).** (Var.) Pr.: Consent of supervisory committee. 273-999-4-2001

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## SOCIOLOGY, ANTHROPOLOGY AND SOCIAL WORK

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*Eugene A. Friedmann,\* Head of Department*

Professors Friedmann,\* Rohrer,\* and Schnur,\* Associate Professors Finnegan,\* O'Brien,\* Orbach,\* M. Ottenheimer,\* Peters,\* and Taylor,\* Assistant Professors Benson, Brede, Camp,\* Cross,\* Dushkin,\* C. Flora,\* J. Flora,\* Harris,\* Miley,\* H. Ottenheimer,\* Pelletier, and Shanline.

The Department of Sociology, Anthropology and Social Work offers four separate undergraduate majors: 1) general sociology; 2) sociology/corrections; 3) anthropology and 4) social work. 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. M.A. programs are offered in general sociology and in sociology/corrections option. The department also offers a Ph.D. program in sociology with a specialization in the areas of community and rural organization and social change and development. Descriptions of the specific undergraduate majors and graduate programs are given below.

### 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.

The trained sociologist is prepared for professional work in social research, teaching, community and government planning and service agencies, and corrections and law enforcement careers. It is also a desirable background, as either a sole or a combined major, for further professional training in law, city planning, public administration, hospital administration, as well as for advanced graduate work in sociology or other of the social sciences.

**The Undergraduate Program.** Students who desire to major in sociology should refer to the general requirements for the B.A. or B.S. degree (see page 91). There is a choice of two majors in the undergraduate sociology program: (1) general sociology; or (2) correctional administration. The student interested in sociology who desires to teach in secondary schools should prepare for teacher certification with a major in sociology (see pages 200 and 205).

Students enrolled in general sociology will be required to take 28 semester hours of sociology to

include Soc. 211, 511 and 520. In addition to the other requirements nine hours of electives in sociology are to be taken at the 500 level or above, and an additional nine hours are required at the 600 level and above.

Students enrolled in correctional administration will be required to take 31 semester hours of sociology to include Soc. 211, 511, 520, 661, 762 and two of the following: Soc. 660, 763, 764, 765, or 766. These courses are intended to help people prepare for a variety of correctional positions concerned with integrating and reintegrating law violators into society. These positions include, among others: probation and parole officer, prison classification officers, reformatory counselors, juvenile institution case managers, probation and parole supervisors, regional and state directors of probation and parole, parole board members, community correction center positions, institutional supervisors and program directors, deputy and associate wardens, superintendents, wardens, directors and commissioners of state correctional systems, teachers, and researchers.

**The Graduate Program.** The graduate programs in sociology provide the student with the opportunity to develop skills and interests in specific areas of focus 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 full range of sociological specialties and a broad sociological background. It is primarily intended to prepare students who want to continue into Ph.D. programs. However, it may also be designed for students who want to teach in community colleges or work in areas of applied research.

The M.A. in sociology with a correctional administration option offers a balanced program of basic and applied sociological studies for those preparing for professional careers in correctional administration.

The Ph.D. program offers specialized training in community and rural organization, societal change and development, sociological theory, and research methods. Additional training is provided in demography and human ecology, deviant behavior, social psychology, and social organization. Graduates will be prepared for academic teaching and research careers as well as for applied social research.

Sociology students may draw upon related graduate programs in computer science, statistics, and various social and behavioral sciences in designing individual programs of study. Special University programs in the economics of development, regional and community studies, and South Asian studies may be relevant for specific objectives. An IBM 370 and a computing center with a full range of facilities and services is available to graduate students. Research facilities in the Department of Sociology, Anthropology and Social Work include a population research laboratory, a community studies laboratory, and a statistical laboratory.

For the major in social work see page 180.

For the major in anthropology see page 178.



## Courses in Sociology

### Undergraduate Credit

**277 211. Introduction to Sociology.** (3) I, II, S. Development, structure, and functioning of human groups; social and cultural patterns; and the principal social processes. 277-211-0-2208

**277 214. Introduction to Sociology.** H (4) I, II. Development, structure and functioning of human groups; societal and cultural patterns; the nature of sociological inquiry. Lecture, discussion and independent study. 277-214-0-2208

**277 301. Topics in Sociology.** (3). Supervised independent and/or interdisciplinary study projects. Pr.: Soc. 211 and consent of instructor. 277-301-0-2208

**277 399. Honors Seminar in Sociology.** (1-3). Readings and discussion of selected topics. Open to non-majors in the Honors Program. 277-399-3-2208

**277 411. Social Problems.** (3) I, II, some S. Problems of personal and social disorganization, such as adolescence, juvenile delinquency, crime, mental illness, unemployment, and family instability; methods of prevention and treatment. Pr.: Soc. 211. 277-411-0-2208

### Undergraduate And Graduate Credit In Minor Field

**277 501. 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. 277-501-0-2208

**277 505. Introduction to the Civilizations of South Asia I.** (3) I. Interdisciplinary survey of the development of civilizations in South Asia; geographical and demographic context; philosophical and social concepts; social and political institutions, literature and historical movements. (Same as Hist. 505, Geog. 505, P. Sci. 505, Anthro. 505.) Pr.: Soc. 211. 277-505-0-2208

**277 506. Introduction to the Civilizations of South Asia II.** (3). Interdisciplinary survey of recent and contemporary civilizations in India, Pakistan, Ceylon, Nepal, and Afghanistan, including literature, geography, social and political structure, ideas. (Same as Hist. 506, Econ. 506, P. Sci. 506, Anthro. 506.) Pr.: Soc. 211. 277-506-0-2208

**277 510. Social Welfare as a Social Institution.** (3). 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 SW 510.) Pr.: Soc. 211. 277-510-0-2208

**277 511. Comparative Social Theories.** (3). Investigations of a range of current sociological theories concerning the socialization process, group behavior and social organization. Pr.: Soc. 211. 277-511-0-2208

**277 520. Methods of Social Research I.** (4). 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.: Soc. 211, Stat. 330 or equiv. To include one credit hour of laboratory and field research experience. 277-520-1-2208

**277 530. Population and Human Ecology.** (3). Theories, policies, growth, composition, spatial aspects, movements, and world population trends. Pr.: Soc. 211. 277-530-0-2208

**277 531. Urban Sociology.** (3). 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.: Soc. 211. 277-531-0-2208

**277 532. Community Organization and Leadership.** (3). American community organization; special emphasis on community problems and planning. Pr.: Soc. 211. 277-532-0-2208

**277 533. Sociology of Agricultural Organization in the U.S.** (3). 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.: Soc. 211. 277-533-0-2208

**277 540. Social Organization.** (3). Principles and processes of the organization and structure of human societies. Analysis of social groups and institutions and theories of social structure. Pr.: Soc. 211. 277-540-0-2208

**277 542. The Social Organization of the Future.** (3). 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.: Soc. 211. 277-542-0-2208

**277 545. The Sociology of Women.** (3). The position of women in the United States and cross-culturally is studied empirically and in theoretical perspective; analysis of social structural inputs to female status; examination of socialization and sex roles. Pr.: Soc. 211. 277-545-0-2208

**277 550. Group Processes and Social Behavior.** (3) I, II. Analysis of processes of group formation, maintenance and change and their interrelationships with individual social behavior. Consideration of major theoretical approaches and their empirical foundations. Pr.: Soc. 211. 277-550-0-2208

**277 565. Program and Policy Formulation and Analysis.** (3). 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 legislative action. (Same as SW 565.) Pr.: Soc. 260, 510. 277-565-0-2104

**277 570. Race and Ethnic Relations in the U.S.A.** (3). Racial and cultural groups; attitudes, prejudices, conflicts; approaches to understanding race and minority group relations in the U.S.A. Pr.: Soc. 211. 277-570-0-2208 (Same as 277 618)

**277 590. Senior Seminar in Sociology.** (3) I. Integration of courses in sociology. Pr.: Soc. 211. 277-590-0-2208

**277 618. Religion in Culture.** (3). The nature of religion in nonliterate and peasant societies, and its manifestations in different cultural systems. (Same as Anthro. 618.) Pr.: Anthro. 200 or Soc. 211. 277-618-0-2208

**277 640. 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.: Soc. 211. 277-640-0-2208

**277 660. Juvenile Delinquency.** (3). Nature, extent, and causes of delinquency; characteristics of delinquents; means of prevention and treatment. Pr.: Soc. 211. 277-660-0-2209

**277 661. Criminology.** (3) I, II. Nature, extent, and causes of crime; programs for prevention and treatment. Pr.: Soc. 211. 277-661-0-2209

### Graduate And Undergraduate Credit

**277 701. Problems in Sociology.** (Var.) I, II, S. Pr.: Soc. 211 and junior standing. 277-701-3-2208

**277 702. Political Sociology.** (3). An introduction to the principles of political sociology. Theories of politics and society. 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 Pol. Sci. 702.) Pr.: Soc. 211, Pol. Sci. 110. 277-702-0-2208



**277 709. Development of Social Thought.** (3). 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.: Soc. 211. 277-709-0-2208

**277 710. Systematic Analysis of Social Theory.** (3). Examination of contemporary sociological theory with reference to the nature of scientific explanation and the function of scientific theory. Critical study and analysis of selected social theorists and types of social theory with the objective of clarifying the conceptual and logical structure of underlying theoretical models and their assumptions about man and society. Pr.: Soc. 511 or equiv. 277-710-0-2208

**277 721. Methods of Social Research II.** (3). Treatment of current sociological research techniques and applications. Examines the logic and strategy of sociological measurement, data gathering procedures, and data analysis. Considers problems of conceptualization and operationalization, measurement and scaling, sampling, the construction of research instruments, the presentation and analysis of data in tabular and graphic form, and the selection and application of standard techniques for data analysis. Pr.: Soc. 520, Stat. 702 or equiv. 277-721-1-2208

**277 722. Specialized Techniques of Social Research.** (3). 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.: Soc. 211 and 721 or equiv. 277-722-0-2208

**277 730. Methods of Demographic Analysis.** (3). Procedures and techniques for the collection, evaluation and analysis of demographic data, measures of population composition and of fertility, mortality and migration. Construction of life tables; population estimates and forecasts. Pr.: Soc. 211. 277-730-1-2208

**277 732. Applied Community Change.** (3). Dynamics of community change processes. Emphasizes community organizing, efficacy of voluntary organizations and local governmental agencies, and the role of extra-community institutions in bringing about or blocking change. Pr.: Soc. 211 and 731 or equiv. 277-732-0-2208

**277 734. Sociology of Agricultural Development.** (3). 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.: Soc. 211. 277-734-0-2208

**277 735. Human Ecology.** (3). 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.: Soc. 211 and consent of instructor. 277-735-0-2208

**277 740. Comparative Social Systems.** (3). Comparison of social systems in the Orient, Middle East, Europe, and the Americas. Pr.: Soc. 211. 277-740-0-2208

**277 741. Social Differentiation and Stratification.** (3). Analysis of societal organization based on age, sex, residence, occupation, community, class, caste, and race. Pr.: Soc. 211. 277-741-0-2208

**277 742. South Asian Social Systems.** (3). Survey of contemporary research and analysis of family and caste structures, demography, mobility, urbanization and modernization in India and Pakistan. Focus on social change: intentions, methods, consequences. Pr.: Soc. 211 or Anthro. 200 and either Soc. 505, Anthro. 505 or Anthro. 645, or consent of instructor. 277-742-0-2209

**277 744. Social Gerontology: An Introduction to the Sociology of Aging.** (3). 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.: Soc. 211. 277-744-0-2208

**277 745. Sociology of Sport.** (3) I, 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.: Soc. 211 or consent of instructor. (Cross-listed as 261 745.) 277-745-0-2208

**277 746. The Sociology of Formal Organizations.** (3). The nature and types of formal and complex organizations; the connections between them and of their societies; and selected aspects of their internal structure, such as peer group and hierarchical relations in organizations, processes of communication, management, and impersonal mechanisms of control. Studies a variety of formal organizations with particular emphasis upon industrial, educational, and governmental organizations. Pr.: Soc. 211. 277-746-0-2208

**277 747. Sociology of Work.** (3). 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.: Soc. 211. 277-747-0-2208

**277 750. Social Control.** (3). Analysis of social and institutional processes and mechanisms of social control: socialization, role allocation, systems of social sanctioning, growth and dynamics of institutional systems of social control. Theoretical approaches to social control emphasizing its character at the institutional and societal level of analysis. Pr.: Soc. 211. 277-750-0-2208

**277 751. 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.: Soc. 211. 277-751-0-2208

**277 752. Social Roles and Social Relationships.** (3). 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.: Soc. 211 and 550. 277-752-0-2208

**277 753. Sociology of Mass Communications.** (3). Social organization and change as influenced by the control, structure, and function of mass communications. Pr.: Soc. 211. 277-753-0-2208

**277 762. Correctional Communities and Their Administration.** (3). The world of the prisoner; an analysis of the society of captives and their captors within the total correctional process. Pr.: Soc. 211. 277-762-0-2105

**277 763. Classification, Training and Treatment in Correctional Institutions.** (3). The organization and delivery of classification, training, and treatment services in prisons, reformatories, and other correctional institutions. Evaluation of the impact of these services upon subsequent criminal behavior. Pr.: Soc. 211 and 762 or consent of instructor. 277-763-0-2105

**277 764. Security, Custody and Discipline in Correctional Institutions.** (3). Analysis of the maintenance of security, custody, and discipline in prisons, reformatories, and other correctional institutions. Purpose, principles, definitions, problems and the role of social control in institutions. Implications for the integration and reintegration of law violators. Pr.: Soc. 211 and 762 or consent of instructor. 277-764-0-2105



**277 765. Correctional Treatment Practices.** (3). Theories and methods for treatment of delinquents and criminals. Social and cultural variables affecting treatment. Evaluation of treatment effectiveness. Pr.: Soc. 211 and 762 or consent of instructor. 277-765-0-2105

**277 766. Probation and Parole.** (3). Probation and parole systems; roles of judges, parole board members, and professional personnel; criteria for parole selection and evaluation of success; attitudes toward probation and parole. Pr.: Soc. 211 and 762 or consent of instructor. 277-766-0-2105

**277 767. Social Reactions to Deviance.** (3). Selected topics in the sociology of deviance, such as (1) public reactions to deviant persons and groups, (2) the nature and extent of formally organized responses to deviance, and (3) deviance considered from the perspective of deviant actors. Pr.: Soc. 411 and consent of instructor. 277-767-0-2208

**277 770. Sociology of Dominant-Minority Relations.** (1-3). Advanced sociological views of race or ethnic relations in industrialized societies; comparative, evolving and contemporary perspectives on dominant-minority relations. Pr.: Soc. 211 and consent of instructor. 277-770-0-2209

### Graduate Credit Only

**277 898. Master's Report Research.** (Var.) I, II, S. 277-898-4-2208

**277 899. Master's Thesis Research.** (Var.) I, II, S. 277-899-4-2208

**277 911. Seminar in Sociological Theory.** (3). Contemporary sociological theory as systems of explanation of social phenomena and as bases for empirical research. Particular attention given to problems of conceptualization, system building and verification. Pr.: Soc. 511 and 710 or equiv. 277-911-0-2208

**277 912. Seminar: Theory Construction in Sociology.** (3). An examination of alternative logical strategies in theory construction with emphasis on theory construction as a research tool. Pr.: Soc. 511 and 710 or equiv. 277-912-0-2208

**277 920. Seminar in Sociological Research.** (3). Application of scientific techniques in the design and execution of research. Pr.: Soc. 710 or equiv. 277-920-0-2208

**277 930. Seminar in Community Analysis.** (3). Various aspects of the structural and functional analyses of communities: demographic, ecological, organizational, institutional. Pr.: Soc. 530 or equiv. 277-930-0-2208

**277 931. Seminar in Demography** (3) II. Demography as a professional scientific discipline with intensive analysis of demographic techniques. Pr.: Soc. 530 or equiv. 277-931-0-2208

**277 932. Seminar in Rural Sociology.** (3). 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.: Soc. 733 or 734 or equiv. 277-932-0-2208

**277 940. Seminar in Social Organization.** (3). Consideration of selected approaches to the study of societal organization, organizational theory and analysis. Pr.: Consent of instructor. 277-940-0-2208

**277 943. Research in Family Organization.** (3). 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. 277-943-0-2208

**277 950. Seminar in Sociology of Small Groups.** (3). Longitudinal and cross-sectional analyses of the basic elements in social interaction. Pr.: Soc. 550, 752 or equiv. 277-950-0-2208

**277 951. Seminar in Societal and Institutional Dynamics.** (3) I or 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.: Soc. 751 or equiv. 277-951-0-2208

**277 962. Seminar in Deviant Behavior and Social Disorganization.** (3). Analysis in detail and depth of selected forms of deviant behavior and their relevance to social disorganization. Pr.: Consent of instructor. 277-962-0-2208

**277 999. Ph.D. Dissertation Research.** (Var.) 277-999-4-2208

### Anthropology

Anthropology emphasizes the interdependence of man's genetically inherited and socially learned characteristics in the study of human nature. Accordingly, it is comprised of two main divisions: physical anthropology and cultural anthropology. Additionally, anthropologists base their generalizations on the most diverse possible sample of biological types and cultures, including those of nonliterate or folk peoples and those of the prehistoric past. Thus, physical anthropologists study both present-day races and the fossil remains of extinct groups; and cultural anthropologists study existing cultures of various levels of complexity as well as prehistoric cultures.

Professional anthropologists engage in teaching or research at the university level or work in applied areas such as the designing of garments or equipment for the military, identification of human remains, mental health research, public health research, consultation and research in the administration of dependent peoples, and training programs for those who work among culturally alien peoples. Those who wish to work as professional anthropologists should plan to obtain a graduate degree.

The undergraduate major is of special value for those who expect to work in technical assistance programs, foreign missionary enterprises, the diplomatic service, or in any other capacity involving dealing with culturally different persons in the United States or in other countries. It is relevant to all lines of endeavor which require an understanding of how human cultures function, for example, social work, religious ministry, counseling, personnel administration, teaching, and industrial relations.

Course work is available in five areas: ethnology (the comparative and generalizing study of culture), ethnography (the descriptive study of nonliterate or folk cultures), linguistic anthropology (the cross-cultural study of languages), archaeology (the study of prehistoric cultures), and physical anthropology (the study of man's evolution and racial variation).

The requirements for a B.A or B.S. in anthropology consist of a minimum of 27 hours in anthropology as follows:

I. Anthro. 200, 260, 280, and 660 (or equivalent courses approved by anthropology faculty).

II. Anthro. 602.

III. Twelve elective hours at or above the 500 level to be distributed among at least two of the following: 1) ethnology and ethnography, 2) linguistic anthropology, 3) archaeology, and 4) physical anthropology.



## Courses In Anthropology

### Undergraduate Credit

**278 100. Kansas Archaeology.** A basic information course which examines the basic prehistoric cultural adaptations who lives in Kansas from man's first appearance in the State about 12,000 years ago to Kansa, Pawnee, Wichita and Plains Apache tribes at the time of Coronado's entrance in A.D. 1547. The role of Kansas archaeology in the development of American anthropology will be discussed as well as the present and potential future destruction of that heritage by land and industrial development. 278-100-0-2202

**278 200. Introduction to Cultural Anthropology.** (3) I, II, S. Introduction to basic anthropological concepts; technological, social and religious characteristics of nonliterate cultures. 278-200-0-2202

**278 201. Introduction to Cultural Anthropology.** H (4). Introduction to basic anthropological concepts; technological, social, and religious characteristics of nonliterate cultures; discussion and independent study. 278-201-0-2202

**278 260. Introduction to Archaeology.** (3) I, II. History of archaeological research; survey of concepts and methods of the field and laboratory; brief outlines of the major Old and New World cultural sequences. 278-260-0-2202

**278 280. Introduction to Physical Anthropology.** (3) I, II. History of research; principles of evolution and human genetics; man's primate relations; fossil evidence of the evolution of man; the study of modern race; culture and evolution. 278-280-0-2202

**278 399. Honors Seminar In Anthropology.** (1-3). Offered on demand. Readings and discussion of selected topics. Open to non-majors in the Honors Program. 278-399-3-2202

### Undergraduate And Graduate Credit In Minor Field

**278 501. Proficiency Development.** (1-3). 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. 278-501-0-2202

**278 505. Introduction to the Civilizations of South Asia I.** (3). Interdisciplinary survey of the development of civilizations in South Asia; geographical and demographic context; philosophical and social concepts; social and political institutions; literature and historical movement. Pr.: Anthro. 200. (Same as Hist. 505, Geog. 505, P. Sci. 505, Soc. 505.) 278-505-0-2202

**278 506. Introduction to the Civilizations of South Asia II.** (3). Interdisciplinary survey of recent and contemporary civilizations in India, Pakistan, Ceylon, Nepal, and Afghanistan, including recent history, current economy, religion, culture, languages, literature, geography, social and political structure, ideas. Pr.: Anthro. 200. (Same as Hist. 506, Econ. 506, P. Sci. 506, Soc. 506.) 278-506-0-2202

**278 520. Senior Seminar.** (3). 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. 278-520-0-2202

**278 531. Peasant Society.** (3). A comparative approach to agrarian societies; the investigation of economic, political, social and ideological aspects of peasantry. 278-531-0-2202

### Undergraduate And Graduate Credit

**278 600. Cultural Dynamics.** (3). 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.: Anthro. 200 or consent of instructor. 278-600-0-2202

**278 602. Anthropological Theory.** (3). Review and integration of the major theoretical approaches in the principal branches of anthropology, history and contemporary methodology and theory. Pr.: Anthro. 200 or consent of instructor. 278-602-0-2202

**278 604. Culture and Personality.** (3). Anthropological contributions to personality study; cross-cultural comparisons of personality types, means of personality formation in nonliterate and folk cultures; culture change and personality. Pr.: Three hours of anthropology or consent of instructor. 278-604-0-2202

**278 608. Economic Anthropology.** (3). An investigation of the relationship of economic organization to the rest of social organization and culture. Discussion of exchange and display, money, trade and markets, and economic development and social change in selected societies. 278-608-0-2202

**278 610. Social Organization in Nonliterate Cultures.** (3). Families, lineages, clans, age sets, tribal fraternities, secret societies, tribes, nations, and other groups found among the world's folk peoples. Special emphasis on how these relate to human behavior. Pr.: Anthro. 200, or Soc. 211, or consent of instructor. 278-610-0-2202

**278 612. Political Anthropology.** (3). Anthropological approaches to the study of 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. 278-612-0-2202

**278 613. Afro-American Music.** (3). Negro music of the New World viewed in a culture-historical framework. Examination of the social conditions under which African and European music styles came into contact in the New World and the ways in which they blended to form the unique style of calypso, blues and jazz. Pr.: Anthro. 200 or consent of instructor. 278-613-0-2202

**278 615. Expressive Culture.** (3). How anthropologists view the expressive and creative aspects of culture. A cross-cultural survey of the verbal, visual and performing arts in non-literate societies. Pr.: Anthro. 200 or consent of instructor. 278-615-0-2202

**278 616. Music and Culture.** (3). Music as an aspect of human behavior. Exploration of structural and functional relationships between music and other aspects of culture. Style area survey. Pr.: Anthro. 200 or consent of instructor. 278-616-0-2202

**278 618. Religion In Culture.** (3). The nature of religion in nonliterate and peasant societies, and its manifestations in different cultural systems. Pr.: Anthro. 200 or Soc. 211 or consent of instructor. 278-618-0-2202 (Same as 277 618)

**278 619. Applied Anthropology.** (3). Application of anthropological principles and insights to programs of planned change and cultural innovation. Pr.: Anthro. 200 or consent of instructor. 278-619-0-2202

**278 622. Special Topics In Anthropology.** (3). Offered on sufficient demand. Variable topics within cultural anthropology, anthropological linguistics, archaeology, or physical anthropology. Pr.: Relevant anthropology courses or consent of instructor. 278-622-3-2202

**278 625. Independent Reading and Research In Anthropology.** (1-3). 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. 278-625-3-2202

**278 630. Indians of North America.** (3). Aboriginal cultures of Canada and the United States; culture contact and change among surviving groups. 278-630-0-2202



**278 632. Indians of Middle America.** (3). Description and comparison of Tarahumara, Aztec, Maya, Cuna, and other civilizations and non-literate cultures of Mexico, Central America, and the Caribbean ring. Culture contact and change in surviving tribes. 278-632-0-2202

**278 634. Indian Cultures of South America.** (3). 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. 278-634-0-2202

**278 636. Cultures of Afro-America.** (3). 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.: Anthro. 200 or consent of instructor. 278-636-0-2202

**278 645. Cultures of South Asia.** (3). 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. 278-645-0-2202

**278 650. Cultures of Africa.** (3). Description and comparison of the aboriginal cultures of Africa south of the Sahara. Culture contact and change. 278-650-0-2202

**278 660. Linguistic Anthropology.** (3). The functions of language as an aspect of culture; diversity, distribution, and dynamics of language; linguistics in anthropology. Pr.: Three hours of anthropology or consent of instructor. 278-660-0-2202

**278 670. Archaeology of North America.** (3). 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.: Anthro. 200, or 260, or consent of instructor. 278-670-0-2202

**278 673. Precolumbian Civilizations of Mexico and Guatemala.** (3). 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.: Anthro. 200, or 260, or consent of instructor. 278-673-0-2202

**278 676. Archaeology of the Old World.** (3). Origin and evolution of human culture and technology; the major prehistoric sequences of Asia, Africa and Europe; emphasis on period of plant and animal domestication and the European sequences. Pr.: Anthro. 200, 260, or consent of instructor. 278-676-0-2202

**278 679. Archaeological Field Methods.** (3). 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. 278-679-1-2202

**278 685. Race and Culture.** (3). 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. 278-685-0-2202

**278 688. Fossil Man and Human Evolution.** (3). 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. Anthro. 200 or 280 or consent of instructor. 278-688-0-2202

**278 691. Primatology.** (3). 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.: Anthro. 280 or consent of instructor. 278-691-0-2202

**278 694. Osteology.** (3). 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.: Anthro. 280 or consent of instructor. 278-694-0-2202

**278 730. Field and Laboratory Techniques in Archaeology.** (8). 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. Credit may be received twice for this course if the areas or problems involved are different. Pr.: Anthro. 200 or 260 or consent of instructor. 278-730-1-2202

**278 792. Field Methods in Linguistics.** (3) Offered on 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 Speech 792 and Mod. L. 792. 278-792-0-2202

## Social Work

The social work major is intended to prepare the beginning level professional social work practitioner. The curriculum is designed to impart theoretical knowledge of individual development, group processes, and organizational behavior, and to teach a repertoire of versatile skills for problem intervention at various levels.

The Undergraduate Social Work Program is nationally accredited by the Commission on Accreditation of the Council on Social Work Education. This accreditation allows a graduate to be licensed as a Bachelor Degree Social Worker in the State of Kansas, and allows for advanced standing in most graduate programs in social work throughout the United States.

The social work undergraduate major is of particular value to those students who intend to pursue a professional career in social work upon graduation.

The student who wishes to declare a major in social work must first complete the introductory course, 279 260, with a grade of "B" or better. The student must also have a general grade point average of 2.5 It is expected that the major in social work will not be declared before the end of the sophomore year.

A student completing a B.A. or B.S. in social work must successfully complete 46 hours of major courses. These courses are divided into several content areas:

1) Human development and social environment content: 15 credits, in which a student must maintain a 3.0 average: Soc. 411, 550 and 531; Psych. 280 and 420

2) Social work practice content: 6 credits: SW 560 and 561

3) Research content: 4 credits: Soc. 520

4) Social Policy content: 6 credits: SW 510 and SW 565

5) Field Placement: 9 credits: SW 562

6) Professional Social Work Seminar: 3 credits: SW 564.



## Courses in Social Work

**279 260. Introduction to Social Work.** (3). A survey of the fields of social work, the relationship of social work to other social developments and vocational opportunities. 279-260-0-2104

**279 501. 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. For undergraduate credit only. Pr.: Consent of instructor and superior performance in relevant course. 279-501-0-2104

**279 510. Social Welfare as a Social Institution.** (3). 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 Soc. 510.) Pr.: Soc. 211. 279-510-0-2104

**279 560. Skills and Techniques in the Practice of Social Work I.** (3). Fundamental skills and techniques for social workers, emphasizing the nature of social work, engagement and communication skills, observation and information gathering skills. Pr.: Soc. 411, 550 and 531; Psych. 280 and 420. (Social Work majors only.) 279-560-0-2104

**279 561. Skills and Techniques in the Practice of Social Work II.** (3). Social work practice course concentrating on assessment skills and planning decisions for intervention, strategies and roles. Evaluation termination of change efforts and selected work skills such as collaboration, consultation, and supervision will be integral parts of course material. Pr.: SW 560. To be taken concurrently with SW 562. (Social Work majors only.) 279-561-0-2104

**279 562. Field Experience.** (1-9). Supervised field experience in community agencies and programs as a practical application of social work knowledge and skills gained from introductory courses. Emphasis on direct work with clients, whether individuals, groups or communities. Weekly seminar makes use of student's experience to analyze social work theory and practice. Pr.: SW 260, Soc. 510, SW 560. To be taken concurrently with SW 561. (Social Work majors only.) 279-562-2-2104

**279 564. Social Work Professional Seminar.** (3). 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 concurrently with Field Experience SW 562. (Social Work majors only.) 279-564-0-2104

**279 565. Program and Policy Formulation and Analysis.** (3). 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 legislative action. Same as Soc. 565. Pr.: SW 260, 510. 279-565-0-2104

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## SPEECH

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*Norma D. Bunton,\* Head of Department*

Professors Bunton,\* Dace,\* and Flanagan;\* Associate Professors Burke,\* Climenhaga,\* Fedder,\* Longhurst,\* Nichols,\* and Rainbolt;\* Assistant Professors Armagost,\* Aseneta, Gray, Hinrichs,\* Nelman,\* Schenck-Hamlin, Lewis Shelton, Lynn Shelton, and Uthoff; Instructors Atkins, Barnes, Bunker, Dean, Firling, and Molineux; Emeritus: Given.\*

## Undergraduate Study

The Department of Speech offers study in the areas of general speech, linguistics, theatre, and speech pathology-audiology.

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.

Students intending to attempt to quiz out of Oral Communication IA for credit should enroll in the line number in the current line schedule which is designated for speech "quiz out." To receive credit by quiz out, a student must receive an A, B, or C.

## Graduate Study

In the Department of Speech major work is offered leading to the degree Master of Arts in the following fields: general speech, linguistics, speech pathology-audiology, and theatre. See inter-departmental program in linguistics, page 95.

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 science 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 the plans: A, B, or C.

Students in general speech and linguistics 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.

## Courses in General Speech

### Undergraduate Credit

**281 080. Speech Seminar.** (0). Special topics and lectures for speech majors. Required of all majors each semester. 281-080-0-1506

**281 101\* Spoken English for International Students.** (3) I, II. Semi-intensive aural-oral familiarization in American English as a second language. 281-101-1-1506

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\*Three hours academic credit, not applicable toward degree requirements. Student in curriculum requiring 120 credit hours must therefore accumulate 123 or 124 hours when taking this course. Hours will apply toward grade-point average.



**281 105. Oral Communication I.** (2). Selection and outlining of speech material, with emphasis on content, organization, and oral presentation. 281-105-0-1506

**281 106. Oral Communication Ia.** (3). Alternate to Spch. 105 permitting greater emphasis on preparation and delivery of speech material. Credit not granted for both Spch. 105 and 106. 281-106-0-1506

Three hours of credit for Oral Comm. Ia may be earned by "Quiz Out" with an A, B, or C. See description of "Quiz Out" in Speech under Undergraduate Study in Speech.

**281 107. Oral Communication Ib.** (3). 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 Examinations and English Readiness Examinations for International Students. 281-107-1-1506

**281 108. Oral Communication IH.** (2) Honors—Participation in and analysis of oral message situations, with emphasis on communication purposes, message design and presentations. 281-108-0-1506

**281 109. Oral Communication IaH.** (4). Honors Speech preparation and delivery; a survey of topics basic to rhetoric, communication and linguistics. For Arts and Sciences Honors students. 281-109-0-1506

**281 210. Debate and Drama Participation.** (1 or 2). Four hours maximum credit. Pr.: Consent of director of the activity. 281-210-2-1506

**281 220. Oral Communication II.** (2). Cont of Spch. 105 and 106. Study and practice of persuasive appeals in oral and written communication, with special consideration and analysis of the use of these appeals in contemporary speeches. Pr.: Spch. 105 or 106. 281-220-0-1506

**281 226. Argumentation and Debate.** (3). Basic theories of argumentation, with emphasis on their application in academic debate. Pr.: Spch. 105 or 106. 281-226-0-1506

**281 235. 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. 281-235-0-1506

**281 320. Introduction to General Semantics.** (3). Basic studies in general semantics, communication models and related materials; emphasis upon problems of reference, definition and meaning in a communicative context. 281-320-0-1506

**281 321. Public Speaking.** (3). The principles of rhetoric applicable to speech composition and delivery. The preparation of speeches adapted to the professional requirements of students. As a term project each student investigates and speaks upon a significant public question of his own choosing. Pr.: Oral Communication I or Ia 281-321-0-1506

**281 327. Interviewing.** (2-3). Examination of theories of interviewing with emphasis on developing the communication skills essential for an effective job interview. 281-327-1-1506

**281 398. Junior Honors Colloquium.** (Var.) I, II. Open only to juniors in the Arts and Sciences Honors Program. 281-398-0-1506

**281 426. Coaching and Directing Speech Activities.** (3). I. A review of 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. 281-426-1506-E

**281 499. Honors Seminar In Speech.** (1-3). Readings and colloquia on selected topics. For non-speech majors in the Honors Program. Pr.: Honors students only. 281-499-3-1506

### Undergraduate And Graduate Credit In Minor Field

**281 520. 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. 281-520-0-1506

### Undergraduate And Graduate Credit

**281 720. Seminar In General Semantics.** (3). The writings of Alfred Korzybski and other germinal contributors to a modern theory of relationships among experience, linguistic habits and behavior. Pr.: Spch. 320. 281-720-0-1506

**281 725. 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. 281-725-0-1506

**281 726. Persuasion.** (3). The study of communication as persuasion; examination of contemporary approaches to persuasion. 281-726-0-1506

**281 727. Group Discussion Methods.** (3). Examination of research, techniques and principles regarding the activities of face-to-face groups; emphasis upon achieving creative group endeavor through discussion. 281-727-0-1506

**281 728. Discussion and Conference Leadership.** (3). Principles and functions of leadership in face-to-face groups. 281-728-0-1506

**281 730. Rhetorical Theory and Criticism.** (3). Study of rhetorical theory and criticism from early Greek to modern times. 281-730-0-1506

**281 731. Medieval and Renaissance Rhetoric.** (3). A study of the influential works of rhetoric from St. Augustine to Thomas Wilson. Pr.: Spch. 730. 281-731-0-1506

**281 732. Modern Rhetoric.** (3). Readings in the rhetorical theories of Kenneth Burke and other twentieth century contributors. Pr.: Spch. 730. 281-732-0-1506

**281 735. History of the Art of the Film.** (3). History, critical theory, and techniques of the film as an art form from its inception to the present. Pr.: Spch. 235. 281-735-0-1506

**281 736. Film Theory and Criticism.** (3). Studies in film criticism based on the writings of Kracauer, Balasz, Eisenstein, Spottiswoode, and others. Pr.: Spch. 235. 281-736-0-1506

**281 737. Documentary Film.** (3). Production methods, theory, in documentary film production. 281-737-0-1506

**281 799. Problems In Speech.** (Var.). Open to students in any speech area. Pr.: Junior standing and consent of instructor. 281-799-3-1506

### Graduate Credit

**281 820. Seminar In Speech.** (3). Selected topics in speech research. May be repeated for credit with change in topic. 281-820-3-1506

**281 899. Research In Speech.** (Var.). Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor. 281-899-4-1506

## LINGUISTICS

### Undergraduate Credit

**282 280. Introduction to the Study of Language.** (3-4). Survey of the scientific study of language. Contributions of linguistics to an understanding of the nature of language. Presupposes no previous knowledge of linguistics. Three hours lec. and one hour rec. per week. 282-280-0-1505



### Undergraduate And Graduate Credit

**282 681. General Phonetics.** (3). Description of speech sounds and their classification according to place and manner of articulation. Exposure to the sounds of English and those of other languages. Students will acquire the ability to recognize, transcribe, and reproduce possible speech sounds. (Same as Engl. 681 and Mod. Lang. 681). 282-681-1-1505

**282 682. Experimental Phonetics.** (3). Introduction to experimental phonetics. Study of the physiologic, acoustic and perceptual characteristics of speech. Pr.: Spch. 350 and 351. 282-682-1-1505

**282 780. Introduction to Linguistics.** (3). The basic concepts of modern linguistics, with exposure to English and other languages. Provides the student with sufficient background to pursue more advanced courses. Assumes no previous linguistics study, but aimed at more mature students. (Same as Engl. 780 and Mod. Lang. 780.) 282-780-0-1505

**282 781. Introduction to Historical Linguistics.** (3). Methods of historical linguistics as used in the reconstruction of earlier forms and stages of a language. Pr.: Junior standing. (Same as Engl. 781 and Mod. Lang. 781). 282-781-0-1505

**282 782. Language Typology.** (3). Presentation and discussion of the languages of the world and the variant methods of their classification. (Same as Engl. 782 and Mod. Lang. 782). 282-782-0-1505

**282 783. 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., Engl., or Mod. Lang. 681 and 780. (Same as Engl. 783 and Mod. Lang. 783.) 282-783-0-1505

**282 784. Phonology II.** (3). Cont. of 783. Pr.: Spch., Engl., or Mod. Lang. 783. (Same as Engl. 784 and Mod. Lang. 784.) 282-784-0-1505

**282 785. 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 Mod. Lang. 780. (Same as Engl. 785 and Mod. Lang. 785.) 282-785-0-1505

**282 786. Syntax II.** (3). Cont. of 785. Pr.: Spch., Engl., or Mod. Lang. 785. (Same as Engl. 786 and Mod. Lang. 786.) 282-786-0-1505

**282 787. Advanced Syntax.** (3). Discussion of recent contributions in the area of English syntax or general linguistic theory. Pr.: Spch., Engl., or Mod. Lang. 785 and 786. (Same as Engl. 787 and Mod. Lang. 787.) 282-787-0-1505

**282 788. Advanced Phonology.** (3). Discussion of recent contributions in the area of English phonology or general linguistic theory. Pr.: Spch., Engl., or Mod. Lang. 783 and 784. (Same as Engl. 788 and Mod. Lang. 788.) 282-788-0-1505

**282 789. Topics In Linguistics.** (3). Seminar on a special topic in linguistics chosen from a broad spectrum of possible interest areas including history of linguistics, theories of performance, and linguistics and society. Topic to be announced for the semester in which offered. Course may be repeated for credit on another topic. Pr.: Spch., Engl., or Mod. Lang. 780. (Same as Engl. 789 and Mod. Lang. 789.) 282-789-0-1505

**282 791. Methods and Techniques of Learning a Second Language.** (3). Linguistics applied to the learning of a foreign language, especially English as a foreign language. Pr.: 12 hours of a foreign language (includes English for native speakers of languages other than English) and Spch., Engl., or Mod. Lang. 780. (Same as Engl. 791 and Mod. Lang. 791.) 282-791-0-1505

**282 792. Field Methods in Linguistics.** (3). Offered only on 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 Mod. Lang. 792 and Soc. and Anthro. 792.) 282-792-0-1505

### Graduate Credit

**282 890. Current Trends in Linguistics.** (3). Seminar on some aspect of linguistic theory seen as an important new development or as an indication of possible future direction. Pr.: Consent of the instructor. 282-890-0-1505

### Speech Pathology-Audiology

The speech pathology-audiology program exists 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 March 1, 1975 requirements for certification of clinical competence of the American Speech and Hearing Association and the State of Kansas Department of Education requirements for speech clinician and school audiologist.

Evidence of meeting professional competency requires a minimum of 60 semester hours of academic credit. Eighteen 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: (1) information relative to communication disorders, and (2) 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 graduate 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.

In addition, the graduate must have completed a minimum of 300 clock hours of supervised direct clinical experience with a variety of disorders and age groups in the campus speech and hearing clinic and the cooperating school and hospital training sites. Each student's specific course of study is selected in consultation with his or her major adviser.



## Courses in Speech Pathology-Audiology

### Undergraduate Credit

**283 115. Teach Your Child to Talk.** (1). The information presented and discussed is designed to clarify how normal children learn to talk and to explain how parents can aid the development of their child's speech and language. 283-115-0-1120

**283 140. Training of the Speaking Voice.** (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. 283-140-1-1220

**283 240. Elements of English Phonetics.** (3). Analysis of sounds which make up English speech and consideration of how sounds vary phonetically and physiologically; acquire skill in the transcription of speech into the symbols of the International Phonetic Alphabet. 283-240-0-1220

**283 243. 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. 283-243-0-1220

**283 250. 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. 283-250-0-1220

**283 255. Language Development.** (3). Basic review of the development of speech and language skills in children. 283-255-0-1220

**283 340. Hearing Problems and Hearing Tests.** (3). Study of the etiology and classification of hearing disorders. Introduction to hearing tests and measurements. 283-340-1-1220

**283 345. Clinical Procedures in Speech Pathology and Audiology.** (2). 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. 283-345-0-1220

**283 350. Speech and Hearing Mechanisms I.** (3). Anatomy and physiology of normal and abnormal speech mechanisms, including respiration, phonation, resonance and articulation. 283-350-0-1220

**283 351. Speech and Hearing Mechanisms II.** (3). Study of the ear and the mechanics of hearing. Pr.: Spch. 350. 283-351-0-1220

### Undergraduate Credit And Graduate Credit In Minor Field

**283 542. Developmental Psycholinguistics.** (3). II. Research and theory of early development of vocalization, phonology, morphology, syntax, and semantics are reviewed. Variables which influence acquisition are discussed. 283-542-1220-E

### Undergraduate Credit And Graduate Credit In Major Field

**283 643. Language Assessment.** (3). I. An introduction and overview of oral language assessment. An assessment paradigm that divides expressive and receptive tasks or procedures into the morphological, syntactic, and semantic levels of language will be presented. Pr.: Spch. 542. 283-643-1220-E

**283 644. Communication Problems of the Hearing Impaired.** (3). Problems in speech and language habilitation of individuals having hearing losses from mild to profound within appropriate educational and habilitative settings. Pr.: Spch. 640 and 745. 283-644-0-1220

**283 645. Modification of Communication Disorders.** (3). Behavior modification principles are utilized to develop techniques for attenuating, establishing, and maintaining vocal behavior of individuals who possess communication deficits. 283-645-1-1220

**283 649. Diagnostic Methods in Speech Pathology.** (3). Study of diagnostic and appraisal procedures utilized in the evaluation of speech and language disorders. 283-649-1-1220

**283 650. Laboratory in Speech Pathology.** (2-3). Supervised practice in the use of the materials and methods of speech pathology. Pr.: Spch. 645, 646, and 649. 283-650-3-1220

**283 655. Language Intervention.** (3). II. Methods of gaining behavior control, training imitation and treatment of morphological, syntactic, and semantic oral language disabilities in children. Pr.: Spch. 643 or consent of instructor. 283-655-1220-E

**283 656. Speech and Hearing Handicapped School Child.** (3). Study of the management of the speech and hearing impaired child in the school community. Speech improvement methods, utilization of resource personnel and interprofessional relationships are treated. Pr.: Senior standing. 283-656-1-1220

**283 657. Practicum in Public School Speech and Hearing Services.** (5-8). 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 and senior standing. 283-657-2-1220

**283 660. Laboratory in Audiology.** (2-3). Supervised practice in the use of the equipment, materials and methods of audiology. Pr.: Spch. 351 and 640. 283-660-3-1220

**283 740. Hearing Conservation and Rehabilitation.** (3). Principles and practices involved in conservation, preservation, and rehabilitation of hearing. Pr.: Spch. 640. 283-740-1-1220

**283 741. Fluency Disorders.** (3). Research and theory concerning etiology characteristics, assessment and treatment of individuals with disfluency problems. Pr.: Spch. 645. 283-741-0-1220

**283 742. Laryngeal Disorders.** (3). Research and theory concerning etiologies, assessment, and clinical measurement of laryngeal pathologies. Pr.: Spch. 350. 283-742-1-1220

**283 745. Audiology.** (3). The clinical evaluation of hearing including the degree and type of hearing deficit and the subsequent effect on communication. Laboratory practice is required. Pr.: Spch. 340 or equiv. 283-745-1-1220

**283 746. Disorders of Articulation.** (3). Research, theories, and principles concerning the diagnosis and management of articulation disorders. Pr.: Spch. 240. 283-746-1-1220

**283 750. Cleft Palate and Cerebral Palsy.** (3). Research and theory concerning etiology, characteristics, assessment and clinical management of individuals with cerebral palsy and cleft lip and/or palate. Pr.: Spch. 350, 645, and 646. 283-750-1-1220



**283 768. Speech Reading and Auditory Training.** (3). Principles and methods of maximizing receptive communication skills of the hearing impaired. Pr.: Spch. 640. 283-768-1-1220

#### Graduate Credit

**283 840. Neuropathologies of Speech and Language.** (3). Research and theory concerning nature, etiologies, evaluation, and principles of neuropathologies. Pr.: Spch. 645. 283-840-1-1220

**283 843. Advanced Audiometry and Hearing Aids.** (3). Special speech and pure tone audiometric techniques for differentiating neural from conductive impairments, for identifying recruitment, malingering, and other hearing problems; administration of test for hearing aid evaluations. Pr.: Spch. 745. 283-843-1-1220

**283 845. Research Techniques in Clinical Audiology.** (3). Study of the auditory mechanism, with emphasis on critical evaluation of current methods employed in clinical audiology. Pr.: Spch. 745. 283-845-1-1220

**283 846. Seminar in Stuttering.** (3). Current research concerned with stuttering behavior, etiology, developmental aspects, evaluation and remediation. Pr.: Spch. 645. 283-846-0-1220

**283 847. Practicum in Audiology and Speech Pathology.** (3-5). 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. 283-847-2-1220

**283 849. Topics in Speech 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. 283-849-0-1220

**283 855. Seminar in Language Assessment and Intervention.** (3). I. Analysis of recent developments in psycholinguistic development, assessment, and intervention. Pr.: Spch. 655 or consent of instructor. 283-855-1220-E

#### Theatre and Interpretation

The undergraduate program 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 its discipline. The three purposes of the program are to provide (1) a liberal arts program in theatre (2) a pre-professional preparation and (3) the basic theatre skills for the bachelor candidate.

Six areas of training are offered: (1) technical theatre—scenery, (2) technical theatre—costume, (3) theatre history and literature, (4) acting-directing, (5) playwriting, and (6) theatre—dance.

A major consists of 30 hours in theatre and nine hours in other areas within the Department of Speech. All majors are required to take the following courses (theatre core):

284 266	Technical Production 1	3
284 267	Technical Production 2	3
284 370	Dramatic Structure	3
284 261	Fundamentals of Acting	3
284 572	History of Theatre 1	3
284 573	History of Theatre 2	3
284 565	Principles of Directing	3
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Students concentrating in technical theatre—scenery, technical theatre—costume, theatre history and literature, acting-directing, or playwriting are required to take their additional nine hours of theatre in courses numbered 500 or above. Because of the special demands of the theatre—dance concentration, students in that area are required to take the following courses in addition to the theatre core:

284 260	Stage Movement	3
284 268	Techniques of Makeup	3
284 560	Advanced Stage Movement	3
261 021	(121) Modern Dance 1	0-1
261 122	Modern Dance 2	1
261 065	(165) Ballet 1	0-1
261 166	Ballet 2	1
261 171	Jazz Dance	1
261 117	Social, Square and Folk Dance	1
261 323	Techniques of Intermediate Modern Dance	2*
261 325	Techniques of Intermediate Ballet	2*
261 500	Methods and Materials of Dance	3
261 501	Dance Composition	3
241 744	History of Dance	3
257 100	Music Fundamentals	3

\*Each of these must be taken twice

Course offerings are available leading to the degree of Master of Arts. Prerequisite 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, C (as described on page 181). There are three fields of concentration within the theatre area: (1) history, literature, and criticism of theatre; (2) technical production, design, and lighting; (3) 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.): General Speech 210, 735, 736; Theatre and Interpretation 160, 165, 560, 563, 664, 710, 712, 760, 763, 779.



## Courses in Theatre and Interpretation

### Undergraduate Credit

**284 050. Theatre Laboratory.** (0). Required each semester for all students enrolled in acting and/or directing courses. Planning and rehearsal sessions for student productions. 284-050-1-1007

**284 160. Introduction to Theatre.** (3). Consideration of the basic elements of theatre: aesthetics, dramatic literature, theatre technology, and producing organizations. 284-160-0-1007

**284 165. Appreciation of Theatre.** (2). Direct experience with live theatre through an investigation of theatrical materials, forms, and styles and attendance at the University theatrical productions. 284-165-0-1007

**284 260. 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 concurrently with stage movement. 284-260-1-1007

**284 261. 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. 284-261-1-1007

**284 263. 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. 284-263-0-1007

**284 266. Technical Production I.** (3). Materials and techniques of scenery construction and theatre lighting. 284-266-0-1007

**284 267. Technical Production II.** (3). II. Materials and techniques of theatre costume construction and theatre drafting. 284-267-0-1007

**284 268. Techniques of Makeup.** (3). Techniques of makeup for stage, movies, and television. 284-268-1-1007

**284 269. Fundamentals of Stage Lighting.** (3). Basic theory of electricity, light and optics. Practical mechanics of stage lighting safety, instruments, and control systems. 284-269-0-1007

**284 275. 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. 284-275-2-1007

**284 370. 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. 284-370-0-1007

**284 475. 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.) 284-475-0-1007

### Undergraduate And Graduate Credit In Minor Field

**284 560. 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.: Spch. 260 and one semester of ballet or modern dance. 284-560-1-1007

**284 561. 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 the instructor. 284-561-1-1007

**284 562. Playwriting.** (3). Theoretical study and practical application of techniques of playwriting with regard to plot, characters, and production; emphasis placed on the one-act form. May be repeated for a total of six hours credit. 284-562-0-1007

**284 563. Storytelling.** (2). A consideration of literary materials appropriate for children in nursery schools, kindergarten, and elementary schools. Major emphasis is directed toward training in the art of storytelling. Pr.: Spch. 105 or 106. 284-563-0-1007

**284 565. Principles of Directing.** (3). Study of the principles and techniques of directing for the theatre; investigation into the historical emergence of the director; study of current theories. 284-565-1-1007

**284 567. Costuming for the Theatre.** (3). A lecture-laboratory course covering the principles and techniques of construction and design of stage costuming. May be repeated for a total of six hours credit. 284-567-1-1007

**284 571. The Opera.** (3). Survey of the history of opera with a review of the most important operas. (Same as Music 571.) Pr.: Music 150 or Spch. 165, or equiv. 284-571-0-1007

**284 572. 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. 284-572-0-1007

**284 573. 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 the instructor. 284-573-0-1007

### Undergraduate And Graduate Credit

**284 664. Creative Dramatics.** (3). Study of techniques for the training and development of creative imagination in primary and secondary school children by means of group improvisation of plays. Emphasis placed on both skillful guidance of the children and the pursuit of original research. 284-664-0-1107

**284 667. 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. 284-667-0-1007

**284 710. Practicum in Theatre.** (0-6). Supervised participation in all aspects of theatre, with emphasis on problems of a concentrated production program. May be repeated for a maximum of 12 hours credit. Pr.: Major in Theatre and Interpretation; three of the following: Spch. 261, Spch. 266, Spch. 562, Spch. 565, and consent of the instructor. (For transfer students equivalent background will be required.) 284-710-2-1007

**284 711. 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.: Spch. 266 and consent of instructor. 284-711-0-1007

**284 712. Theatre Management.** (3). Theatre management, promotion, finance, organization; emphasis on contract negotiations and use of facilities. 284-712-0-1007

**284 760. Children's Theatre.** (3). Introductory course in theory and practice for Children's Theatre. Reading, demonstrations, practice study of play scripts; play selection and production methods; operation of and assistance in production of plays for the child audience. Pr.: Consent of the instructor. 284-760-0-1007



**284 761. Advanced Acting.** (3). Studies in style, techniques, and characterization. May be repeated for a total of nine hours credit by qualified students. Pr.: Consent of the instructor. 284-761-1-1007

**284 762. 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. 284-762-0-1007

**284 763. 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 the instructor. 284-763-1-1007

**284 764. 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. 284-764-0-1007

**284 765. Practice in Directing.** (3). A lecture-laboratory 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 the instructor. 284-765-1-1007

**284 766. Advanced Technical Production.** (3). A lecture-laboratory 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 the instructor. 284-766-1-1007

**284 767. 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.: 284-267 or consent of the instructor. 284-767-1-1007

**284 768. Scene Design.** (3). Principles and styles of design for the stage, utilizing sketches, diagrams, plates, and models. May be repeated for a total of six hours credit by qualified students. Pr.: Consent of the instructor. 284-768-0-1007

**284 769. 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.: 284-266 or consent of instructor. 284-769-1-1007

**284 770. Greek Theatre.** (3). Studies in the drama and stagecraft of the Greek period. 284-770-0-1007

**284 771. Roman, Medieval, and Baroque Theatre.** (3). Studies in the drama and stagecraft of the Roman, Medieval, and Baroque periods. 284-771-0-1007

**284 772. Romantic Theatre.** (3). Studies in the drama and stagecraft of the Romantic era. 284-772-0-1007

**284 773. Modern European Theatre.** (3). Studies in the European drama and stagecraft of the period from 1876 to the end of World War II. 284-773-0-1007

**284 774. Avant-Garde Theatre.** (3). Studies in Avant-Garde drama and stagecraft since World War II. 284-774-0-1007

**284 775. Oriental Theatre.** (3). Studies in the drama and stagecraft of India, China, and Japan. 284-775-0-1007

**284 776. Slavic Theatre.** (3). Studies in the drama and stagecraft of the Slavic countries from 1800 to the present. Pr.: Junior standing. 284-776-0-1007

**284 777. Aesthetics of the Theatre.** (3). Principal emphasis on theoretical problems of dramatic art. 284-777-0-1007

**284 778. 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.: Spch. 266. 284-778-0-1007

**284 779. 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 the instructor. 284-779-2-1007

### Graduate Credit

**284 870. Seminar in Theatre.** (3). Selected topics in theatre research. May be repeated for credit with change of topic. 284-870-0-1007

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## STATISTICS

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*Arthur Dayton,\* Head of Department*

Professors Feyerherm,\* Fryer,\* Nassar,\* and Siotani;\* Associate Professors Dayton,\* Grosh,\* Johnson,\* Kemp,\* Milliken,\* and Perng;\* Assistant Professor Hasza, Hess and Rubison.

### 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 high-speed calculating machines relieves the statistician of tedious computations and elevates his professional activity to that of an adviser, a consultant, a supervisor, a teacher, and/or a person engaged in basic research.

A person wishing to major in statistics may seek a Bachelor of Arts degree by satisfying the general requirements of that degree (page 91), completing Math. 240 and doing one of the following:

(a) Take one of Stat. 320, 330, 340, or 350; and either Stat. 341 or 351; and either Stat. 510 and 511 or Stat. 770 and 771; and one additional statistics course; or

(b) Take Stat. 702 or 703, 704 and 705, and also take either Stat. 510 and 511 or Stat 770 and 771 and one additional statistics course. Each statistics major also must take Comp. Sci. 200 and one of 201, 202, 203, 204 or 205. A student may seek a Bachelor of Science degree by satisfying the general requirements of that degree (page 91) and the same requirements as noted for the Bachelor of Arts degree. It also is recommended that such a student take extra courses in computer science, or otherwise gain extra experience in programming. Each student must consult an adviser in the Department of Statistics before enrolling.

### 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 can study toward the doctor's degree, enter industry or governmental service as statistical consultants, or join organizations which do scientific research in the biological, physical and social sciences or in the humanities. Holders of the master's degree also can 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

**285 200. Appreciation of Statistics.** (3) I, II, S. A relatively non-technical coverage of the many roles played by probability and statistics in everyday life: appropriate history, descriptive uses, "scientific" distortion of facts, legal uses, opinion and other survey sampling, cryptography, demography, sports, insurance, and games. Two hours of lecture-recitation and two hours of laboratory inside and outside the classroom. Not acceptable as a prerequisite for any other statistics course. 285-200-0-1702

**285 320. Elements of Statistics.** (3) I, II, S. 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. 285-320-0-1702

**285 330. Elementary Statistics for the Social Sciences.** (3) I, II. 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. 285-330-0-1702

**285 340. 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. 285-340-0-1702

**285 341. Biometrics II.** (3). 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. 285-341-0-1702

**285 350. Business and Economic Statistics I.** (3) I, II. 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. 285-350-0-1702

**285 351. Business and Economic Statistics II.** (3) I, II, S. Cont. of Stat. 350 including study of index numbers, time series, business cycles, seasonal variation, multiple regression and correlation, forecasting; some non-parametric methods applicable in business and economic studies. Pr.: Stat. 320, 330, 340, or 350. 285-351-0-1702

### Undergraduate And Graduate Credit In Minor Field

**285 510. 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 CI's and  $\chi^2$ ; goodness of fit. Numerous applications. Pr.: Math. 222. 285-510-0-1702

**285 511. Introductory Probability and Statistics II.** (3) 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. 285-511-0-1702

### Undergraduate And Graduate Credit

**285 702. Statistical Methods for Social Sciences.** (3) I. Statistical methods applied to experimental and survey data from social sciences; test of hypotheses concerning treatment means; linear regression; product-moment, rank, and bi-serial correlations; contingency tables and chi-square tests. Pr.: Stat. 330. 285-702-0-1702

**285 703. 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 equivalent of college algebra. 285-703-0-1702

**285 704. 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 per week during first half of semester. Pr.: Stat. 702 or 703. 285-704-0-1702

**285 705. 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 per week during second half of semester. Pr.: Stat. 702 or 703. 285-705-0-1702



**285 710. Sample Survey Methods.** (2) II, S. Design, conduct, and interpretation of sample surveys. Pr.: Stat. 702 or 703. Meets four times per week during first half of semester. 285-710-0-1702

**285 716. Non-Parametric Statistics.** (2) II. 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 per week during second half of semester. Pr.: One previous course in statistics. 285-716-0-1702

**285 720. 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. 285-720-0-1702

**285 725. Digital Statistical Analysis.** (3) II. Programming languages; efficient programming for analysis of variance and covariance, missing data, least squares, multiple regression, multiple correlation, and chi-square analyses. Emphasis on efficient programming. Pr.: Comp. Sci. 201 and Stat. 704 and 705 or concurrent enrollment. 285-725-0-1702

**285 730. 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, and course in matrices. 285-730-0-1702

**285 750. Probability and Stochastic Processes I.** (3) I. Random variables; conditioning; independence; laws of large numbers; central limit theorems; generating functions, difference equations. Pr.: Math 240. 285-750-0-1702

**285 751. Probability and Stochastic Processes II.** (3) II. Markov chains; Markov processes; Wiener-Kolmogorov prediction theory; time series. Pr.: Stat. 750. 285-751-0-1702

**285 770. Theory of Statistics I.** (3) I, S. 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. 285-770-0-1702

**285 771. Theory of Statistics II.** (3) II, S. Introduction to multivariate distributions; sampling distributions, derivation and use; estimation of parameters, testing hypothesis; multiple regression and correlation; simple experimental designs; introduction to non-parametric statistics; discrimination. Pr.: Stat. 770. 285-771-0-1702

**285 799. Problems in Probability and Statistics.** (Var.) I, II, S. Pr.: Stat. 703 or 770 and consent of instructor. 285-799-3-1702

### Graduate Credit

**285 810. 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. 285-810-0-1702

**285 820. Experimental Design Theory.** (3) II. Incomplete block designs; theory of the construction and analysis of experimental designs. Pr.: Stat. 720 and course in matrices. 285-820-0-1702

**285 830. Statistical Population and Quantitative Genetics I.** (3) I. Equilibrium law of gene frequencies; forces that change gene frequency; gene frequency distributions; prediction equations for selection. Pr.: Stat. 704 and 705 and six semester hours of genetics. 285-830-0-1702

**285 831. Statistical Population and Quantitative Genetics II.** (3) II. Estimation of genetics parameters; inbreeding, heterosis, level of dominance; epistasis, genetic load linkage; experimental approaches to statistical genetics. Pr.: Stat. 830. 285-831-0-1702

**285 840. Theory of Statistics III.** (3) I. Functional forms and properties of selected distribution functions. Characteristic functions. Limiting distributions. Pr.: Stat. 771. 285-840-0-1702

**285 841. Theory of Statistics IV.** (3) II. Convolutions of distributions. Theory of runs. Distributions of order statistics. Sequential analysis. Pr.: Stat. 840. 285-841-0-1702

**285 860. Linear Models I.** (3) I. Multivariate normal covariance matrix and operations with it; distribution of quadratic forms; some specific linear models; application to experimental design, analysis of variance and variance components. Pr.: Stat. 704, 705, 771; course in matrices. 285-860-0-1702

**285 861. Linear Models II.** (3) II. Generalized inverses; polynomial regression; experimental design, variance-component, and mixed models. Pr.: Stat. 860. 285-861-0-1702

**285 898. Master's Report.** (2) I, II, S. Pr.: Consent of Instructor. 285-898-4-1702

**285 899. Master's Thesis Research.** (Var.) I, II, S. Pr.: Consent of instructor. 285-899-4-1702

**285 945. 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. 285-945-2-1702

**285 950. Advanced Studies in Probability and Statistics.** (3) 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 and consent of instructor. 285-950-0-1702

**285 965. Multivariate Analysis I.** (3) I. Matrix formulas, Jacobian of matrix transformations, likelihood estimates; Hotelling's  $T^2$ ; generalized F, generalized beta, generalized Cochran's Theorem; distributions of simple, partial, and multiple correlation coefficients; testing multivariate hypothesis; exact and asymptotic distributions of test statistics. Pr.: Stat. 861 and one year of advanced calculus. 285-965-0-1702

**285 966. Multivariate Analysis II.** (3) II. Classification and discrimination; canonical correlations; distributions of roots of determinantal equations; multivariate analysis of variance; union-intersection principles; simultaneous confidence estimation; multiple comparisons; nonparametric multivariate inference. Pr.: Stat. 965. 285-966-0-1702

**285 990. Foundations of Probability I.** (3) I, in alt. years. Distribution functions; characteristic functions; sums of independent random variables; Central Limit Theorem. Pr.: Equivalent of two semesters of advanced calculus. Stat. 840. 285-990-0-1702

**285 991. Foundations of Probability II.** (3) II. Conditional random variables, martingales, ergodic theorems. Pr.: Stat. 990. 285-991-0-1702

**285 995. Advanced Inference I.** (3) I. Statistical decision problem, risk functions, and optimal procedures; classical and Bayesian sufficient statistics; estimation: least squares, moments, maximum likelihood, best unbiased, least invariant estimations; asymptotic optimal maximum likelihood procedures. Pr.: Equivalent of two semesters of advanced calculus. Stat. 841. 285-995-0-1702

**285 996. Advanced Inference II.** (3) II. Testing hypotheses: Neyman-Pearson Lemma; monotone likelihood ratio and exponential families; method of least favorable distribution; uniformly best unbiased and best invariant procedures; confidence sets and uniformly best test procedures. Pr.: Stat. 995. 285-996-0-1702

**285 999. Research In Statistics.** (Var.) I, II, S. Pr.: Consent of instructor. 285-999-4-1702







# College of Business Administration

*Robert A. Lynn,\* Dean*

*John R. Graham,\* Associate Dean*

*Kay C. Stewart, Assistant to the Dean*

Professors Barton-Dobenin,\* Coleman,\* Fox,\* Jones,\* Laughlin,\* Lynn,\* O'Brien,\* and Richards; Associate Professors Brown,\* Graham,\* Gugler,\* Stark, Thiessen, Vaden,\* and Winkler; Assistant Professors Buzenberg, Caldwell, Doering, Gentry,\* Hollinger, McCarty, Norvell,\* Pohlman, Reutzel, and Riley; Instructors Castro, Clement, Ginn, Grotheer, Innes, Killough, Shrimplin, Stewart, Stockard, Stout, and Streit; Emeritus: Professor Clark; Associate Professor Eriksen; Assistant Professor Rapp.

The main objective of the College of Business Administration is to provide a challenging opportunity for liberal education and professional study and development in business administration and accounting. Undergraduate and graduate programs alike are designed to facilitate maximum development of the student into an informed, capable and responsible individual.

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 matter and instructional techniques focus on decision-making and implementation of decisions through critical and creative analysis.

In addition to its instructional programs, the College of Business Administration recognizes its responsibilities and opportunities to work closely with the business community. It provides to business, through the Committee on Management Services and the general faculty, professional services in accounting, finance, marketing and management. The College of Business Administration also sponsors numerous short courses and conferences for business and management groups.

The College of Business Administration participates in the Intercollegiate Program in Women's Studies, see page 40.

## Undergraduate Study

At the undergraduate level, the College of Business Administration seeks to produce a graduate with: (1) a broad education in the arts, sciences and humanities, (2) a solid knowledge and understanding of the functioning of the business world, (3) sufficient knowledge and skill in a field of specialization to obtain a position in business, and (4) the proven ability to think creatively and analytically in order to progress into positions of greater responsibility in the future. (To accomplish this purpose, the College is future-oriented. To be of any lasting value, education for business must develop students' abilities to project their thinking and to shape the future.)

During the first three years, students take work in written and oral communication; mathematics; statistics and quantitative analysis; social, behavioral and natural sciences; and the humanities. The required "core courses" in accounting, economics, business law, finance, management and marketing provide the fundamentals of business administration. Seven majors are available for selection by Business Administration students.

The College has two internship programs which provide valuable practical experience. The accounting internship is designed for accounting majors either the first or second semester of their senior year and operates in cooperation with certified public accounting firms. The business administration internship is for students between their junior and senior years. This is a summer program offered in cooperation with numerous business firms throughout the midwest.

## Bachelor Of Science In Business Administration

**Curriculum Requirements.** The curriculum in Business Administration is designed from a general management viewpoint. Prior to or during the first semester of the junior year, students select their major field of study. These fields are: accounting, finance, general business, industrial relations, management, marketing, and office administration.

The following curriculum is effective for all students entering the College after August 1, 1973 or graduating after August 1, 1977.



## 192 Business Administration

### Communications

229 100	English Composition I	3
229 120	English Composition II	3
281 106	Oral Communications Ia	3
	Communication Electives	2-3
		11-12

### Social Science

269 325	U.S. Politics	3
273 110	General Psychology	3
277 220	Introduction to Sociology	3
		9

### Quantitative

245 100	College Algebra	3
245 500	Introduction to Analytic Processes	3
285 350	Business and Economic Statistics I	3
285 351	Business and Economic Statistics II	3
286 200	Fundamentals of Computer Programming	2
286 201-205	Language Lab	1
		15

### General Electives

	Social Science	3
	Humanities	6
	Natural Science*	6
	Social Science, Humanities or Natural Sciences	6
		21

### Business and Economics

225 110	Economics I	3
225 120	Economics II	3
305 260	Fundamentals of Accounting	4
305 370	Mgr. Cost Controls	3
305 390	Business Law I	3
305 420	Management Concepts	3
305 421	Production Management	3
305 440	Marketing	3
305 450	Business Finance	3
305 695	Business Policy	3
305 696	Business and Society	3
	Economics Electives	6
	Major field (see below)	18
		58

### Other

	Concepts in Physical Education	1
	Free Electives	10-11

Total credit hours required for graduation 126

### MAJOR FIELDS

#### Accounting

<b>Required:</b>		
305 360	Intermediate Accounting I	3
305 371	Cost Accounting	3
305 361	Intermediate Accounting II	3
305 460	Advanced Accounting	3
<b>Plus six credit hours selected from:</b>		
305 461	Taxation**	3
305 465	Accounting Internship	3
305 660	CPA Problems	3
305 661	CPA Theory and Law	3
305 662	Auditing I**	3
305 663	Auditing II	3
305 665	Comp. App. in Acctg.	3
306 666	Advanced Managerial Controls	3

#### Finance

<b>Required:</b>		
305 550	Financial Institutions	3
305 551	Investments	3
305 650	Capital Budgeting	3
305 651	Financial Management	3
<b>Plus six hours selected from:</b>		
305 360	Intermediate Accounting I	3
305 350	Insurance	3
305 361	Intermediate Accounting II	3
305 552	Real Estate	3
305 553	Business Risk Management	3
305 653	Portfolio Management	3
305 692	Applications of the Computer in Business	3
305 770	Controllershship	3
225 510	Intermediate Macro	3
225 520	Intermediate Micro	3
225 530	Money and Banking	3
225 633	Public Finance	3
225 681	International Trade	3

### General Business

18 credit hours required to be taken from courses offered by the College of Business Administration and distributed as follows:

12 of the 18 hours must be selected from among the required courses in the finance, labor relations, management or marketing majors representing at least three of those four major areas.

The remaining six hours must be selected from the business courses listed in either the required or the elective courses listed for those four majors.

#### Labor Relations

<b>Required:</b>		
305 530	Labor Legislation	3
305 531	Personnel and Wage Administration	3
305 630	Industrial Relations	3
305 631	Labor Arbitration	3

#### Plus six hours selected from:

305 520	Organizational Behavior	3
305 632	Contemporary Issues in Labor Relations	3
305 692	Applications of the Computer in Business	3
225 620	Labor Economics	3
225 627	Contemporary Labor Problems	3
550 551	Work Design	3
550 609	Occupational Safety and Health	3
305 641	Business Logistics	3

#### Marketing

<b>Required:</b>		
305 540	Consumer Behavior	3
305 640	Marketing Research	3
305 642	Marketing Strategy	3
305 643	Promotional Administration	3

#### Plus six hours selected from:

305 541	Retailing	3
305 542	Sales Management	3
305 543	Sales Communications	3
305 641	Business Logistics	3
305 644	International Marketing	3
305 692	Applications of the Computer in Business	3

#### Management

<b>Required:</b>		
305 520	Organizational Behavior	3
305 521	Quantitative Management	3
305 531	Personnel and Wage Administration	3
305 622	Decision Analysis	3

#### Plus six hours selected from:

305 371	Cost Accounting	3
305 630	Industrial Relations	3
305 632	Contemporary Issues in Labor Relations	3
305 691	Business Measurements and Forecasting	3
305 692	Applications of the Computer in Business	3
550 554	Industrial Facilities Layout & Design	3
550 609	Occupational Health and Safety	3
305 641	Business Logistics	3
305 690	International Business	3

#### Office Administration

<b>Required:</b>		
305 111	Production Typing	3
305 213	Transcription	3
305 310	Exec. Secretarial Procedures	3
305 311	Office Management	3

#### Plus six hours selected from:

305 210	Office Machines	3
305 350	Insurance	3
305 391	Administrative Communications	3
305 392	Business Law II	3
305 531	Personnel and Wage Administration	3
305 552	Real Estate	3
305 590	Women in Business	3

## Dual Degree In Business Administration

The dual degree programs allow students to earn the Bachelor of Science in Business Administration degree in addition to their non-business degree. Because of course sequence requirements, the program should be commenced during a student's junior year. Students must be enrolled in both the College offering their non-business degree and the College of Business Administration.



The following requirements are effective for all students entering the program after August 1, 1973, or all students graduating after August 1, 1977. Any student who wishes to take a dual degree must take a minimum of 150 credit hours and satisfy the requirements for both degrees. The following requirements must be completed either as part of the student's non-business degree or in addition to it.

#### Dual Degree Requirements

305 260	Fundamentals of Accounting	4
305 370	Mgr. and Cost Controls	3
305 390	Business Law I	3
305 420	Management Concepts	3
305 421	Production Management	3
305 440	Marketing	3
305 450	Business Finance	3
305 695	Business Policy	3
305 696	Business and Society	3
225 110	Economics I	3
225 120	Economics II	3
245 500	Introduction to Analytic Processes	3
286 200	Fundamentals of Computer Programming	2
286 201-205	Language Lab	1
Major Field		9
		49

## Pre-Business Education

Effective Fall Semester, 1975, 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: (1) the acquisition of skills in comprehension and expression, (2) understanding human institutions, and (3) the ability to think clearly, carefully and independently. The stated purpose of the undergraduate program in Business Administration is to achieve these objectives. 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.

## Information For Pre-Business Students Transferring To Kansas State University

Many of the fundamental courses required for a degree in Business Administration may be obtained through pre-business programs at other four-year institutions or community colleges. In general, two years of course work will be transferable. Below are some suggested courses to be taken the first two years to transfer to Kansas State University for a degree in Business Administration without loss of credit.

First Semester	Credit Hours
English Composition I	3
Oral Communications (speech)	3
College Algebra*	3
Accounting I	3
General Psychology	3
Concepts in Physical Education (1st or 2nd semester)	1
15 or 16	

Second Semester	Credit Hours
English Composition II	3
American Government	3
Accounting II	3
Humanities Electives	3
Social Science Electives	3
Concepts in Physical Education (1st or 2nd semester)	1
15 or 16	

Third Semester	Credit Hours
Economics I	3
Fund. of Computer Programming	3
Natural Science Electives	3 or 4
Humanities Electives	3
Social Science Electives	3
15 or 16	

Fourth Semester	Credit Hours
Economics	3
Business Law I	3
Introduction to Sociology	3
Natural Science Electives	3 or 4
Cost Accounting, Managerial Accounting or Business Communication	3
15 or 16	

\*The prerequisite of College Algebra for Business Administration students is two units of high school algebra. If a student has had one unit of high school algebra only, Intermediate Algebra must be taken as a first semester freshman and College Algebra as a second semester freshman. Intermediate Algebra credit cannot be applied to a degree. If a student takes Analytic Geometry and Calculus I, it will substitute for 245 500 Introduction to Analytic Processes and his College Algebra requirement will be waived.

\*Students must take at least one scientific laboratory

\*\*Students wishing to qualify to sit for the CPA examination in Kansas must take Taxation and Auditing I.

## Graduate Study

The College of Business Administration provides graduate work leading to a Master of Business Administration (MBA) degree in business administration and in accounting. All graduate programs require study in behavioral management, quantitative techniques and the decision-making processes. Specialization in a particular field is provided through the use of electives.

Admission to graduate study at Kansas State University is granted on three bases: (1) full standing, (2) provisional, or (3) probational. Recommendations concerning an applicant's qualifications and admission are made to the dean of the Graduate School by a faculty committee of the College of Business Administration. The final decision regarding admission of an applicant is made by the dean of the Graduate School.

Admission in full standing to graduate study in business and accounting normally requires a minimum grade point average of 3.0 (B average) in an institution whose requirements for the bachelor's degree are substantially equivalent to those of Kansas State University.

Applicants with grade averages below 3.0 but above 2.5 will be considered for probational admission. In such cases evidence of superior capability in business, economics and mathematics or statistics will be considered.

Provisional admission may be granted to applicants who have subject matter deficiencies in undergraduate preparation. Normally these deficiencies will be made up by enrolling in courses for undergraduate credit.



All applicants must take the Graduate Management Admissions Test (GMAT). This test is a required part of the application, and the applicant should have the testing service report the test scores to the director of the graduate program, College of Business Administration. A score of 450 or higher is an admission requirement which is waived only in exceptional cases where other strengths are demonstrated. Requests for applications and all questions concerning the test, including time and place, should be addressed to: Educational Testing Service, Box 966, Princeton, New Jersey 08540.

Completed applications should be on file with the College of Business Administration at least 60 days prior to requested enrollment date. For international students the completed application should be on file 120 days prior to requested enrollment date.

## Master Of Business Administration

The program leading to the MBA degree in Business Administration is designed to provide broad education in business management. Depth in a particular area is possible through the use of electives. The MBA program in accounting is designed to prepare graduate students for careers in public, industrial or governmental accounting.

## MBA In Business Administration

**Admission Requirements:** In addition to the general admission requirements set forth above, the applicant must have completed at least two courses in economics and one course in accounting, business finance, business law, management, marketing, production management, business policy, statistics, calculus, and computer programming.

**The Program of Study:** Generally, each candidate must complete the following core courses, or their reasonable equivalent, and fulfill either option A or option B. Other programs must be arranged with the advice of the graduate committee.

Required Core:		
305 820	Behavioral Management Theory	3
305 840	Advanced Marketing Management	3
305 850	Financial Controls for Business	3
305 870	Accounting Controls for Business	3
305 891	Legal and Social Environment of Business	3
		15

Select two:		
305 890	Decision Theory of the Firm	(3)
305 892	Research Methods in Business	(3)
305 893	Business Operations Analysis	(3)
		6

Option A:		
Required core		21
Elective area*		9
Written comprehensive exams required		0
Hours required for graduation		30

\*Elective areas include, but are not necessarily limited to, the following: computer science; economics; finance; industrial relations; management; marketing; operations research (industrial engineering); political science; psychology; sociology; statistics. At least 24 hours must be taken at the 800 level or higher.

Option B:		
Required core		21
Electives		3
Master's thesis		6
Oral defense of thesis required		0
Hours required for graduation		30

## MBA In Accounting

The program is designed to prepare graduate students for careers in public, industrial, or governmental accounting.

**Admission Requirements:** In addition to the general admission requirements set forth above, the student must have completed work in the following areas:

Area	Credit Hrs.
Accounting	13
Economics	9
Business Finance	3
Business Law	3
Management	3
Marketing	3
Statistics	3
Computer Programming	3
Math through Calculus	3
Business Policy	3
Production Management	3
46	

**The Program of Study:** Generally, each candidate must complete one of the following options. Other programs must be arranged with the advice of the graduate committee. Candidates who wish to qualify for a C.P.A. certificate (after passing the Uniform C.P.A. exam) upon completion of their degree requirements must consult with the director of graduate programs concerning the regulations of the State of Kansas. Individual copies of these regulations may be obtained from the Board of Accountancy, First National Bank Tower, Topeka, Kansas 66603. In 1975 the regulations required students to elect courses 861 and 862.

Required:		
305 820	Behavioral Management Theory	3
305 850	Financial Controls for Business	3
305 860	Accounting Theory I	3
305 891	Legal and Social Environment	3
		12

Select two:		
305 890	Decision Theory of the Firm	(3)
305 892	Research Methods in Business	(3)
305 893	Business Operations Analysis	(3)
		6

Select four:		
305 660	CPA Problems	(3)
305 661	CPA Theory and Law	(3)
305 663	Auditing II	(3)
305 665	Computer Applications in Accounting	(3)
305 666	Advanced Managerial Controls	(3)
305 861	Accounting Theory II	(3)
305 862	Tax Planning and Research	(3)
Written comprehensive exams required		0
		30

## Courses in Business and Accounting

### Undergraduate Credit

**305 110. Intermediate Typing.** (3) I, II. Emphasis on speed and accuracy in typing straight copy and in production of letters, manuscripts, and tabulated reports. Pr.: One unit of high school typing. 305-110-0-0514

**305 111. Production Typing.** (3) I, II. Develop increased speed and accuracy in production typing—legal forms, statistical materials and letters—within acceptable time limits. Pr.: 305 110 or equiv. 305-111-0-0514



**305 112. Shorthand I.** (4) I, II. Beginning course in fundamentals of Gregg Shorthand. Open only to students with no previous shorthand instruction. Pr.: One unit of high school typing. 305-112-0-0514

**305 202. Small Business Operations.** (3). Offered on sufficient demand. Opportunities in business ownership, principles governing the starting of a small enterprise; importance, status, problems, and management of small business. Pr.: 225 110. Not open to students in College of Business Administration. 305-202-0-0506

**305 210. Office Machines.** (3) II. Instruction in electronic and 10-key calculators, techniques in machine dictation and transcription, and layout planning and production on duplicating machines. 305-210-1-0501

**305 212. Intermediate Shorthand.** (3) I, II. Emphasis on writing speed and the introduction of transcription. Pr.: 305 110 or concurrent enrollment and 305 112 or one unit of high school shorthand. 305-212-0-0514

**305 213. Transcription.** (3) I. Advanced shorthand with speeds of 100 to 120 or higher. Setting up business letters in various styles—gaining speed in transcription of letters and manuscripts. Pr.: 305 110 and 212 or equiv. 305-213-0-0514

**305 260. Fundamentals of Accounting.** (4) I, II, S. The preparation and use of accounting records for individual, partnership and corporate business organizations. Pr.: Sophomore standing. 305-260-0-0502

**305 293. Black Business Studies.** (2-3) Intersession, II. Offered on sufficient demand. Exposure to operations of black-managed enterprises is the focal point. The study of these businesses and their problems is approached in an interdisciplinary fashion. 305-293-0-0501

**305 294. World Business—A Field Study.** (2) Spring Intersession. A concentrated study tour of businesses in selected world industrial centers outside the continental United States. 305-294-2-0504

**305 301. Personal Finance.** (2). Finance from the viewpoint of the individual; principles and practices of credit buying borrowing, saving and investing; purchase of government bonds, insurance, real estate, and annuities; problems of taxation and wills. Not open to students in College of Business Administration. Pr.: Sophomore standing. 305-101-0-0501

**305 310. Executive Secretarial Procedures.** (3) II. Study of operational and managerial functions top-level secretaries perform. Situations are provided giving practical, meaningful experiences that develop administrative and supervisory skills and functions. Pr.: 305 110 or equiv. 305-310-0-0514

**305 311. Office Management.** (3) I. An examination of the theory and practice of office management. The scope of the course is defined by the five functions of the office manager—organizing, staffing, directing, planning, and controlling. 305-311-0-0506

**305 350. 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 contributions of the insurance industry. Pr.: 225 110. 305-350-0-0512

**305 360. Intermediate Accounting I.** (3) I, II. Application of accounting theory to the valuation of balance sheet accounts with emphasis on cash inventories and fixed assets. Pr.: 305 260. 305-360-0-0502

**305 361. Intermediate Accounting II.** (3) I, II, S. Statement analysis and special problems peculiar to the corporate form of organization. Pr.: 305 360. 305-361-0-0502

**305 370. Managerial and Cost Controls.** (3) I, II, S. Development and use of accounting information for management control. Covers statement analysis, cash and funds flows, cost analysis and budgeting. Pr.: 305 260. 305-370-0-0501

**305 371. Cost Accounting.** (3) I, II. Allocation of production costs to determine unit costs of goods manufactured and sold and the utilization of such data by management. Pr.: 305 260. 305-371-0-0502

**305 390. Business Law I.** (3) I, II, S. A study of law as it relates to business. Coverage includes contracts, agency and partnerships. Pr.: Junior standing. 305-390-0-0501

**305 391. Administrative Communications.** (3) I, II. Preparation of business communications, reports and correspondence, and analysis of communication systems within an enterprise structure. Pr.: 229 120 and 281 106. 305-391-0-0501

**305 392. Business Law II.** (3) I, II. Study of the social forces which bring about changes in Civil Law as it affects commercial transactions. Coverage includes corporations, commercial paper and contractual rights. Pr.: 305 390. 305-392-0-0501

**305 399. Honors Seminar in Business.** (1) I, II. Readings and discussions on selected topics. A maximum of four hours credit may be obtained. 305-399-0-0501

**305 420. Management Concepts.** (3) I, II, S. Fundamental processes in managing the going concern. Provides a basic understanding of administrative problems through study of organization theory, quantitative, and behavioral aspects of decision making. Pr.: 273 110, 277 211 and junior standing. 305-420-0-0506

**305 421. 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.: 225 120, 245 500 and 285 351. 305-421-0-0506

**305 440. Marketing.** (3) I, II, S. A general study of marketing from a social-economic point of view; a study of the institutional organization of the market and the functioning of marketing agencies in the distribution of goods. Pr.: 225 110 and junior standing. 305-440-0-0509

**305 450. 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.: 225 120, 285 350 286 200 and lab and 305 370. 305-450-0-0504

**305 460. Advanced Accounting.** (3) I, II. Accounting for partnerships, installment sales, consignments, consolidated statements, and other special topics. Pr.: 305 260 and 360. 305-460-0-0502

**305 461. Taxation I.** (3) I, II, S. Fundamental concepts of income determination in federal and state income tax regulations; examination of the impact of tax regulations on business and personal financial planning and decision-making. Pr.: 305 260 and junior standing. 305-461-0-0501

**305 465. Accounting Internship.** (3) II. Provides eight weeks of practical diversified public accounting experience for accounting majors. The course objective is a broader educational experience for participating students. Pr.: 305 361, 461, 662, and consent of instructor. 305-465-2-0502

**305 495. Business Administration Internship.** (3) S. Eight weeks of business experience between junior and senior years coordinates the interests of participating students and firms. Pr.: 305 420, 440, 450, completion of junior year and consent of instructor. 305-495-2-0501

### Undergraduate and Graduate Credit

**305 520. Organizational Behavior.** (3) I. Examination of psychological and sociological variables important in understanding individual motivation, group functioning, change, creativity and leadership in organizations. Pr.: 305 420 or 531. 305-520-0-0501



**305 521. Quantitative Management.** (3) I. Emphasis on quantitative techniques, models and the integrative nature of management systems. Includes PERT, CPM, linear programming and decision risk analysis. Pr.: 245 500 or 220, 285 350 and 286 200 and lab, and 305 420. 305-521-0-0506

**305 530. Labor Legislation.** (3) II. Development of government regulations pertaining to legal rights and duties of employers, unions, and the public. Analysis of labor laws and their effect on labor-management relationships. Pr.: Junior standing. 305-530-0-0513

**305 531. Personnel and Wage Administration.** (3) I, II. Personnel program and its operational processes of manpower planning, recruiting, testing, development, and wage administration. Analysis of role of personnel department in the organization with emphasis on problem solving. Pr.: Junior standing. 305-531-0-0515

**305 540. Consumer Behavior.** (3) I, II, S. Behavioral concepts and theories as they relate to marketing: motivation, learning, beliefs, attitudes, habits, taste, custom, fashion, social class, reference, group influences, value and utility theory. Pr.: 305 440. 305-540-0-0509

**305 541. Retailing.** (3) II. 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.: 305 440. 305-541-0-0509

**305 542. Sales Management.** (3) I. From the point of view of the manufacturer or wholesaler, a study of management problems relating to sales—including sales programs, product and distribution policies, price policy, management of sales force, sales promotion, and market research. Pr.: 305 440. 305-542-0-0509

**305 543. Sales Communication.** (3) I. Intensive investigation of the art of persuasive sales communication, with emphasis on selection, organization and effective oral presentation of marketing, sales and promotional information. Pr.: Junior standing. 305-543-0-0509

**305 550. Financial Institutions.** (3) I. The role of financial intermediaries in the flow of funds; emphasis on the financial management concepts that underlie these institutions and their impact on business and economic growth. Pr.: 305 450. 305-550-0-0504

**305 551. Investments.** (3) I. 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.: 245 500 or 220, 285 350 286 200, any language lab, and 305 450. 305-551-0-0505

**305 552. Real Estate.** (3) II. Principles and practices including legal, economic and social implications from the viewpoint of the real estate practitioner, investor and society. Pr.: Junior standing. 305-552-0-0511

**305 553. Business Risk Management.** (3) I. Development of risk management and insurance programs for the business firm. Risk identification, evaluation and treatment for business property and life insurance, group insurance and pension fund programs. Pr.: 305 450. 305-553-0-0501

**305 583. Veterinary Practice Management.** (3) II. The business aspects of a veterinary practice, including consideration of factors involved in establishing and maintaining a professional practice, professional ethics, accounting, and investments. Pr.: Fourth year standing in the College of Veterinary Medicine. No other students admitted. Joint listing with College of Veterinary Medicine.

**305 590. Women in Business.** (3) I. A study of the legal and economic impact of women in the work force. The social and sexual dimensions of occupations and personnel procedures relating to women in modern industrial society. Pr.: Junior standing. 305-590-0-0501

**305 622. Decision Analysis.** (3) II. Systematic application of decision theory, input-output analysis and quantitative techniques to business problems and policy. Includes cases that integrate concepts and techniques, develop analytic skills and creative investigation. Pr.: 305 521. 305-622-0-0501

**305 630. Industrial Relations.** (3) I. Study of strategies and procedures in industrial relations including prenegotiations and negotiations, grievance procedure, arbitration, labor law, conflict resolutions, behavioral aspects of union-management relations and current issues. Pr.: Junior standing. 305-630-0-0516

**305 631. Labor Arbitration.** (3) II. Role of arbitration and mediation in settling labor-management disputes. Intensive analytical probe into disputed areas including discipline, wages, discrimination and working conditions. Role playing and case research emphasized. Pr.: 305 630. 305-631-0-0501

**305 632. Contemporary Issues in Labor Relations.** (3) II. Research-oriented course concentrating on current critical issues in the labor-management field. Pr.: 305 630 or 225 620. 305-632-0-0516

**305 640. Marketing Research.** (3) II. 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.: 285 350, 285 351, 286 200 and 286 201 or 286 202, and 305 440. 305-640-0-0500

**305 641. Business Logistics.** (3) I. Operational analysis of the logistics system including locational analysis, inventory control, production scheduling and transportation. Utilizes concepts and techniques from economics and operations research to analyze logistics systems. Pr.: 285 350, 285 351, 286 200 and 286 201 or 286 202, and 305 421. 305-641-0-0500

**305 642. Marketing Strategy.** (3) I. Marketing policy formulation and implementation. Emphasis on developing students' ability to analyze and solve marketing problems by integrating knowledge in major marketing areas. Pr.: 305 640, or concurrent enrollment in 540 or 640. 305-642-0-0509

**305 643. Promotional Administration.** (3) II. Focuses on decisions made in managing the promotional mix. Relies on the concepts of economics, behavioral science and mathematics. Stresses analytical decision-making techniques in dealing with promotional problems. Pr.: 305 540. 305-643-0-0501

**305 644. 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, i.e., international economic factors, foreign cultures, nationalism and government influences, economic development, etc. Pr.: Six hours of marketing.

**305 650. Capital Budgeting.** (3) 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.: 245 500, 285 350 and 305 450. 305-650-0-0501

**305 651. Financial Management.** (3) II. Analysis of problems in advanced financial planning and control. Pr.: 245 500, 285 350 and 305 450. 305-651-0-0501

**305 653. Portfolio Management.** (3) II. A theoretical and empirical synthesis of institutional investment decision-making. Concentrates on selecting the optimal investment set. Pr.: 245 220 or 500, 285 351 and 305 450. 305-653-0-0501



**305 660. C.P.A. Problems.** (3) I. A study of problems in various C.P.A. examinations. Pr.: 305 361 and consent of instructor. 305-660-0-0502

**305 661. 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.: 305 390 and 361. 305-661-0-0502

**305 662. Auditing I.** (3) I, II. Theory and procedures used in balance sheet audits. Pr.: 305 361. 305-662-0-0502

**305 663. Auditing II.** (3) II. Theory and procedure used in more complex balance sheet and detailed audits; a study of auditing questions as given in C.P.A. examinations, and review of current literature. Pr.: 305 662 and consent of instructor. 305-663-0-0502

**305 665. Computer Applications in Accounting.** (3) I. Study of the computer as an accounting tool. Emphasizes applications to custodial, performance and decision functions. Pr.: 286 200 and 201 or 202, and 12 hours of accounting. 305-665-0-0502

**305 666. Advanced Managerial Controls.** (3) II. Control of operations through budgeting, cost analysis and income determination. Emphasizes use of accounting data for decision making. Pr.: 225 110 and 120, 305 450 and 10 hours of accounting. 305-666-0-0501

**305 690. International Business.** (3) On sufficient demand. Examination of business decision parameters and strategy in a foreign environment. Emphasis on aspects differing from the domestic area as they relate to marketing, management and financial decisions. Pr.: Senior standing. 305-690-0-0513

**305 691. Business Measurements and Forecasting.** (3) II. Analysis of business data, with emphasis on selection and the use of information for executive decisions. Topics include current economic indicators, forecasting techniques, and business data sources. Pr.: 285 350. 305-691-0-0501

**305 692. Application of the Computer in Business.** (3) II. A study of computer solutions of business problems. Programs will be developed in Information Systems, Location, PERT, Inventory Control, Simulation and Finance. Pr.: 285 350, 286 200 and 286 201 or 286 202, and 305 421. 305-692-0-0501

**305 695. Business Policy.** (3) I, II, S. Integration of the subject matter of required courses in business and economics through study of the problems of policy formulation and administration. Cases are used as the basis of class discussion and written reports. Business simulation is used as an additional pedagogical technique. Pr.: Open only to graduating seniors and graduate students; 305 420, 440 and 450. 305-695-0-0501

**305 696. Business and Society.** (3) I, II, S. The impact of changes in the non-market environment on business; the relationship of business to social, economic and political forces. Pr.: Senior or graduate standing plus nine hours of credit in the social sciences. 305-696-0-0501

**305 698. Problems in Business Administration.** (Var.) I, II, S. Pr.: Background of courses needed for the problem undertaken. 305-698-3-0501

**305 699. Problems in Accounting.** (Var.) I, II, S. Pr.: Background of courses needed for the problem undertaken. 305-699-3-0502

**305 770. Controllership.** (3) I. Emphasis on control of operation through cost analysis, internal and external reporting, and income determination concepts. Pr.: 305 370. 305-770-0-0501

### Graduate Credit

**305 820. Behavioral Management Theory.** (3) I, S. The development of the behavioral bases of individual and group functioning in business, governmental, educational and other organizations. Pr.: 305 420. 305-820-0-0506

**305 840. Advanced Marketing Management.** (3) II. An analytical approach to the study of marketing problems of business firms and other types of organizations. Attention on the influence of the marketplace and the marketing environment on marketing decision-making; the organization's products, and communication strategies; and the organization's system for planning and controlling its marketing effort. Pr.: Six hours of economics, three hours in marketing, three hours in statistics, and 245 500 or equivalent.

**305 841. Special Topics in Marketing.** (3) I. Investigation and discussion of contemporary issues, theories, and approaches affecting marketing policies. Pr.: 305 840 or six hours of marketing.

**305 850. Financial Controls for Business.** (3) II, S. The data necessary to judge economic flexibility and risk of investment proposals, cost of capital and capital structure are evaluated under static and dynamic assumption regarding money and capital markets. Pr.: 305 450. 305-850-0-0506

**305 860. Accounting Theory I.** (3) I. An intensive treatment of problems related to corporation accounting and reporting, with emphasis on income determination and balance sheet valuation. Pr.: 13 hours of accounting. 305-860-0-0502

**305 861. 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.: 13 hours of accounting. 305-861-0-0502

**305 862. Tax Planning and Research.** (3) I. Intensive examination of specific problems in taxation of partnership and corporate income, gift taxes and death taxes. Emphasis on research and tax planning. Pr.: 12 hours of accounting and 305 461. 305-862-0-0502

**305 870. Accounting Controls for Business.** (3) I. 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.: 225 120 and 305 260. 305-870-0-0502

**305 890. Decision Theory of the Firm.** (3) I. An integration of economic theory and operations research, with business decisions and application of these tools to management problems. Pr.: 225 120, 285 350 and 305 260. 305-890-0-0501

**305 891. Legal and Social Environment of Business.** (3) II. Problems affecting business, government and society are used to develop insight into the existence of business problems calling for judgments involving human and social values. Pr.: Consent of instructor. 305-891-0-0501

**305 892. 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.: 285 350 and 305 420. 305-892-0-0503

**305 893. Business Operations Analysis.** (3) II. The use of quantitative decision models in business decisions; includes linear and dynamic programming, queuing, inventory control, simulation and multi-strategy game theory. Pr.: One course in calculus. 305-893-0-0501

**305 894. 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.: 15 hours of B.A. courses at the 600 level or higher. 305-894-0-0501

**305 898. Advanced Business Problems.** Credit arranged. I, II, S. Intensive investigation of special business problems. Pr.: 21 hours of Business Administration courses at the 600 level or higher and sufficient training to complete the desired investigation. 305-898-3-0501

**305 899. Thesis Research.** (Var.) I, II, S. Pr.: Sufficient background to pursue line of research undertaken and consent of instructor. 305-899-4-0501







# College of Education

*Jordan Utsey, Dean*

*Vida E. Stanius, Assistant Dean*

*Margaret C. Bloomquist, Director, Student Personnel Services*

*Willard J. Nelson, Director, Pre-education Advisement Center*

*Roy A. Bartel, Coordinator of Field Experiences*

*Fred A. Teague, Director, Instructional Media Center*

*G. Kent Stewart, Director, Center for Extended Services and Studies*

The College of Education is concerned with programs preparing individuals for the broad spectrum of educational positions in schools, colleges, business, industry, and in governmental agencies.

Primary consideration is given to: 1) the preparation of teachers for elementary schools and secondary schools, and for occupational and vocational programs, 2) the preparation of personnel to serve at various levels of administration in schools and colleges, 3) the training of supervisory personnel for curricular development and instructional improvement, 4) the preparation of persons for a wide variety of positions in counseling and guidance and in student personnel work, 5) the preparation of instructors for community colleges and four-year institutions, 6) the preparation of teachers and other personnel in the area of special education, 7) the preparation of teachers and other personnel in adult and continuing education, 8) the provision of consultative services and in-service training for the improvement of various aspects of educational programs at all levels.

The College of Education cooperates with all other colleges and departments at Kansas State University in its interdisciplinary approach to the preparation of teachers and other educational personnel.

The Kansas State University undergraduate Teacher Education Programs and the Master of Science and Doctor of Philosophy Degree Programs are accredited by the Kansas State Board of

Education, North Central Association of Colleges and Secondary Schools, and National Council for Accreditation of Teacher Education.

The College of Education participates in the Intercollegiate program in Women's Studies, see page 40.

## Center For Extended Services And Studies

The Center for Extended Services and Studies is operated by the College of Education, in response to the needs of schools in the State of Kansas and of education generally. The Center provides a structure within which the College and the University can direct their resources toward working cooperatively with schools to develop and provide services and studies. The services and studies relate to the solution of educational problems and general improvement of education.

The center is staffed and maintained through the assignment of faculty members within the College, through contracts with faculty from K-State and other Kansas colleges and universities, and through the assignment of graduate students. The problem will determine the resources that will be coordinated through agreement.

## Instructional Media Center

The Instructional Media Center provides a wide range of services, instructional materials and audiovisual equipment for faculty and students. Materials such as tapes, overhead transparencies, slides, films and displays are produced for faculty members. Students use the Media Center to prepare similar materials for use in class projects and in student teaching. Audiovisual equipment of all 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 provided for use in the production of instructional television recordings. The Instructional Media Center also includes an outstanding audio recording studio. These studios ac-



commodate 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. Rooms are provided for group viewing of films and video tapes. An independent development laboratory is provided for the use of instructional materials on an individual basis. The laboratory includes learning spaces which are provided with all materials and equipment needed for totally individualized instruction.

## Undergraduate Study

The curriculum in elementary education or secondary education at Kansas State University is a four-year program.

**Pre-Education.** For the freshman and sophomore years, students preparing to teach on either the elementary or secondary level will enroll in the appropriate pre-professional curriculum: Elementary (402) or Secondary (404). **Exceptions to the above:** Students majoring in agricultural education, home economics education, music education, and physical education must enroll in a curriculum within another college. Refer to the section on secondary education major fields.

Freshmen and sophomores are advised by a College of Education pre-education adviser in Room 110 Holton Hall. Refer to the sections Bachelor of Science in Elementary Education, page 201, and Bachelor of Science, page 201 for further information.

**Transfer Students.** Students transferring as freshmen or sophomores will enroll in one of the pre-professional curricula as indicated in the pre-education paragraph. Students transferring as juniors or seniors (53 hours minimum) will enroll in Elementary Curriculum (410), Elementary—special education—Curriculum (411) or one of the appropriate Secondary Education Curricula as indicated in the Section Secondary Education Major Fields.

Students planning to transfer to Kansas State University after one or two years at a junior college are encouraged to plan their degree programs in a four-year sequence. The faculty of the College of Education is available to advise students on the selection of courses which will meet Kansas State University degree requirements.

Students planning to transfer are invited to write to either the director of the pre-education advisement center, Holton Hall Room 110, or the director of student personnel services, Holton Hall Room 111.

## Programs In Education

**Adult Education.** The adult education program is designed to develop competencies essential to persons working with adults. Graduates are qualified to be employed in continuing education, cooperative extension, community and junior colleges, technical schools, adult basic education, voluntary agencies, hospitals, industry, rehabilitation agencies, employment security, government, and other settings. The adult education bachelor's degree program is not to be used for vocational certification.

The program in adult education requires (1) general education studies, (2) professional education studies and (3) area of concentration as outlined in the section entitled Bachelor of Science Curriculum in Adult Education.

**Teacher Education.** The teacher education programs are designed to develop competencies essential for teaching. The programs in elementary education and in secondary education require (1) general education studies, (2) professional education studies and (3) major studies, as specifically outlined in the sections entitled Bachelor of Science in Elementary Education and Bachelor of Science Curricula in Secondary Education. All programs have met program approval by the Kansas State Department of Education.

**All students wishing to teach in elementary or secondary schools must fully complete one of the approved programs.**

Students completing a teacher education program in secondary education which may be part of requirements for a degree granted by another college at KSU must complete all requirements of the approved teacher education program. (See pages 202-206) Elementary education is a degree program in the College of Education only.

## Admission To The Programs In Education

**Adult Education.** Any student intending to enter adult education must have the application for admission to adult education filed and approved before the student may enroll in any of the following courses:

- 405 315 Educational Psychology II
- 405 611 Educational Sociology
- 410 633 Practicum in Adult Education

The application for admission to the adult education program must be approved before a change into the Adult Education curriculum may be completed. The application forms are available in the Office of Student Personnel Services, College of Education, Holton Hall Room 111.

**Teacher Education.** Any student intending to teach in elementary or secondary schools must have the application for admission to a teacher education program filed and approved before the student may enroll in any of the following courses that may be in their program:

- 405 315 Educational Psychology II
  - 415 316 Introduction to Instructional Media
  - 415 470 Science for Elementary Schools
  - 415 471 Language Arts for Elementary Schools
  - 415 472 Social Studies for Elementary Schools
  - 415 473 Mathematics for Elementary Schools
  - 415 474 Elementary School Reading
- also any course which is a part of the professional semester as listed on page 777

The application forms are available in the Office of Student Personnel Services, College of Education, Holton Hall, Room 111.

Students in the College of Education will be transferred from the pre-professional to the professional program when the application for admission to teacher education programs has been approved.



**Dates:** (1) Students must apply by October 1 or February 15 of the sophomore year in the semester in which they earn 53 semester hours. The application for admission to a teacher education program and adult education must be filed two years prior to graduation. If this is not adhered to students may experience difficulties in meeting certification requirements.

(2) Transfer students transferring 53 or more hours from another institution should apply at the time of enrollment or pre-enrollment or the student will be required to complete a semester in residence.

Students making a change in teacher education programs should file an application for the new program.

**Academic Standards Committee:** The Academic Standards Committee of the College of Education must approve the application for admission to the teacher education programs.

### Requirements for Admission to all Teacher Education Programs and Adult Education:

1. a. Over-all grade-point average of 2.2 in all resident work attempted at Kansas State University.  
b. The grade-point average requirements for students transferring to KSU will be based on all work attempted at previously attended institutions only when the application is filed at the time of initial enrollment.
2. A grade-point average of 2.5 in all resident work attempted at Kansas State University in the teaching field (as defined by the Certificate Handbook of the State of Kansas). This requirement does not apply to the elementary education and adult education majors. Transfer students will have the grade average based on all attempted work in the teaching field at previously-attended institutions only when the application is filed at the time of initial enrollment.
3. Passing English Composition I and II with a grade of "C" or better in one of the courses.
4. Grade of "C" or better in one of the following speech courses: 105, 106, 109, 220.

Provisional admission may be granted to an applicant who meets all requirements and whose over-all grade-point average is not below 2.0 and teaching field over-all grade-point average is not below 2.3.

## Bachelor Of Science In Elementary Education

Students preparing to teach in the elementary school are enrolled in the pre-professional elementary curriculum (402) in the College of Education for the freshman and sophomore years. Freshmen and sophomores are advised by a College of Education pre-education adviser in Room 110, Holton Hall. The adviser is available for advising and counseling students concerning the courses essential for entry into the teacher education program.

All sophomores must make application for admission to the teacher education program. When the applications are approved, students are transferred into the teacher education professional program. Students are reassigned from a pre-education adviser to an elementary education adviser.

### GENERAL EDUCATION REQUIREMENTS

**Humanities** ..... minimum requirement 12 sem. hours  
Required: English Composition I & II. (A minimum grade of "C" is required in at least one of the courses.) A course in oral communication. (A minimum grade of "C" required.) modern foreign language, linguistics, or literature

**Psychology** ..... minimum requirement one course  
Required: General Psychology, 273 110.

**Social Sciences** ..... minimum requirement 9 sem. hours.  
(Psychology not included here. See general education electives below.) Required: Courses must be selected from anthropology, economics, geography (excluding 235 220 and 235 420), history, political science, sociology. The total of social sciences & general psychology must be a minimum of 12 sem. hours.

**Natural Sciences** ..... minimum requirement 12 sem. hours  
Required: At least one biological science course, and at least one physical science course. One laboratory course.

**Mathematics** ..... minimum requirement 3 sem. hours  
Course recommended: mathematics 245 508 "Topics in Mathematics for Elementary School Teachers." No mathematics may apply to the natural sciences requirement.

**General Education Electives** ..... 11 hours.  
Electives must be selected from any area included above and/or general religion, philosophy, art and music history, literature, appreciation of art, music and theatre, and humanities courses

The minimum total hours required in general education ..... 50

### Physical Education Requirement:

261 101 Concepts in Physical Education, 1 sem. hour

### PROFESSIONAL AND SPECIALIZED COURSES REQUIRED

Following courses may be taken before student is admitted to the teacher education program

405 215	Educational Psychology I	3
415 300	Principles of Elementary Education	3
209 170	Art for Elementary Schools	3
257 405	Music for Elementary Teachers	3
229 540	Literature for Children	3
261 201	Personal and Community Health	3
	OR	
261 369	PE for Elem. School Teachers	3

Student must be admitted to the teacher education program before enrolling in the following courses

405 315	Educational Psychology II	3
415 316	Introduction to Instructional Media	1
415 470	Science for Elementary Schools	3
415 471	Language Arts for Elementary Schools	3
415 472	Social Studies for Elementary Schools	3
415 473	Mathematics for Elementary Schools	3
415 474	Elementary School Reading	3
415 475	Elementary School Reading Lab	1
405 611	Educational Sociology	3

### Clinical Experiences

415 585	Teaching Participation in Elementary School	8
	Reading Practicum	2
	(Become effective with July, 1978 graduates)	

Total hours required in professional and specialized courses ..... 51

### AREA OF CONCENTRATION

The hours selected from the field of concentration are in addition to those taken to meet general education requirements. Concentrations are offered in the following fields:

biological sciences	
health education	
home economics	
music and art	
social science	
english and speech	
modern foreign language	
physical sciences and mathematics	
special education (learning disabilities, mental retardation, emotionally disturbed)	
speech pathology	
Total hours required in the area of concentration	15

### ELECTIVES

Remaining hours in the degree may be taken as additional hours in the major, general education and related courses, and free electives.

Total hours required in electives ..... 9

Total credit hours required for graduation ..... 126

## Bachelor Of Science

**Curriculum In Adult Education.** For the freshman and sophomore years, students who wish to teach or pursue careers as other personnel in adult education are enrolled in the pre-professional curriculum (401)



in the College of Education. Freshmen and sophomores are advised by the College of Education pre-professional adviser in Room 110, Holton Hall. The adviser is available for advising and counseling students concerning the courses essential for entry into the adult education program.

All sophomores make application for admission into the adult education program. When students are accepted into the adult education curriculum (450), they are reassigned from the pre-professional adviser to an adult education adviser.

#### GENERAL EDUCATION REQUIREMENTS

**Humanities** ..... minimum requirement 12 sem. hours  
Required: English Composition I & II (A minimum grade of "C" is required in at least one of the courses.) A course in oral communication (A minimum grade of "C" required.) modern foreign language, linguistics, or literature.

**Psychology** ..... minimum requirement one course  
Required: General Psychology, 273 110

**Social Sciences** ..... minimum requirement 9 sem. hours  
(Psychology not included here. See general education electives below.) Required: Courses must be selected from anthropology, economics, geography (excluding 235 220 and 235 420), history, political science, sociology. The total of social sciences & general psychology must be a minimum of 12 sem. hours

**Natural Sciences and Mathematics** ..... minimum requirement 12 sem. hours  
Required: At least one biological science course, and at least one physical science course. One laboratory course. A maximum of four hours of mathematics may apply, but not substitute for a physical science. Mathematics may include statistics or computer science.

**General Education Electives** ..... 14 hours  
Electives must be selected from any area included above and/or general religion, philosophy, art and music history, literature, appreciation of art, music and theatre, and humanities courses.

The minimum total hours required in General Education ..... 50

#### Physical Education Requirement:

261 101 Concepts in Physical Education, 1 sem. hour

#### PROFESSIONAL EDUCATION REQUIREMENTS

The following courses may be taken before student is admitted to the adult education curriculum.

410 680	Introduction to Adult Education	3
	Professional Education electives	25-28

A student must be admitted to the adult education curriculum before enrolling in the following three courses:

405 315	Educational Psychology II	3
405 611	Educational Sociology	3
410 633	Practicum in Adult Education	3-6

Total hours required in professional education	40
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#### AREA OF CONCENTRATION

The hours selected from the field of concentration are in addition to those taken to meet general education requirements and may not be professional education courses. Concentrations are offered in the following fields:

- agriculture
- art
- architecture
- business
- computer science
- economics
- English and speech
- engineering
- family and child development
- home economics
- humanities
- journalism & mass communications
- modern languages
- music
- natural sciences
- nursing
- psychology
- recreation and physical education
- social sciences
- statistics and mathematics
- vocational (skill areas)

Total hours required in area of concentration	15
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ELECTIVES	21
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Total credit hours required for graduation	126
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**Curricula in Secondary Education.** For the freshman and sophomore years, students preparing to teach in the secondary school are enrolled in the pre-professional secondary curriculum (404) in the College of Education. Exceptions are students majoring in agricultural education, home economics education, music education, and physical education. Refer to section on secondary education major fields.

Dual advisement is provided during the entire four years for all prospective secondary teachers. For the first two years students are advised by a College of Education pre-education adviser in Room 110, Holton Hall. In addition to the pre-education adviser, students are assigned to advisers in their majors who assist in the selection of courses in their majors and teaching fields.

All sophomores must make application for admission to the teacher education program. When the applications are approved, students are accepted into the College of Education professional program. Students are reassigned from the pre-education adviser to a secondary education adviser but retain their advisers in their major fields.

There are 22 subject fields applicable to teaching at the secondary level.

#### GENERAL EDUCATION REQUIREMENTS

**Humanities** ..... minimum requirement 12 sem. hours  
Required: English Composition I & II. (A minimum grade of "C" is required in at least one of the courses.) A course in oral communication. (A minimum grade of "C" required.) modern foreign language, linguistics, or literature.

**Psychology** ..... minimum requirement one course  
Required: General Psychology, 273 110

**Social Sciences** ..... minimum requirement 9 sem. hours  
(Psychology not included here. See general education electives below.) Required: Courses must be selected from anthropology, economics, geography (excluding 235 220 and 235 420), history, political science, sociology.

**Natural Sciences and Mathematics** ..... minimum requirement 12 sem. hours  
Required: At least one biological science course, and at least one physical science course. One laboratory course. A maximum of four hours of mathematics may apply, but not substitute for a physical science. Mathematics may include statistics or computer science.

**General Education Electives** ..... 14 sem. hours  
Electives must be selected from any area included above and/or general religion, philosophy, art and music history, literature, appreciation of art, music and theatre, and humanities courses.

The minimum total hours required in General Education ..... 50

#### Physical Education Requirement:

261 101 Concepts in Physical Education, 1 sem. hour

#### Professional Education Requirement:

The following course may be taken before student is admitted to the teacher education program:

405 215	Educational Psychology I	3
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A student must be admitted to the teacher education program before enrolling in the following courses:

405 315	Educational Psychology II	3
415 316	Introduction to Instructional Media	1
405 611	Educational Sociology	3
415 451	Principles of Secondary Education	3
415 476	Methods of Teaching in the Secondary School	3

#### Clinical Experiences:

415 586	Teaching Participation in the Secondary School	8
Total hours required in professional education	24	

#### ELECTIVES

Remaining hours in the degree may be taken in additional hours in the major, general education and related courses, and free electives.

Total hours required in electives	credit variable
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Total credit hours required for graduation	126
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## Secondary Education Major Fields

### AGRICULTURAL EDUCATION (AE0 075)

Students planning to be agricultural education majors will be enrolled in and receive their degrees from the College of Agriculture. See page 49.

### ART EDUCATION (EAR 420)

Art	209 095	Art Assembly	0
Art	209 096	Art Education Sem.	0
Art	209 100	Design I	2
Art	209 190	Drawing I	2
Art	209 195	Survey Art History I	3
Art	209 196	Survey Art History II	3
Art	209 200	Design II	2
Art	209 210	Drawing II	2
Art	209 220	Water Color I	2
Art	209 225	Figure Drawing I	2
Art	209 230	Sculpture I	2
Art	209 235	Printmaking I	2
Art	209 245	Oil Painting I	2
Art	209 265	Ceramics I	2
Art	209 270	Metalsmithing and Jewelry	2
Art	209 545	Twentieth Century Art History I	3
Art	209 690	Techniques in Teaching Art	2
Art	209	Art electives	6

Additional hours in one of the following specialized art subjects: oil, prints, ceramics, sculpture, art history, metalcrafts and jewelry, graphic design, drawing 6

Students preparing for K-12 certification must complete 209 170 and student teaching on both the elementary and secondary levels.

### BUSINESS EDUCATION (EBU 421)

B.A.	305 110	Intermediate Typing	3
B.A.	305 111	Production Typing	3
B.A.	305 210	Office Machines	3
B.A.	305 260	Fund. of Accounting	4
B.A.	305 360	Inter. Accounting I	3
		OR	
B.A.	305 270	Manag. & Cost Contr.	3
B.A.	305 292	Business Law I	3
B.A.	305 310	Exec. Sec. Procedures	3
B.A.	305 311	Office Management	3
B.A.	305 392	Business Law II	3
B.A.	305 420	Management Concepts	3
B.A.	305 440	Marketing	3
B.A.	305 450	Business Finance	3
		OR	
Econ.	225 530	Money and Banking	3

Minimum of 6 hours from one of the following options:

B.A.	305 112	Shorthand I	4
B.A.	305 212	Intermediate Shorthand	3
B.A.	305 213	Transcription I	3
		OR	
B.A.	305	Additional hours of Accounting	6

Supporting courses required:

Econ.	225 110	Economics I	3
Econ.	225 120	Economics II	3
Pol. Sci.	269 225	U.S. Politics	3
Soc.	277 211	Intro. to Sociology	3
Math.	245 100	College Algebra	3
C. Sci.	286 200	Fund. of Computer Programming	3
Fam. Econ.	630	Family Economics electives	3

### ENGLISH (EED 422)

Three of the following four courses:

Engl.	229 260	E. British Survey I	3
Engl.	229 265	E. British Survey II	3
Engl.	229 280	American Survey I	3
Engl.	229 285	American Survey II	3
Engl.	229 400	Advanced Comp.	3
Engl.	229 530	Modern English Grammar	3
Engl.	229 545	Literature for Adolescents	3
Engl.	229 350	Intro. to Shakespeare	3
		OR	
Engl.	229 716	Shakespearean Drama I	3
Engl.	229	Literature electives, 6 hours at 600 level and above	9

For English majors who need 12 hours for certification to teach journalism, the following courses are suggested:

Journ.	289 235	Reporting I	3
Journ.	289 285	Reporting II	3
Journ.	289 330	Editing I	3
Journ.	289 665	Law of Mass Communications	3

### HOME ECONOMICS EDUCATION (HED 672)

Students will be enrolled in and receive their degrees from the College of Home Economics. See page 267. Completion of this program satisfies State of Kansas requirements for vocational home economics certification.

### JOURNALISM (EJO 423)

Journ.	289 235	Reporting I	3
Journ.	289 285	Reporting II	3
Journ.	289 330	Editing I	3
Journ.	289 665	Law of Mass Communications	3

18 hours of Journalism electives; the following courses are suggested

Journ.	289 310	Photojournalism I	3
Journ.	289 320	Principles of Advertising	3
Journ.	289 335	Editing II	3
Journ.	289 360	Publications Practice	1-4
Journ.	289 510	Yearbook Editing and Management	2
Journ.	289 555	Advertising Copy and Layout	3
Journ.	289 605	Supervisor of School Publications	3
Journ.	289 610	Interpretation of Contemporary Affairs	3
Journ.	289 660	History of Journalism	3
Journ.	289 685	MC Ethics and Issues	3

To be certified in Kansas to teach English as a second field, one must complete 24 hours of English (not including English Composition I and II), including:

One course in American Literature	3
One course in Advanced Composition	3

One of the following:

Modern English Grammar (3)	
Linguistics (3)	
OR	
Intro. Study of Language	3-4

### MATHEMATICS (EMA 424)

Math.	245 220	Analytic Geom. and Calc. I	4
Math.	245 221	Analytic Geom. and Calc. II	4
Math.	245 222	Analytic Geom. and Calc. III	4
Math.	245 240	Series and Differential Equations	4

18 hours of mathematics courses numbered 400-799, the following courses are recommended

Math.	245 511	Intro. to Algebraic Systems	3
Math.	245 512	Intro. to Modern Algebra I	3
Math.	245 513	Intro. to Modern Algebra II	3
Math.	245 570	History of Mathematics	3
Math.	245 572	Modern Geometry	3
Math.	245 612	Finite Appl. of Math	3
Math.	245 619	Foundations of Analysis	3
Math.	245 717	The Real Number System	3
Math.	245 771	Transformation and Vector Geometry	3
Math.	245 791	Topics in Mathematics for Secondary School Teachers	3

Supporting courses required:

Stat.	285 320	Elements of Statistics	3
		OR	
Stat.	285 510	Introductory Probability and Statistics I	3

It is recommended that a course in physics and a course in computer programming be included as part of general education.

### MODERN LANGUAGES (EML 425)

30 hours in one language at 200 level or above.

A second teaching field is recommended.

Elective courses in the following areas are recommended: speech (linguistics), history, anthropology, and philosophy.

Early experience as a teacher's aide is recommended. Make arrangements with Modern Language education adviser.

### MUSIC EDUCATION (MED 272)

Student planning to be music education majors will be enrolled in and receive their degrees from the College of Arts and Sciences. See page 157.

### PHYSICAL EDUCATION (HPR 276)

Students planning to be physical education majors will be enrolled in and receive their degrees from the College of Arts and Sciences. See page 129.



**PSYCHOLOGY (EPY 426)**

Psych.	273 110	General Psychology	3
Psych.	273 250	Experimental Methods in Psychology	4
Psych.	273 520	Personality Development	3
Psych.	273 535	Social Psychology	3
Psych.	273 460	Information Processing and Memory	3
		OR	
Psych.	273 475	Principles of Learning and Motivation	3
		OR	
Psych.	273 480	Fundamentals of Perception and Sensation	3
Psych.	273	Psychology electives (excluding Ed. Psych. I & II)	2
Supporting courses required:			
Stat	285 320	Elements of Statistics	3
		OR	
Stat	285 330	Stat. for Soc. Sc. Majors	3
A&F	405 715	Principles of Measurement	3
A&F	405 721	Mental Hygiene in the School and Community	3

Completion of a second teaching field based on minimum College of Education requirements.

**SPEECH (ESP 429)**

30 hours in speech to include the following:

A. 21 hours from one of the following major areas of interest:

Speech	281	General Speech
Speech	282	Linguistics
Speech	283	Speech Pathology/Audiology
Speech	284	Theatre and Interpretation

B. 9 hours in speech courses outside the major area of interest.

Note: To satisfy Kansas State certification requirements, each candidate must complete one course in each of the following four areas:

Speech	281	Public speaking
Speech	281	Discussion and debate
Speech	284	Theatre
Speech	284	Oral interpretation

To be certified in Kansas to teach English as a second field, one must complete 24 hours of English (not including English Composition I and II), including:

One course in American literature	3
One course in advanced composition	3
One of the following:	
Modern English Grammar (3)	
Linguistics (3)	
OR	
Intro. Study of Language	3-4

**Natural Science Majors****BIOLOGICAL SCIENCE (EBI 430)**

Biol.	215 198	Principles of Biology	4
Biol.	215 201	Organismic Biology	5
Biol.	215 555	Microbiology	4
Biol.	215 303	Ecosystems and Society	3
		OR	
Biol.	215 529	Fundamentals of Ecology	3
		OR	
Biol.	215 631	Ecology	3
AS&I	005 500	Genetics	3
		OR	
Biol.	215 650	Molecular Genetics	3

8 hours of biology electives: Many different biology courses may be used but it is strongly suggested that the following courses be considered:

Entom	030 311	Gen. Entomology	3
Biol.	215 310	Biology and the Future of Man	3
Biol.	215 440	Cell-Develop. Biol.	5
Biol.	215 560	Evolutionary Biology	2

Chemistry Courses Required:

Chem.	221 210	Chemistry I	4
Chem.	221 230	Chemistry II	4
Chem.	221 240	Environ. Chem. Lab.	1
Chem.	221 350	General Organic Chemistry	3

Other Required Courses:

Geol.	234 512	Earth Science	3
Geol.	234 130	El. Geo. Lab.	1
Phys.	265 115	Descriptive Physics	4
C&I	415 614	Lab Techniques	3

**CHEMISTRY (ECH 431)**

Chem.	221 210	Chemistry I	4
Chem.	221 230	Chemistry II	4
Chem.	221 271	Chemical Analysis	4
Chem.	221 350	Gen. Organic Chemistry	3
Chem.	221 351	Gen. Organic Chemistry Lab.	2
Chem.	221 500	Descriptive Phys. Chemistry (A substitution may be Phys. Chem. 585 & 586.)	3
Chem.	221	Chemistry electives	5

Supporting courses required:

Biol.	215 198	Principles of Biology	4
Biol.	215 201	Organismic Biology	5
Math.	245 220	Analytic Geom. & Calc. I	4
Math.	245 221	Analytic Geom. & Calc. II	4

Physics Option A:

Phys.	265 113	General Physics I	4
Phys.	265 114	General Physics II	4

Physics Option B:

Phys.	265 213	Engineering Physics I	5
Phys.	265 214	Engineering Physics II	5
C&I	415 614	Lab Techniques	3

Additional courses highly recommended:

Math.	245 222	Analytic Geom. & Calc. III	4
Chem.	221 799	Problems in Chemistry	Credit Variable

**EARTH SCIENCE (EEA 432)**

Geol.	234 100	Geology I	3
Geol.	234 130	Elem. Geol. Lab.	1
Geol.	234 512	Earth Science	3
Geol.	234 520	Geomorphology	4
Geol.	234 502	Mineralogy and Petrology I	4
Geog.	235 220	Environmental Geography I	4

Supporting courses required:

Biol.	215 198	Principles of Biology	4
Biol.	215 201	Organismic Biology	4
Chem.	221 210	Chemistry I	4
Chem.	221 230	Chemistry II	4
Chem.	221 240	Environ. Chem. Lab.	1
Math.	245 100	College Algebra	3
Math.	245 150	Plane Trigonometry	3
Phys.	265 113	General Physics I	4
Phys.	265 114	General Physics II	4
Phys.	265 191	Descriptive Astronomy	3
Phys.	265 193	Descriptive Meteorology	3
C&I	415 614	Lab Techniques	3

**PHYSICAL SCIENCE (EPS 434)**

Physics Option A:

Phys.	265 113	General Physics I	4
Phys.	265 114	General Physics II	4

Physics Option B:

Phys.	265 213	Engineering Physics I	5
Phys.	265 214	Engineering Physics II	5

6 hours physics electives selected from the following:

Phys.	265 191	Descriptive Astronomy	3
Phys.	265 193	Descriptive Meteorology	3
Phys.	265 636	Phys. Meas. Instr.	4
Phys.	265 506	Physics Lab. I	3
Phys.	265 551	Atomic Physics	3
		OR	
Phys.	265 451	Modern Physics	3

Note: Kansas physics certification requires at least one physics course that specifies Physics II as a prerequisite.

Supporting courses required:

Chem.	221 210	Chemistry I	4
Chem.	221 230	Chemistry II	4
Chem.	221 240	Environ. Chem. Lab.	1
Chem.	221 350	General Organic Chem.	3
Chem.	221 351	General Organic Chem. Lab.	2
Geol.	234 100	Geology I	3
Geol.	234 130	El. Geol. Lab.	1
Geol.	234 512	Earth Science	3
Biol.	215 198	Principles of Biology	4
Biol.	215 201	Organismic Biology	4
Math.	245 220	Analytic Geom. and Calc. I	4
Math.	245 221	Analytic Geom. & Calc. II	4
C&I	415 614	Lab Techniques	3



**PHYSICS (EPH 435)**

Phys.	265 017	Colloquium in Physics	0
Phys.	265 213	Engineering Physics I	5
Phys.	265 214	Engineering Physics II	5
Phys.	265 506	Physics Lab. I	3
Phys.	265 522	Mechanics I	3
Phys.	265 532	Electricity and Magnetism	3
Phys.	265 551	Atomic Physics I	3
Phys.	265 636	Phys. Meas. Instr.	4

**Supporting courses required:**

Biol.	215	one biology course	3-4
		(selection must be approved by the education adviser)	
Chem.	221 210	Chemistry I	4
Chem.	221 230	Chemistry II	4
Chem.	221 240	Environ. Chem. Lab.	1
Math.	245 220	Analytic Geom. & Calc. I	4
Math.	245 221	Analytic Geom. & Calc. II	4
Math.	245 222	Analytic Geom. & Calc. III	4
Math.	245 240	Series & Differential Equations	4
C&I	415 614	Lab Techniques	3

**Additional courses highly recommended:**

Geol.	234 512	Earth Science	3
Geol.	234 130	El. Geol. Lab.	1

**Social Science Majors****ECONOMICS (EEC 437)\***

Econ.	225 110	Economics I	3
Econ.	225 120	Economics II	3
Econ.	225 510	Inter. Macroeconomics	3
Econ.	225 520	Inter. Microeconomics	3

15 hours of economics courses numbered 500 and above, selected with advice of economics and education advisers.

**Supporting courses required:**

Geog.	235 100	World Regional Geography	3
		OR	
Geog.	235 440	Geography of Natural Resources	3
		OR	
Geog.	235 450	Geography of Economic Behavior	3
Hist.	241 251	U.S. History to 1877	3
Hist.	241 252	U.S. History since 1877	3
Math.	245 100	College Algebra	3
Pol. Sci.	269 110	Principles of Pol. Sci.	3
Soc.	277 211	Intro. to Sociology	3
Stat.	285 350	Bus. & Econ. Stat. I	3
		OR	
Stat.	285 330	Elem. Stat. for Soc. Sci.	3

**One of the following four courses:**

B.A.	305 260	Fund. of Accounting	4
Math.	245 220	Analytic Geom. & Calc. I	4
Math.	245 500	Intro. to Analytic Processes	3
Stat.	285 351	Bus. & Econ. Stat. II	3

**Social Science electives:**

Hist.	241	Additional courses in U.S. History	6
		OR	
Pol. Sci.	269	Political Science courses	9

**GEOGRAPHY (EGG 436)\***

Geog.	235 220	Environmental Geog. I	4
Geog.	235 420	Environmental Geog. II	4
Geog.	235 440	Geography of Natural Resources	3
Geog.	235 450	Geography of Economic Behavior	3
Geog.	235 470	Cartography	3
Geog.	235 480	Pro-Seminar in Geography	2
Geog.	235	Additional Geography courses 600 level and above	9

**Supporting courses required:**

Hist.	241 101	Rise of Europe	3
Hist.	241 102	Modern Era	3
Hist.	241 251	U.S. History to 1877	3
Hist.	241 252	U.S. History since 1877	3
Hist.	241	World History courses	6
Pol. Sci.	269 110	Principles of Pol. Sci.	3
Soc.	277 211	Intro. to Sociology	3

**HISTORY (EHI 438)\***

Hist.	241 101	Rise of Europe	3
Hist.	241 102	Modern Era	3
Hist.	241 251	U.S. History to 1877	3
Hist.	241 252	U.S. History since 1877	3
Hist.	241 397	Junior Seminar	3
Hist.	241 599	Senior Seminar	3
		OR	
Hist.	241	Approved alt. above 500	3

12 hours of courses numbered 500 and above distributed in three of the following fields:

- (a) ancient, medieval and early modern Europe
- (b) modern Europe including Britain
- (c) third world (Asia, Africa, Latin America)
- (d) The United States
- (e) history of science, history of technology, military history

**Supporting courses required:**

Econ.	225 110	Economics I	3
Geog.	235 100	World Regional Geog.	3
Pol. Sci.	269 110	Principles of Pol. Sci.	3
Pol. Sci.	269	Pol. Sci. elective	3
Soc.	277 211	Intro. to Sociology	3

**POLITICAL SCIENCE (EPL 439)\***

Pol. Sci.	269 110	Introduction to Pol. Sci.	3
Pol. Sci.	269	Political Science courses	21

**Supporting courses required:**

Econ.	225 110	Economics I	3
Geog.	235 100	World Regional Geography	3
Hist.	241 101	Rise of Europe	3
Hist.	241 102	Modern Era	3
Hist.	241 251	U.S. History to 1877	3
Hist.	241 252	U.S. History since 1877	3
Soc.	277 211	Intro. to Sociology	3

**SOCIOLOGY (ESO 440)\***

Soc.	277 211	Intro. to Sociology	3
Soc.	277 420	Methods of Soc. Res. I	4
Soc.	277 460	Contemp. Soc. Theory	3
Soc.	277	Sociology electives 400 level and above	9**
Soc.	277	Sociology electives numbered 500-799	9**
		Social Science electives (all either U.S. hist. or pol. sci.)	6

**Supporting courses required:**

Econ.	225 110	Economics I	3
Geog.	235 100	World Regional Geog.	3
Hist.	241 251	U.S. History to 1877	3
Hist.	241 252	U.S. History since 1877	3
Pol. Sci.	269 110	Principles of Pol. Sci.	3
Pol. Sci.	269	Political Science elective	3**
Stat.	285 320	Elements of Statistics	3

\*Note: At least 12 hours of U.S. history or 12 hours of political science or 12 hours of world history must be completed prior to student teaching.

\*\*Selected in consultation with education adviser

**The Professional Semester**

Teaching participation is the culminating clinical experience of the professional semester. The professional semester is comprised of a series of prescribed courses which are accelerated so that one-half of the semester is allocated to the clinical experience (teaching participation). This semester usually occurs in the fall or spring semester 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 Kansas State University.



## Application For Student Teaching

Each student who plans to enroll in teaching participation in the elementary or secondary school must submit an "Application for Student Teaching" to the College of Education coordinator of field experiences not later than December 20 of the year preceding the professional semester. This application must be made even though all admission requirements to the professional semester are not fully satisfied at the time of the application. The application will be obtained from the College of Education adviser and returned to the coordinator of field 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 field experiences will notify applicants of their admission to the professional semester. Students will be approved for the professional semester when the requirements listed below have been met. If the coordinator of field experiences notifies a student that all requirements for the professional semester have not been satisfied, the student may request through the College of Education adviser that his application be postponed for one semester. Only one postponement is permitted without filing a new "Application for Student Teaching."

### A. Requirements for ALL applicants to the Professional Semester:

1. Full admittance to a teacher education program.
2. Completion of 90 semester hours
3. An overall grade-point average of 2.2 in all course work attempted at KSU
4. Satisfactory completion of:
  - 405 215 Educational Psychology I
  - 405 315 Educational Psychology II
  - 415 316 Introduction to Instructional Media
5. Recommendation by the College of Education adviser.
6. Physical examination by the Student Health Center or by a licensed physician.
  - a. Physicals are taken no later than the semester preceding the professional semester.
  - b. A copy of the physical examination must be on file in the office of the coordinator of field experiences before a student teaching assignment will be finalized.

### B. Additional requirements:

#### 1. Applicants to the SECONDARY PROFESSIONAL SEMESTER:

A grade-point average of 2.5 in all resident work attempted at KSU in the teaching field is required. Psychology majors must have the 2.5 grade-point average in the required second teaching field

#### 2. Applicants to the ELEMENTARY PROFESSIONAL SEMESTER:

Satisfactory completion of the following courses is required:

- 415 470 Science for the Elementary School
- 415 471 Language Arts for the Elementary School
- 415 472 Social Studies for the Elementary School
- 415 473 Mathematics for the Elementary School
- 415 474 Elementary School Reading

## Professional Semester Options

**A. CONVENTIONAL PROFESSIONAL SEMESTER.** This semester involves eight weeks in the classroom on campus and eight weeks in student teaching. Normally, students will commute from Manhattan to student teaching positions, except in the case of vocational agriculture and vocational home economics and when students choose to live off campus.

The conventional professional semesters are shown below:

### ELEMENTARY PROFESSIONAL SEMESTER

415 474	Elementary School Reading	3
415 475	Reading Laboratory	1
405 611	Educational Sociology	3
415 585	Teaching Participation in Elementary School	8
	Practicum in Reading	2
(Effective December 1978)		17

### SECONDARY PROFESSIONAL SEMESTER

415 586	Teaching Participation in Secondary School	8
415 451	Principles of Secondary Education	3
405 611	Educational Sociology	3
415 476	Methods of Teaching in Secondary School	3
		17

### AGRICULTURAL EDUCATION PROFESSIONAL SEMESTER

410 586	Teaching Participation in Secondary School	8
410 621	Program Planning in Vocational Education	3
410 500	Methods of Teaching Agriculture	2
506 599 & 506 553	Courses in Major	6
		19

### HOME ECONOMICS EDUCATION PROFESSIONAL SEMESTER

410 586	Teaching Participation in Secondary School	8
410 621	Program Planning in Vocational Education	3
410 550	Methods of Teaching Home Economics	2
415 316	Introduction to Instructional Media	1
		14

### MUSIC EDUCATION PROFESSIONAL SEMESTER

415 583	Teaching Participation in Elementary Music	4
415 584	Teaching Participation in Secondary Music	4
415 451	Principles of Secondary Education	3
405 611	Educational Sociology	3
415 316	Introduction to Instructional Media	1
	Courses in Major	2
		17

### PHYSICAL EDUCATION PROFESSIONAL SEMESTER (SECONDARY)

415 586	Teaching Participation in Secondary Schools	8
415 451	Principles of Secondary Education	3
405 611	Educational Sociology	3
415 476	Methods of Teaching in Secondary Schools	3
		17

### PHYSICAL EDUCATION PROFESSIONAL SEMESTER (ELEMENTARY)

415 585	Teaching Participation in Elementary Schools	8
405 611	Educational Sociology	3
415 469	Physical Education for the Elementary Schools	3
		14

### B. The following professional semester options are on the credit/no credit basis only.

**The EEST Option.** The Early Experience in Student Teaching Option is a semester-long elementary program with emphasis in reading. Information about the option is disseminated to all elementary education majors the semester prior to student teaching. Special applications are necessary.

**The MITEC Option.** There are Multi-Institutional Teacher Education Centers located in Topeka and Kansas City. The Kansas City center includes both Kansas City, Kansas, and Shawnee Mission. This is a voluntary, full-semester off-campus option. This professional semester option requires advanced planning with the education adviser or the coordinator of field 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 Wichita in which the students spend a full semester off campus. Only five or six students are selected by application for this option.

**The Competency-Based KSU Teacher Education Option.** The secondary mathematics, social science, English and science students are involved with a professional semester which focuses on the development of specific teacher competencies, the implementation of those competencies in the classroom where they will student teach, and early participation in those classrooms. The schedule is flexible and a basic objective of the option is to provide alternative ways of developing competencies.

## Student Teaching Assignment Request

All options require a special application, "Student Teaching Assignment Request." This form may be obtained from the office of the coordinator of field experiences. This request form should be returned to the office of the coordinator of field experiences 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.



## Special Information Concerning The Professional Semester

1. Students enrolled in the professional semester may take no courses which do not conform to the accelerated schedule. This means that during the professional semester no assignments or class attendance may be required during the clinical experience.
2. Students will receive credit or no-credit for teaching participation.
3. Students must be eligible for admission to the professional semester to enroll in any of the professional education courses which are a part of the professional semester.

## Graduate Study

The College of Education offers work leading to the Master of Science degree and the Doctor of Philosophy in 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.

**Professional Certification and Renewal.** Those students who are primarily interested in graduate study to meet certification and/or renewal of teaching skills and do not wish to seek an advanced degree may apply to admission as a special student. Admission in this category is consistent with Graduate School standards for special students. Refer to the section Professional Certification.

**Resident Graduate Credit in Field-Based Programs.** The College of Education has established a series of field-based programs located throughout the State of Kansas for the purpose of offering course work to students in the field. Residence credit toward a graduate degree may be earned in courses that are offered through the College of Education. These courses will be offered to graduate students who are working full-time and who cannot attend courses on campus. Students who cannot complete all their requirements in the field-based programs during the academic year may finish their course work during the summer on campus. Doctoral candidates are expected to meet specific on-campus residency requirements.

**Master of Science Degree.** Major work leading to the degree Master of Science is offered in the following fields:

agricultural education

home economics education

education—specialization in: adult education, elementary administration, secondary administration, guidance and counseling, secondary education, elementary education, special education, occupational education

**Requirements:** Candidates for graduate work shall meet the following admission requirements:

1. Graduation from an accredited institution whose requirements for the bachelor's degree are substantially equivalent to those of Kansas State University.

2. Undergraduate grade average of 3.0 or better in the junior and senior years.
3. Undergraduate preparation substantially equivalent to that given by Kansas State University in the specific subject-matter field in which the applicant expects to do graduate work.
4. Undergraduate preparation in closely related or supporting subjects adequate to support advanced work in the field of the applicant's choice.
5. Undergraduate professional education necessary to satisfy the requirements of the graduate program the student expects to pursue.
6. International students whose native language is not English must make available the results of the Test of English as a Foreign Language (TOEFL).

Students lacking preparation in certain areas may be required to do additional work.

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. Advisors and/or departments may require additional information.

M.S. degree requirements include:

1. A minimum of 30 semester hours, approximately one-half of which shall be in the major field (one option provides for 12 hours).
2. All programs of study must include courses selected from the following list: Philosophy of Education, Curriculum Development, Advanced Educational Psychology, Principles and Practices of Guidance, Basic Principles of Measurement, and Research Methods and Treatment of Data.
3. Academic advisors should be consulted regarding specific departmental course requirements.
4. **Thesis, Report, Non-Report Options:** Departments shall have the option of using one or more of the three plans below:
  - a. A thesis of six to eight semester hours
  - b. A written report of two semester hours either of research or of problem work on a topic in the major field.
  - c. Course work only, but including evidence of scholarly effort such as term papers, production of art, music, designs, etc., as determined by the student's supervisory committee.
5. A final oral examination or a comprehensive written examination or both 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 broad areas of specialization: (1) Administration and Foundations Education, (2) Adult and Occupational Education, and (3) Curriculum and Instruction Education. Joint



programs involving selected departments in other Colleges at Kansas State University will prepare individuals for teaching positions in community and four-year colleges.

**Requirements:** Applicants for admission to the Ph.D. degree program in Education shall make available to the office of graduate studies, College of Education two copies of the graduate school application, two official transcripts for undergraduate and graduate courses, verbal and quantitative scores from the aptitude test of the Graduate Record Examination or the Miller Analogies Test score, and a statement of objectives indicating educational experience and professional goals. The major professor and/or the departmental faculty may require additional information.

Additional requirements for the Ph.D. degree include a minimum of 90 semester hours of graduate study beyond the bachelor's and these must include:

1. A minimum of 24 hours of course work above the Master's degree or equivalent, and 30 hours of research at Kansas State University after admission to the doctoral program.
2. A minimum of 20 hours in the area of specialization, 12 hours in an integrated supporting area, and nine hours in the prescribed research core. The prescribed research core consists of the following: (a) a first course in statistics, (b) Administration & Foundations (A&F) 817 and (c) A&F 917. A foreign language is not required.
3. For the residency requirement of the doctoral program, 24 hours of course work will be completed on the Kansas State University campus within a calendar year but not less than two consecutive semesters. The candidate must be enrolled in a minimum of nine hours of credit each semester during the residency year. The student may be employed up to half-time.
4. Written preliminary and oral examinations that meet the requirements of the Graduate School and the College of Education.

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 on the student's interests, expertise, and professional goals.

A member of the graduate faculty in the student's area of study serves as the major professor. The graduate faculty member must agree in conference with the department head to serve as major professor.

Information on special requirements for an advanced degree may be obtained by writing to a department head.

### Professional Certification

**Initial Certification.** The College of Education has the responsibility to serve as the recommending agent for all Kansas State University 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 requirements. Pre-school, elementary and secondary teaching certification may be accomplished

through the completion of the approved program and the B.S. or B.A. degrees. Students enrolled in and earning degrees in colleges other than the College of Education must complete all requirements of the approved teacher education program.

Students may qualify for the three-year degree early childhood certificate, the three-year degree elementary certificate, the three-year degree secondary certificate, or the three-year degree elementary and secondary certificate, as established by the State Board of Education.

Applications for certification are processed by the office of student personnel services of the College of Education, Room 111, Holton Hall.

Persons seeking initial certification who present degrees from other accredited institutions must meet all requirements of the teacher education program.

**Recertification.** Kansas State University continues to act as the parent institution for persons who have been recommended for initial certification. The renewal requirements as established by the State Board of Education as well as requirements of the College of Education must be satisfied. Community or junior college credit or credit earned through correspondence study may not be used for recertification.

Kansas State University may become the recommending agent for recertification of individuals presenting degrees from other accredited institutions. These persons must complete eight hours in residence, a portion of which must be earned in the College of Education.

**Certification requiring work beyond the Bachelor's Degree.** The College of Education will recommend for certification individuals satisfying program requirements for the following:

1. **Junior College Teaching.** Students preparing for junior college teaching have the following options: (1) Completion of a teacher education program in secondary education plus a master's degree which includes the requirements for junior college certification; (2) Completion of a master's degree program designed specifically for junior college certification.
2. **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 at the level they plan to counsel and have two years teaching experience or must satisfy these requirements concurrently with the program.
3. **Speech Clinician.** The speech pathology-audiology program at Kansas State University has been designed to meet the requirements for certification of clinical competence of the American Speech and Hearing Association and the State of Kansas Department of Education requirements for speech clinician. The approved program requires the M.S. degree in the College of Arts and Sciences.
4. **Administrator.** A graduate degree is required for any of the three administrative certificates granted by the State of Kansas. In addition, specific



areas of study are required according to the certification desired. The KSU College of Education may be designated as the parent institution for recommending administrative certification when a student completes a minimum of eight graduate hours at KSU with some work taken in the College of Education. The Department of Administration and Foundations should be contacted regarding advisement for specific administrative certification.

**5. Special Education.** Students at Kansas State University wishing to prepare as special education teachers may meet all academic requirements for certification as teachers of the gifted, mentally retarded, learning disabled, or those who have personal and social adjustment problems (emotionally disturbed). Each program is considered as being primarily one that leads to a master's degree.

**6. 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 12 semester hours in a planned sequence of graduate reading courses is required. (A Master's degree is not required for certification.) The College of Education offers a variety of courses which meet these requirements.

## Teacher Aide Program

The teacher aide program is designed to give the student early contact with the teaching effort of the public school system. There are both learning and observation situations provided for the student. Providing the aide with this experience hopefully will lead to an earlier and deeper commitment to the teaching profession. Students wishing to participate in the teacher aide program should enroll in 400-100.

## Departments & Course Offerings

### General Courses in Education

**400 100. Pre-Professional Laboratory Experiences.** (1) I, II. Supervised experiences in the field of education designed to facilitate orientation and investigation of teaching through the teacher aide program. Maximum credit of three (3) hours. No more than one credit per semester. 400-100-0808-2

**400 105. Introduction To Women's Studies.** (3)

**400 405. Senior Seminar In Women's Studies.** (3)

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## ADMINISTRATION AND FOUNDATIONS

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*Michael C. Holen,\* Head of Department*

Professors Danskin,\* DeMand,\* Hanna,\* Hoyt,\* McCain,\* and Wilson;\* Associate Professors Bradley,\* Kaiser,\* Litz,\* Newhouse,\* Nolting,\* Ohlsen,\* Parish,\* Stewart,\* and VanMeter;\* Assistant Professors Dyck,\* Goodyear,\* Hershey,\* Lynch,\* McIlvaine,\* Sparkman,\* Sherrard,\* Shoop,\* and Urbansok;\* Emeritus Professors Baker,\* Green,\* Moggle,\* and Olson.\*

The focus of the department is twofold: (1) foundations of education at the undergraduate level in special education and educational psychology and (2) graduate studies in educational administration,

guidance counseling, educational psychology, special education, and higher education.

The foundations of education include such topics as community education, educational sociology, plus 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.

Studies in special education are intended to 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. Early planning will permit completion of coursework required for provisional certification in special education at the undergraduate level. Permanent certification requires the completion of additional work at the graduate level. Program focus is to work with the mentally retarded, learning disabled and emotionally disturbed student at both the elementary and secondary levels. In addition, a close working relationship is maintained with the Department of Speech in the preparation of supporting personnel in the area of speech pathology and hearing conservation.

Graduate studies in educational psychology and counseling and student personnel prepare teachers, researchers, counselors and guidance personnel for schools, colleges, universities and community settings. Students may choose coursework emphasizing such dimensions as learning and human development, statistics and measurement, guidance and counseling, student personnel work and career development.

The program in the educational administration area is designed to prepare individuals for positions of leadership at all levels of education and in professional organizations and educational agencies. The program provides sufficient breadth and depth to give candidates for advanced degrees ample opportunity to develop essential competencies. A close working relationship is maintained with the Environmental Laboratory, the Center for Community Planning Services, the Computing Center and the College of Architecture and Design in the development of joint programs. Explorations are being made in other areas in which cooperative activities may occur.

### Undergraduate Credit

**405 111. Group Life Seminar.** (1) I. 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. 405-111-1-0801

**405 211. Leadership Training Seminar.** (2) I. 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. 405-211-1-0801



**405 215. Educational Psychology I.** (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. Pr.: Psych. 110 and sophomore standing. 405-215-1-0822

**405 311. 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 practicing in emitting skills which influence interaction quality. Pr.: Junior standing.

**405 315. Educational Psychology II.** (3) I, II, S. The learning process, with special emphasis on abilities and teaching-learning processes, and measurement and evaluation of school learning. Pr.: A&F 215, junior standing, and admission to Teacher Education. 405-315-1-0822

### Undergraduate And Graduate Credit In Minor Field

**405 511. Independent Study in Education.** (1-3). I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department head. 405-511-3-0801

**405 550. Art for Exceptional Children.** (Same as Art 560). 405-550-2-0831

### Undergraduate And Graduate Credit

**405 611. Educational Sociology.** (3) I, II, S. A study to gain an understanding of the ways in which the school can effectively utilize 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. 405-611-0-0801

**405 622. 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 A&F 215. 405-622-1-0808

**405 628. Characteristics of the Emotionally Disturbed.** (3) I. A survey and exploration of approaches to the educational needs of the socially and emotionally disturbed child. Development of curricula and learning environment will be emphasized. Pr.: A&F 622 or A&F 663 and/or consent of instructor. 405-628-1-0816

**405 631. Characteristics of Learning Disabilities.** (3) 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.: A&F 622 or A&F 663. 405-631-0-0818

**405 632. 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.: A&F 315. 405-632-0-0808

**405 633. 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.: A&F 631. 405-633-0-0808

**405 634. Instructional Materials for Special Education.** (3) On sufficient demand. Evaluation and adaptation of instructional materials and media appropriate to the education of the exceptional child. Special materials and media for specific exceptionalities will be considered. 405-634-0-0808

**405 663. Education of Exceptional Children.** (3) On sufficient demand. A general study of the field 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.: A&F 215 and C&I 300 or 451. 405-663-1-0808

**405 664. Mental Retardation.** (3) On sufficient demand. Etiological, psychological, sociological, and educational aspects of mental retardation. Pr.: A&F 663. 405-664-0-0808

**405 675. 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.: 405 215 or 410 540. (See 410 675 and 415 675) 405-675-3-0801

**405 686. 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.: 405 215 or 410 540. (See 410 686 or 415 686) 405-686-3-0801

**405 687. Field Experiences in Special Education.** (1-3) On sufficient demand. Observation and supervised activities in schools, camps, clinics, or institutions as related to student's area of special interest or preparation. Pr.: A&F 622 or A&F 663. 405-687-2-0808

**405 716. 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 405 315. 405-716-1-0824

**405 715. 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.: A&F 315. 405-715-1-0825

**405 720. Principles and Practices of Guidance.** (3) I, S. Need and nature of guidance functions; personnel, their duties and relations; programs and evaluation of results. Pr.: C&I 585 or 586 or consent of instructor. 405-720-1-0826

**405 721. 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 A&F 215. 405-721-0-0808

**405 726. Junior High School.** (2 or 3). I, alternate S. Origin, objectives, program, and administration of the junior high school, and relations with lower and higher education units. Pr.: Teaching experience. 405-726-1-0804

**405 752. 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 the area of career life planning. Pr.: Senior standing and consent of instructor. 405-752-0-0801

**405 753. 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.: A&F 663. 405-753-1-0810

**405 755. Guidance in the Education 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 pre-school, elementary, secondary, post-secondary, and adult settings. Pr.: A&F 622, A&F 663 and permission of instructor. 405-755-0-0802



**405 786. Practicum in Education of Exceptional Children.** (3-5) 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. 405-786-2-0808

**405 795. 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. 405-795-3-0801

### Graduate Credit

**405 810. Methodology in Student Personnel Work.** (3) S. Study of the methods and procedures to plan, implement, and evaluate a total student personnel program in a higher education setting. Special attention will be given to the environmental, sociological, and psychological influences on the personal and educational development of students. Pr.: A&F 859 and consent of instructor. 405-810-0-0826

**405 811. 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. 405-811-0-0826

**405 812. 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. 405-812-0-0821

**405 813. 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.: A&F 611 or consent of instructor. 405-813-0-0801

**405 814. International Education.** (3) On sufficient demand. Developing, administering, conducting, and evaluating educational programs from a world perspective. Pr.: Teaching experience or consent of instructor. 405-814-0-0801

**405 815. Individual Appraisal.** (3) I, S. 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.: A&F 720 and A&F 715. 405-815-1-0825

**405 816. 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. 405-816-1-0824

**405 817. 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 A&F 715. 405-817-1-0824

**405 818. General School Administration.** (3) I, 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. 405-818-1-0827

**405 819. School Business and Finance.** (3) II, alternate S. Professional preparation primarily for school administrators and persons planning to enter that work including problems of finance, administration, and support of schools at local, state, and federal levels. Pr.: At least one year of teaching experience. 405-819-1-0801

**405 820. Individual Intelligence Testing.** (3-5) II. Theory of the appraisal of individual intelligence with emphasis on techniques of administration, scoring, interpreting and applying in school settings. Supervised practice and developed proficiency in the use of Stanford-Binet and WISC and/or WAIS. Pr.: A&F 715 and consent of instructor. 405-820-1-0825

**405 823. Counseling Theory.** (3) I, II, S. Theories, methods, and problems in counseling, relating the counseling process to dynamics of human behavior. Pr.: A&F 815 or Psych. 520 or equivalent and conc. enrollment. 405-823-1-0826

**405 825. Social Psychology of Education.** (3) II. Consideration of the literature and applications of social-psychological studies of the student, student cultures, characteristics of educational institutions, and organizational change. Pr.: A&F 611 or A&F 812 or consent of instructor. 405-825-0-0821

**405 830. The School Plant.** (3) I, alt. S. Determination and provision of building and other plant needs by the local public school district, including planning, financing, construction, and utilization. Pr.: At least one year of teaching experience. 405-830-1-0801

**405 831. Public School Law.** (1 or 3) II. The nature of legal responsibilities faced by the public school administrator; resources available to him for solution of legal problems. Designed to develop understanding of the legal base upon which public education is built and controlled. Pr.: A&F 818 or consent of instructor. 405-831-1-0827

**405 832. The Junior College.** (3) I, II, S. This course is designed to give the student an overview of one of the most rapidly growing units in the American educational system. Emphasis on philosophy, purposes, curriculum, organization, professional staff, student-personnel programs, and the role of the comprehensive community junior college in higher education. Pr.: A&F 315 and consent of instructor. 405-832-1-0806

**405 833. Administration of Special Education Programs.** (2-3) I, II, S. The study of administrative units for special education, placement procedures, federal and state legislation, and program reimbursement and funding. Pr.: 405 818 or 405 811. 405-833-2-0808

**405 834. Strategies for Educational Change.** (3) I. This course is designed to provide 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.: A&F 818 or 857, or C&I 831. 405-834-0-0801

**405 835. The Principalship.** (3) I, alt. S. Analysis of the principal's role as he interacts with his various referent groups. Applicable to both elementary and secondary administration. Pr.: One year of teaching experience. 405-835-1-0827

**405 836. School-Public Relations.** (2 or 3) I. Interrelationships that exist between the school and the community and the role of the teacher and administrator in such relationships. Pr.: A&F 818 for graduate students in educational administration. One year of teaching experience for all others. 405-836-1-0801

**405 856. Guidance in the Elementary School.** (3) I. 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.: C&I 585, A&F 720 and consent of instructor. 405-856-0-0826



**405 857. Organization and Administration of the Guidance Services Program.** (2 or 3) II, S. 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. 405-857-0-0826

**405 858. Group Guidance.** (3) I, S. Designed to acquaint students with group procedures as basic tools in counseling, guidance, and other education services. Pr.: A&F 823 and Psych. 550. 405-858-1-0826

**405 859. 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. 405-859-1-0826

**405 860. Adult Counseling.** (3) I, S. 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.: A&F 823 or concurrent enrollment. 405-860-0-0807

**405 861. Organization of Counseling Services for Adults.** (3) II. 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.: A&F 860. 405-861-0-0807

**405 863. Vocational Psychology.** (3) I, S. Environment and human factors in occupational adjustment; appraisal of vocational fitness. Pr.: Consent of instructor. 405-863-0-0839

**405 865. Community Education for Post-Secondary Schools.** (2-3) II. Analysis of community education trends, techniques and evaluations as they relate to and are implemented into the post-secondary educational environment. Pr.: A&F 611. 405-865-0-0807

**405 885. 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.: A&F 859 and consent of instructor. 405-885-2-0826

**405 886. Guidance Services Practicum.** (3) I, II, S. Supervised experience in guidance services in secondary schools; preparation and use of pupil personal records, tests, provision and use of occupational and educational information, counseling, placement and follow-up, and use of school and community personnel and resources. Pr. or conc.: A&F 823 and consent of instructor. 405-886-2-0826

**405 887. Practicum in Counseling.** (3) I, II. Supervised practical experience in counseling. Pr.: A&F 823 and consent of instructor. (Same as Psych. 860). 405-887-2-0826

**405 888. Seminar in Student Personnel Work.** (1-4) On sufficient demand. Credit arranged. 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. 405-888-0-0826

**405 889. Practicum in School Administration.** (3 to 6) I, II, S. Supervised on-the-job experience in school administration. Pr.: Kansas School Administrator's Certificate or consent of instructor. 405-889-2-0827

**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.

**405 890. Educational Administration.** 405-890-0-0827

**405 891. Social Foundations.** 405-890-0-0821

**405 892. Guidance Services.** 405-890-0-0826

**405 893. Special Education.** 405-890-0-0808

**405 894. Community Education.** 405-890-0-0807

**405 898. Master's Report.** (Var.) I, II, S. Pr.: Consent of instructor. 405-898-3-0801

**405 899. Master's Research.** (Var.) I, II, S. Pr.: Consent of instructor. 405-899-4-0827

**405 910. Educational Personnel Administration.** (3) II. Personnel practices in education are considered along with the implications of collective negotiations and professional accountability for personnel policies. Pr.: A&F 818. 405-910-0-0805

**405 915. Theory of Measurement.** (3) I. 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.: A&F 715. 405-915-1-0825

**405 917. 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.: A&F 817. 405-917-1-0824

**405 920. Advanced Educational Psychology: Learning.** (3) I, S. 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.: A&F 315 or its equivalent. 405-920-1-0822

**405 921. Advanced Educational Psychology: Development.** (3) II. Advanced studies in physical, intellectual, emotional, social and personality development with the focus on the importance of these factors to the educational process. Pr.: A&F 315. 405-921-1-0822

**405 924. Systems and Theories of Vocational Counseling.** (3) II. A historical and contemporary analysis of systems and theories of vocational psychology and their implications for use in the counseling setting. Pr.: A&F 752 and A&F 823. 405-924-0-0839

**405 925. Educational Systems Analysis.** (3) I. A study of systems analysis techniques applicable to education including PERT, CPM and PPBS. Intended for administrators, business managers and educational researchers. Pr.: A&F 818 or consent of instructor. 405-925-0-0827

**405 926. 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.: A&F 818. 405-926-0-0827

**405 927. Higher Education Administration.** (3) On sufficient demand. 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.: A&F 812. 405-927-1-0827

**405 928. Educational Governance.** (3) II. 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.: A&F 818 and six additional hours in Educational Administration. 405-928-0-0801



**405 933. Educational Personnel Administration.** (3) II. Personnel practices in education are considered along with the implications of collective negotiations and professional accountability for personnel policies. Pr.: A&F 818. 405-933-1-0827

**405 986. Advanced Counseling Theory and Practice.** (3-6) I, II. Designed to help the student integrate advanced theory, research and practice in counseling and student personnel work. Pr.: Knowledge of personality theory, theories of learning and motivation, A&F 823 and consent of instructor. 405-986-2-0826

**405 987. 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. 405-987-2-0826

**405 988. Internship in Education—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. 405-988-2-0808

**Internship in A&F.** (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.

**405 989. Educational Administration and Foundations.** 405-989-2-0827

**405 990. Student Personnel Services.** 405-990-2-0826

**Advanced Seminars in A&F.** (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.

**405 991. Educational Administration.** 405-991-3-0827

**405 992. Educational Psychology.** 405-992-3-0822

**405 993. Student Personnel.** 405-993-3-0826

**405 994. Special Education.** 405-994-2-0808

**405 999. 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. 405-999-4-0801

teaching and allied positions in adult education, vocational education in agriculture and home economics, business education, career education and related fields of adult and occupational education.

The adult education undergraduate curriculum, described on page 201, is a relatively new program designed to accommodate those embarking on a career in adult education. Students completing the curriculum are awarded the B.S. in education with a major in adult education.

The agricultural education undergraduate curriculum, described on page 49, is offered in cooperation with the College of Agriculture. Students completing the curriculum requirements are awarded a B.S. in agriculture and may be certified to teach vocational agriculture in Kansas.

The business education undergraduate curriculum, offered in cooperation with the College of Business Administration, is described on page 203 under secondary education major field. Students completing the curriculum requirements are awarded a B.S. in secondary education and may be certified to teach business education in Kansas secondary schools.

The home economics education undergraduate curriculum, offered in cooperation with the College of Home Economics, is described on page 267. Students completing the curriculum requirements are awarded a B.S. in home economics and may be certified to teach vocational home economics in Kansas.

To provide opportunities for professional development and/or meeting state certification requirements for persons already employed in public and private adult and occupational education programs, inservice courses are offered at both the undergraduate and graduate levels.

Graduate programs supervised by the adult and occupational education faculty include the Master of Science degree in agricultural education and in home economics education. Adult and occupational education offers specializations in adult education or occupational education and supporting course work in adult basic education, career education, extension education, industrial training, and vocational-technical administration. The Doctor of Philosophy degree in education is offered in the comprehensive areas of adult and continuing education and occupational education. Graduates of these programs are prepared to enter administration, teaching, program development and community service areas. Examples of agencies and organizations employing adult and occupational education graduates are continuing education, cooperative extension, community and junior colleges, technical schools, voluntary agencies, adult basic education, hospitals, industry, military, rehabilitation agencies, employment security, government, religious institutions, proprietary schools. Refer to Graduate Study section, page 207, for College of Education general requirements.

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## ADULT AND OCCUPATIONAL EDUCATION

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*Robert Meisner,\* Head of Department*

*Professors Apel,\* Field,\* Johnson,\* Meisner,\* Parsons, Prawl,\* and Scott;\* Associate Professors Albracht,\* Carpenter,\* Griffith, Hausmann, Oaklief,\* Terrass,\* and Welton; Assistant Professors Eaves, Green, Jorns, Powell, Simmons, Stanlus, and Vicker; Instructors Ward, and Wlssman. Emeritus: Associate Professors Bradley\*, and Hall.\**

The undergraduate and graduate programs in the adult and occupational area are designed for selected individuals seeking to prepare themselves for roles as professional educators in public and private institutions and agencies.

Undergraduate teacher education programs are designed to prepare prospective teachers for



## Courses in Adult and Occupational Education

### Undergraduate Credit

**410 319. Agricultural Education Colloquium.** (Var.) On sufficient demand. Discussion, assigned readings, and lectures over the selected trends, developments, and problems which are peculiar to the overall field of 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. 410-319-0-0899

### Undergraduate And Graduate Credit In Minor Field

**410 500. 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.: A&F 315. 410-500-0-0899

**410 501. Independent Study in Education.** (1-3). Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department head. 410-501-3-0899

**410 540. Contemporary Practice of Adult Education.** (3) I, S. Consideration of those andragogical processes critical to the professional practice of adult education in specific areas of application. Pr.: 405 215.

**410 550. Methods of Teaching Home Economics.** (2) I, II. 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; A&O 621 or conc. enrollment; taken semester prior to A&O 586. 410-550-0-0899

**410 560. Methods of Teaching for Dietetic Students.** (3) I. Principles of teaching applied to selection, organization, and development of subject matter for individuals and courses taught by dietitians. Pr.: Senior standing in Institutional Management and Dietetics. 410-560-0-0839

**410 586. Teaching Participation in the Secondary School.** (Var.) I, II. Observation and teaching participation under direction of selected teachers in junior and senior high schools. Pr.: Admission to Student Teaching. (See C&I 586.) 410-586-2-0803

### Undergraduate And Graduate Credit

**410 605. 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. 410-605-0-0807

**410 610. Occupational Home Economics Education.** (3) I, 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.: A&F 215 or conc. enrollment. 410-610-0-0899

**410 620. 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.: A&F 315. 410-620-0-0839

**410 621. 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.: A&O 620. 410-621-0-0839

**410 625. 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 references, resources and other materials. Pr.: 405 215.

**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.

**410 632. Career Education.** 410-632-2-0807

**410 633. Adult Education.** 410-633-2-0807

**410 634. Agriculture Related Occupations.** 410-634-2-0899

**410 635. Business and Office Occupations.** 410-635-2-0807

**410 636. Extension Education.** 410-636-2-0807

**410 637. Home Economics Related Occupations.** 410-637-2-0899

**410 638. Industrial Occupations.** 410-638-2-0839

**410 639. Coordination of Cooperative Vocational Education.** (3) I, II, S. Emphasis on the legal aspects and other minimum requirements essential to conducting cooperative vocational education programs at the secondary and post-secondary levels. Pr. or conc.: A&O 620. 410-639-0-0839

**410 675. 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.: 405 215 or 410 540. No more than six hours may apply to a graduate degree (See A&F 675 and C&I 675).

**410 680. 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. 410-680-0-0807

**410 686. 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.: 405 215 or 410 540. No more than six hours may apply to a graduate course (See A&F 686 and C&I 686).

**410 701. Administration and Supervision of Vocational Education.** (2-3) Offered on sufficient demand. I, S. 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. 410-701-0-0839

**410 703. Teaching Adult Classes in Agriculture.** (2 or 3) Offered 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.: A&O 620. 410-703-0-0899

**410 705. Organization Problems in Teaching Farm Mechanics.** (2) Offered on sufficient demand. Analysis of the farm mechanics course of study; needs and interests of boys; learning difficulties; skills and technical knowledge required; correlation with agriculture; application of laws of learning to the teaching process; determination of objectives. Pr.: A&O 586. 410-705-0-0839

**410 707. 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. 410-707-0-0807



**410 713. Occupational Analysis.** (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.: A&O 620. 410-713-0-0807

**410 750. Practical Arts Education.** (3) I, S. Emphasis on designing unified practical arts programs for exploration; occupational clusters; and curricular innovation relevant to career education. Pr.: Teaching experience. 410-750-0-0807

**410 752. 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. 410-752-0-0807

**410 753. 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. 410-753-0-0807

**410 754. Adult Basic Education.** (3) I, II, S. 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. 410-754-0-0807

**410 788. 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. Designed to serve undergraduate as well as graduate needs. Pr.: Consent of instructor. 410-788-0-0899

**410 791. Career Education.** (2-4) I, II, S. 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. 410-791-0-0839

**410 792. 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. 410-792-0-0839

**410 795. 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. 410-795-3-0807

### Graduate Credit

**410 805. Field Experience In Agricultural Education.** (2 or 3) On sufficient demand. A course designed for prospective teachers to help bridge the gap between classroom theory and student teaching. Emphasis will be placed on observation of and participation in school and community organizations and programs. Pr.: A&O 620 and consent of instructor. 410-805-0-0899

**410 811. Consumer Education.** (2 or 3) S. Evaluate syllabi and approaches to teaching consumer education. Relate consumer education to consumer economics and consumer affairs. Pr.: A&O 550 or A&O 752 and F. Ec. 400 or consent of instructor. (See F. Ec. 811). 410-811-0-0807

**410 820. 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. 410-820-0-0807

**410 822. Young Farmer and Adult Farmer Education In Agriculture.** (2 or 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. 410-822-0-0899

**410 823. Agricultural Education for Beginning Teachers.** (1 to 3) S. Securing and organizing information and planning teaching activities which will help the beginning vocational agriculture teacher. Pr.: Graduation from the Curriculum in Agricultural Education. 410-823-0-0899

**410 825. 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.: 410-605 or 410-680.

**410 830. 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. 410-830-0-0807

**410 834. 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.: A&O 621 and teaching experience. 410-834-0-0899

**410 840. Curriculum in Agriculture I.** (2 or 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. 410-840-0-0899

**410 842. Curriculum in Agriculture II.** (2 or 3) S. Cont. of A&O 840. Pr.: A&O 840 or consent of instructor. 410-842-0-0899

**410 845. Field Studies in Agricultural Education.** (2 or 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. 410-845-0-0899

**410 854. Advanced Occupational Home Economics Education.** (2-3) I, II, S. Development of home economics related occupational programs with emphasis on curriculum, evaluation and techniques used in cooperative programs. Pr.: A&O 610 and teaching experience. 410-854-0-0899

**410 860. 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.: A&O 680. 410-860-0-0807

**Seminars in Education.** Credit arranged. 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.

**410 890. Home Economics Education.** 410-890-0-0899

**410 891. Agricultural Education.** 410-891-0-0899

**410 892. Adult Education.** 410-892-0-0807

**410 899. Master's Research.** (Var.) I, II, S. Pr.: Consent of instructor. 410-899-3-0839

**410 910. 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. 410-910-0-0807

**410 914. Technical Education.** (3) I, S. An analysis of the evolving role of technical education and other post-secondary occupational education with emphasis upon principles underlying organization and practice unique to technical education. Pr.: Graduate standing. 410-914-0-0839

**410 916. 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. 410-916-0-0807



**410 929. 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. 410-929-0-0839

**410 930. Manpower Surveys.** (3) II, S. A critical study of methods and procedures involved in planning, organizing, conducting, and analyzing community and regional manpower surveys. Application to particular fields of occupational education will be stressed. Pr.: Graduate standing. 410-930-0-0839

**410 937. 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. 410-937-0-0807

**410 940. 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.: A&O 701 or consent of instructor. 410-940-0-0807

**410 952. Internship in Adult & 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. 410-952-2-0807

**410 962. Advanced Seminars in Adult & 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. 410-962-0-0807

**410 999. 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. 410-999-4-0807

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## CURRICULUM AND INSTRUCTION

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*Norbert W. Maertens,\* Head of Department*

Professors Boyer,\* Dixon,\* Hause,\* James,\* Keys,\* Kurtz,\* Littrell,\* Maertens,\* Owens,\* Price,\* Schell,\* and Utsey;\* Associate Professors Bailey,\* Bartel,\* McAnarney,\* Teague,\* Trennepohl,\* and Wauthier;\* Assistant Professors Alexander, Byars,\* Caine,\* Calvano,\* DeChenne, Dotts,\* M. Harris,\* Hazlett, Heerman,\* Hewitt, Jones, Loeb,\* W. Martin, Pearce, Perl, Readence,\* Romero, Sullivan, and Treadway; Instructors B. Newhouse and Kater; Assistant Instructor Goodenow. Emeritus: Professors Craig and Smethers

### Undergraduate Credit

**415 050. Developmental Reading Laboratory.** (3) I, II. Designed to improve the college student's reading skills, rates of comprehension, vocabulary, and study skills. Pr.: Consent of instructor. 415-050-1-0801

**415 051. Study Skills Laboratory.** (1-3) I, II, S. Designed to help the student to learn effective study methods, analyze difficulties in reading and studying, how to prepare for and improve performance in examinations. 415-051-0-0829

**415 300. Principles of Elementary Education.** (3) I, II. An over-all view of the elementary school: organization, management, purpose, curriculum trends, and pupil characteristics. Pr.: Junior standing. 415-300-0-0802

**415 316. Introduction to Instructional Media.** (1) I, II, S. Experiences in the choice, production, evaluation, and utilization of instructional materials. Operation and simple maintenance of basic types of instructional equipment. Pr.: Admission to teacher education or consent of instructor. 415-316-1-0801

**415 317. Instructional Media for Elementary Children.** (3) I, II, S. Methods of planning and evaluating experiences to help children gain skills for interpreting life experiences through book and nonbook media. Pr.: A&F 215 or consent of instructor. 415-317-0-0802

**415 325. Safety.** (3) I, II, S. Fundamentals of accident analysis and prevention, maintenance, human factors, safety standards, treatment of special hazards. Three hours rec. a week. Pr.: Junior standing. 415-325-1-0836

**415 326. Problem in Safety Education.** (1) Pr.: Consent of instructor. 415-326-3-0836

**415 328. Driver and Traffic Safety Education I.** (3) I, S. Critical analysis of traffic accidents, attitude factors, essential knowledge of automobile operation, traffic laws and regulations. Includes laboratory experience in the use of psychophysical testing and in the teaching of driving skills. Two hours rec. and three hours lab. a week. Pr.: Psych. 110, A&F 215, C&I 325, a valid driver's license, and good driving record. 415-328-1-0836

**415 330. Driver and Traffic Safety Education II.** (3) II, S. This course deals with professional preparation for secondary school instruction in this field. Primary areas of study include classroom and in-car teaching techniques. A study of organization and administration of driver education: emphasis on competence in transforming knowledge and skills, as well as inspiring satisfactory attitude in students. Two hours rec. and three hours lab. a week. Pr.: C&I 328, 21 years of age, and senior standing. 415-330-1-0836

**415 331. Problem in Driver Education.** (1) Pr.: Consent of instructor. 415-331-1-0836

**415 415. Art for Exceptional Children.** (3) I, II. A study of the knowledge and methods of utilizing art concepts and art activities by the elementary teacher to develop and enhance the learning experiences of exceptional children, including the disadvantaged, physically handicapped, mentally retarded and emotionally disturbed. Six hours lab. Pr.: Elementary Education or Art major and Psych. 110. Same as Art 415. 415-415-1-0831

**415 451. 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.: A&F 315. 415-451-0-0803

**415 469. 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, and 261 206, and at least two courses from the Elementary Physical Education specialization. 415-469-0-0802

**415 470. Science for Elementary Schools.** (3) I, II, S. The relationships among nature, environment and elementary science in their role in childhood education resources and activities suitable to the elementary school. Pr.: Admission to Teacher Education or consent of instructor. 415-470-1-0834

**415 471. 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. 415-471-1-0802



**415 472. 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. 415-472-1-0802

**415 473. 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. 415-473-1-0833

**415 474. 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. 415-474-1-0830

**415 475. Elementary School Reading Lab.** (1) I, II, S. Application of topics selected from and correlated with Elementary School Reading. Pr.: C&I 474 or concurrent enrollment. 415-475-1-0830

**415 476. Methods of Teaching in the Secondary School.** (2 or 3) I, II. General principles of teaching applied to secondary school instruction; motivation, organization of subject matter; lesson planning; evaluation and reporting; challenging the levels of ability; organization and management of the classroom; attention given to both methodology and materials of the secondary schools. Pr.: Admission to Student Teaching. 415-476-1-0803

#### **Undergraduate And Graduate Credit In Minor Field**

**415 502. 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. 415-502-3-0801

**415 530. Education and the Black American.** (3) II, S. An examination of curriculum implementation in light of race relations and economic-educational development. Modules related to the role of the Black American in education as seen from a Black perspective will be employed. (Interracial school studies) Pr.: Junior or senior standing or consent of instructor. 415-530-0-0801

**415 583. Teaching Participation in Elementary Music.** (4) I, II. Observation in teaching under the direction of selected teachers in elementary music school programs. Pr.: Music 412 and admission to Student Teaching. 415-583-2-0832

**415 584. Teaching Participation in Secondary Music.** (4) I, II. Observation in teaching under the direction of selected music teachers in junior and senior high schools. Pr.: Music 413 and admission to Student Teaching. 415-584-2-0832

**415 585. Teaching Participation in the Elementary School.** (Var.) I, II. Observation and teaching participation under the direction of selected elementary teachers. Pr.: C&I 300, 470, 471, 472, 473 and admission to Student Teaching. 415-585-2-0802

**415 586. Teaching Participation in the Secondary School.** (Var.) I, II. Observation and teaching participation under direction of selected teachers in junior and senior high schools. Pr.: Admission to Student Teaching. (See A&O 586). 415-586-2-0803

#### **Undergraduate And Graduate Credit**

**415 614. 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.: Junior or senior standing and consent of instructor. 415-614-1-0834

**415 617. Corrective Reading Instruction.** (1-3) I, II, S. Supervised tutoring of children with reading difficulties. Not open to students with credit in C&I 847. Pr.: Student teaching experience or consent of instructor. 415-617-2-0817

**415 630. Curriculum Materials for Ethnic Diversity.** (3) I, II, S. An examination and analysis of recent materials and practices of schools serving multi-ethnic student bodies, particularly minorities from disadvantaged backgrounds. Materials include any items utilized by the school in implementing the curriculum. Pr.: Senior standing or higher. 415-630-2-0801

**415 640. Motorcycle Safety Education.** (2) II, S. Curriculum development, teaching practices, and administration of motorcycle safety education. Laboratory activities: teaching learners in classroom, on range and street. Pr.: C&I 330. 415-640-1-0801

**415 645. Driving Ranges and Simulators.** (2) I, S. Principles and practices of teaching on multiple-car driving ranges and with driving simulators; administration of multi-phase programs in driver and traffic safety education. Two hours lab. a week. Pr.: C&I 330. 415-645-1-0801

**415 662. Instructional Television.** (3) On sufficient demand. The principles of instructional television: its development, programming, techniques and application. Pr.: Junior standing. 415-662-1-0801

**415 675. 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.: 405 215 or 410 540 (See 405 675 and 410 675). 415-675-3-0829

**415 686. 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.: 405 215 or 410 540 (See 405 686 and 410 686). 415-686-0-0829

**415 704. 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.: C&I 450, senior standing, or consent of instructor. 415-704-0-0803

**415 706. 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.: C&I 475, C&I 586 or teaching experience. 415-706-1-0801

**415 715. Reading in the Secondary School Subjects.** On sufficient demand. Information concerning the reading process. Techniques for helping students develop reading and study skills needed for studying materials used in the secondary school subjects. Course is designed for classroom teachers. Pr.: Senior standing and consent of instructor. 415-715-0-0830

**415 719. 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. 415-719-0-0801

**415 730. Education of the Disadvantaged.** (3) On sufficient demand. Consideration of the life-space of the disadvantaged learner and its relationship to curriculum, organization and inter-personal relationships in schools. The development of realistic, relevant goals for the teacher of the disadvantaged. Pr.: A&F 611 or consent of instructor. 415-730-0-0813

**415 735. 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. 415-735-1-0834



**415 737. 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. 415-737-0-0801

**415 739. 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.: A&F 302, a course in environmental studies and/or consent of instructor. 415-739-0-0801

**415 756. Instructional Communication Processes.** (3) I, S. Processing of information via the auditory and visual perceptual systems and implications for the design and utilization of instructional technology. Pr.: Consent of instructor. 415-756-0-0801

**415 760. Audio-Visual Instruction.** (2 or 3) I, II, S. Principles and techniques in the use of visual and audio-visual materials; operation and maintenance of equipment and sources of supply. Pr.: Completion of student teaching or graduate standing. 415-760-1-0801

**415 765. 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.: C&I 760 or consent of instructor. 415-765-1-0801

**415 779. 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.: A&F 315 and/or consent of instructor. 415-779-0-0823

**415 780. 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.: A&F 215, C&I 300 and junior standing. 415-780-0-0823

**415 795. Problems in Curriculum and Instruction.** (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Consent of instructor. 415-795-3-0823

### Graduate Credit

**415 803. 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. 415-803-0-0829

**415 804. Curriculum Construction for Secondary Schools.** (2 or 3) On sufficient demand. Procedures for organizing and conducting programs for curriculum improvement in the secondary schools; techniques for the development and evaluation of curriculum materials. Opportunity is provided for work on individual curriculum problems. Pr.: C&I 803 and teaching experience. 415-804-0-0829

**415 808. Curriculum in the Inner City.** (3) I, II. Exploration of research and innovations in curriculum and instruction for inner city schools. Emphasis placed on curricular and instructional difficulties in low-income communities and on productive compensatory educational practices. Pr.: C&I 803 and/or consent of instructor. 415-808-0-0801

**415 811. Curriculum Construction for Elementary Schools.** (2 or 3) On sufficient demand. Procedures for organizing and conducting programs for curriculum improvement in the elementary schools; techniques for the development and evaluation of curriculum materials. Opportunity is provided for work on individual curricular problems. Pr.: C&I 803 and teaching experience. 415-811-0-0829

**415 820. 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. 415-820-0-0802

**415 821. 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. 415-821-0-0833

**415 822. 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. 415-822-0-0802

**415 831. Supervision and Improvement of Instruction.** (3) S. A course designed for administrators, supervisors, and classroom teachers who wish to help themselves and others isolate and analyze teaching problems. Pr.: One year of teaching experience. 415-831-0-0801

**415 832. 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, multi-graded, and multi-tracked programs. Pr.: Teaching experience or consent of instructor. 415-832-0-0801

**415 833. 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. 415-833-0-0801

**415 835. 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. 415-835-0-0801

**415 842. 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. 415-842-0-0803

**415 843. Principles of College Teaching.** (3) I, II. Overview of principles of learning, learning theory, educational objectives, methods and techniques, college students and evaluation in the classroom. Emphasis upon pre-service and in-service help in improving instruction at the college level. Pr.: Consent of instructor. 415-843-0-0805



**415 844. Current Issues in College Teaching.** (2) II. Attention given to 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.: C&I 843 and consent of instructor. 415-844-0-0805

**415 845. 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.: C&I 474 or consent of instructor. 415-845-1-0830

**415 846. Diagnosis and Treatment of Reading Disabilities.** (3 or 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.: C&I 715 or 847 and teaching experience or consent of instructor. 415-846-3-0817

**415 847. Clinical Practices in Reading.** (3) II, S. Supervised experience in diagnosing and teaching children with reading problems. Pr.: C&I 846. 415-847-1-0817

**415 848. 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.: C&I 715 or 845 or consent of instructor. 415-848-0-0817

**415 860. 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.: C&I 760 or consent of instructor. 415-860-0-0801

**415 864. 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 multi-media formats. Pr.: C&I 760 and A&F 920 or consent of instructor. 415-864-1-0829

**415 866. 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.: C&I 760 or consent of instructor. 415-866-1-0829

**415 872. 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 field. Pr.: C&I 845, C&I 715 or consent of instructor. 415-872-0-0830

**415 873. 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.: C&I 803 and consent of instructor. 415-873-0-0834

**415 874. 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.: C&I 803, experience teaching mathematics, and consent of instructor. 415-874-0-0833

**415 875. The English 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.: C&I 803 and consent of instructor. 415-875-0-0801

**415 876. 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.: C&I 803 and/or consent of instructor. 415-876-0-0803

**415 877. 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.: C&I 803 and consent of instructor. 415-877-0-0829

**415 879. Junior College Curriculum.** (3) I, II, S. Evaluation of 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.: A&F 832 and/or consent of instructor. 415-879-0-0806

**415 884. 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. 415-884-1-0801

**415 886. Seminars in Curriculum & 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. 415-886-0-0829

**415 898. Master's Report.** (Var.) I, II, S. Pr.: Consent of instructor. 415-898-3-0829

**415 899. Master's Research.** (Var.) I, II, S. Pr.: Consent of instructor. 415-899-3-0829

**415 907. Curriculum Theory.** (3) On sufficient demand. Theoretical concepts underlying significant curriculum developments. A systematic critique of current curricular theory. Consideration of model generation. Pr.: C&I 804 or 811 and consent of instructor. 415-907-0-0829

**415 908. 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.: C&I 831, A&F 920, and consent of instructor. 415-908-0-0829

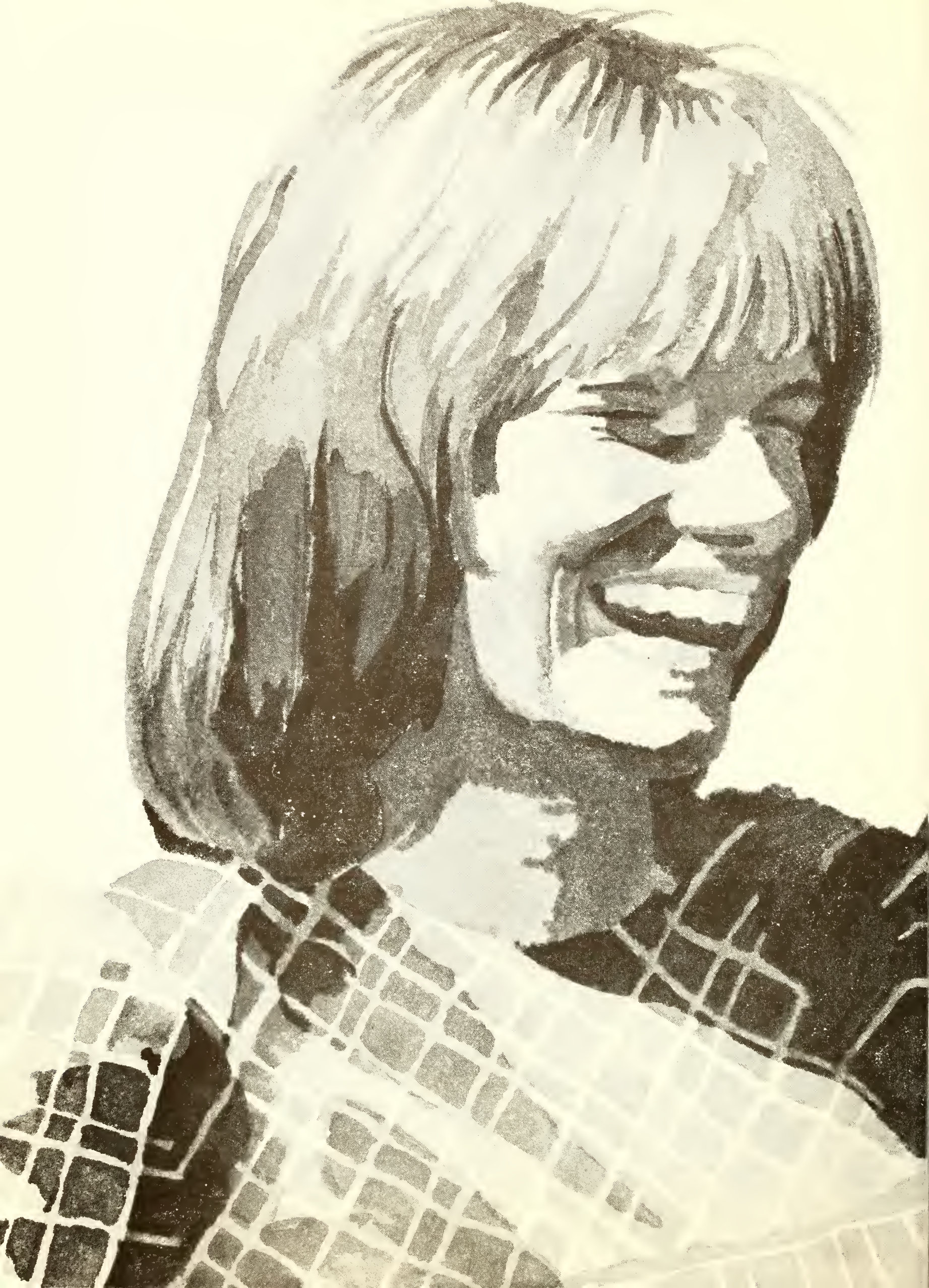
**415 920. The Analysis and Evaluation of Curriculum and Instruction.** (3) On sufficient demand. Data matrices, formative and summative evaluation, and other models as bases for decision making about educational programs. Consideration of criterion problems in instructional evaluation. Pr.: C&I 803, A&F 816 and/or consent of instructor. 415-920-0-0829

**415 990. 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, C&I 844, and consent of department head. 415-990-2-0805

**415 991. Internship In Curriculum & 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. 415-991-2-0829

**415 999. Research In Curriculum and Instruction.** (Var.) I, II, S. Pr.: A&F 817 and/or consent of instructor. 415-999-4-0829







# College of Engineering

*Donald E. Rathbone, Dean*  
*Teddy O. Hodges, Associate Dean*  
*John P. Dollar, Assistant Dean*  
*Ray E. Hightower, Assistant to the Dean*

A course of study leading to a degree in the College of Engineering provides a well-rounded university education designed to develop the general qualities of leadership and human understanding inherent to an educated person.

In addition, it equips the student with a broad theoretical and practical background to meet the new and demanding problems of our technological society. To assure the continued economic and technologic development of this nation, an increasing number of high school students should select careers in this challenging profession.

In the College of Engineering at KSU, an outstanding faculty and excellent physical facilities provide a stimulating environment for the student.

The College of Engineering offers the Bachelor of Science degree in each of the following fields:

Agricultural Engineering—curriculum on page 222  
 Architectural Engineering—curriculum on page 222  
 Chemical Engineering—curriculum on page 223  
 Civil Engineering—curriculum on page 226  
 Construction Science—curriculum on page 223  
 Electrical Engineering—curriculum on page 224  
 Industrial Engineering—curriculum on page 225  
 Mechanical Engineering—curriculum on page 225  
 Nuclear Engineering—curriculum on page 226  
 Engineering Technology—curriculum on page 227

A general description of each of these curriculums, including a list of the faculty and departmental course offerings, is presented on pages 232 through 256. Also included in this section is a summary of the graduate program of each department. The Master of Science degree is offered in each of the preceding areas except architectural engineering, engineering technology and construction science.

To provide the engineering graduate student with maximum access to all of its resources (faculty, laboratories, etc.), the College of Engineering offers the Ph.D. degree in engineering. The student can

now study in one of the traditional areas or develop a program of study to fit particular interests and needs.

## CLASSICAL DEPARTMENTS

Agricultural Engineering  
 Chemical Engineering  
 Civil Engineering  
 Electrical Engineering  
 Industrial Engineering  
 Mechanical Engineering  
 Nuclear Engineering

## TYPICAL INTERDISCIPLINARY AREAS

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, page 30.

## Undesignated Major

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		Course	Sem. Hrs.
English	229 100	English Composition I	3
Chemistry	221 210	Chemistry I	4
Mathematics	245 220	Anal. Geometry & Calculus I	4
Gen. Engg	500 160	Engineering Concepts	2
		Hum. or Soc. Sci. Elec.	3
Physical Education	261 101	Concepts in Phys. Ed.	1
Gen. Engg	500 010	Engineering Lectures	0
			17
Spring Semester		Course	Sem. Hrs.
English	229 120	English Composition II	3
Chemistry	221 230	Chemistry II	4
Mathematics	245 221	Anal. Geometry & Calculus II	4
Economics	225 110	Economics I	3
		Hum. or Soc. Sci. Elec.	3
Gen. Engg.	500 010	Engineering Lectures	0
			17



## CURRICULUM IN AGRICULTURAL ENGINEERING

B.S. in Agricultural Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
English	229 100	English Composition I	3
Chemistry	221 210	Chemistry I	4
Mathematics	245 220	Anal. Geometry & Calculus I	4
Ag. Engg.	505 160	Ag. Engg. Concepts	2
		Humanities or Soc. Sci. Elec.*	3
Phys. Ed.	261 101	Concepts in Phys. Ed.	1
			17

## Spring Semester

English	229 120	English Composition II	3
Chemistry	221 230	Chemistry II	4
Mathematics	245 221	Anal. Geometry & Calculus II	4
Economics	225 110	Economics I	3
		Hum. or Soc. Sci. Elec.*	3
			17

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Mathematics	245 222	Anal. Geometry & Calc. III	4
Physics	265 213	Engg. Physics I	5
Biology	215 198	Principles of Biology	4
Mech. Engg.	560 212	Graph. Comm. Anal. & Des. I	2
Speech	281 105	Oral Communication I	2
			17

## Spring Semester

Mathematics	245 240	Series & Diff. Equations	4
Physics	265 214	Engg. Physics II	5
Ag. Engg.	505 312	Biol. Malls & Machine Function	3
Ind. Engg.	550 372	Comp. and Data Processing	2
Civil Engg.	525 333	Statics	3
			17

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Ag. Engg.	505 510	Env. Des. of Farm Bldgs.	3
Mech. Engg.	560 513	Thermodynamics I	3
Mech. Engg.	560 512	Dynamics	3
Civil Engg.	525 533	Mech. of Materials	3
Civil Engg.	525 534	Mech. of Materials Lab	1
		Hum. or Soc. Sci. Elec.*	3
			16

## Spring Semester

Ag. Engg.	505 566	Anal. Ag. Structures	3
Ag. Engg.	505 520	Energy Use & Control in Ag. Systems I	3
Ag. Engg.	505 551	Hydrology	2
Mech. Engg.	560 571	Fluid Mechanics	3
Elec. Engg.	530 510	Circuit Theory I	3
or			
Elec. Engg.	530 519	Electric Circuits & Controls	4
Civil Engg.	525 522	Soil Mechanics I	3
or			
Ag. Engg.	015 745	Phys. Env. of Crops & Soils	3
			17/18

## SENIOR

Fall Semester		Course	Sem. Hrs.
Ag. Engg.	505 530	Soil and Water Engg.	3
Ag. Engg.	505 536	Design of Ag. Machines	3
		Hum. or Soc. Sci. Elec.*	3
		Technical Electives**	6
			15

## Spring Semester

Ag. Engg.	505 570	Energy Use and Control in Ag. Systems II	3
Ag. Engg.	505 581	Prof. Practice in Ag. E.	1
		Hum. or Soc. Sci. Elec.*	3
		Technical Electives**	8/7
			15/14

Number of hours required for graduation is 131.

\*Humanities and social science electives are to be selected from the approved catalog list.

\*\*To be chosen with the advice and approval of the faculty adviser and department head.

The engineering science requirements will be satisfied by the required courses in this curriculum.

Any student is allowed to apply a maximum of four (4) hours of basic ROTC credit toward a degree without being required to take more credits than non-ROTC students.

## CURRICULUM IN ARCHITECTURAL ENGINEERING

B.S. in Architectural Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
Pre-des. Prof.	104 210	Design Graph. I	3
English	229 100	English Composition I	3
Speech	281 105	Oral Communication I	2
Mathematics	245 220	Anal. Geom. & Calc. I	4
Chemistry	221 210	Chemistry I	4
Phys. Ed.	261 101	Concepts in Phys. Ed.	1
Arch. Engg.	510 020	Arch. Engg. Seminar	0
			17

## Spring Semester

Pre-des. Prof.	104 211	Design Graph. II	3
English	229 120	English Composition II	3
Con. Sci.	515 210	Intro. Const. Prog.	3
Mathematics	245 221	Anal. Geom. & Calc. II	4
Chemistry	221 230	Chemistry II	4
Arch. Engg.	510 020	Arch. Engg. Seminar	0
			17

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Pre-des. Prof.	104 260	Envir. Des. Stu. I	4
Pre-des. Prof.	104 271	Elem. & Iss. of Env. Des.	2
Pre-des. Prof.	104 290	Basic Const. Tech. I	3
Physics	265 213	Engg. Physics I	5
Mathematics	245 222	Anal. Geom. & Calc. III	4
Arch. Engg.	510 020	Arch. Engg. Seminar	0
			18

## Spring Semester

Pre-des. Prof.	104 261	Envir. Des. Stu. II	4
Pre-des. Prof.	104 280	Landscape Ecology	2
Pre-des. Prof.	104 291	Basic Const. Tech. II	3
Physics	265 214	Engg. Physics II	5
Arch. Engg.	510 020	Limited Sci. Elec.**	3-4
		Arch. Engg. Seminar	0
			17/18

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Architecture	105 401	Arch. Des. Stu. I	5
Civil Engg.	525 333	Statics	3
Architecture	105 433	Arch. Constr. I	3
Civil Engg.	525 212	Et. Surv. Engg.	3
Arch. Engg.	510 020	Hum. or Soc. Sci. Elec.*	3
		Arch. Engg. Seminar	0
			17

## Spring Semester

Civil Engg.	525 533	Mechanics Materials	3
Civil Engg.	525 534	Mech. Malls Lab	1
Architecture	105 434	Arch. Constr. II	3
Mech. Engg.	560 512	Dynamics	3
Architecture	105 301	Apprec. of Arch.	3
Arch. Engg.	510 020	Hum. or Soc. Sci. Elec.*	3
		Arch. Engg. Seminar	0
			16

## SENIOR

Fall Semester		Course	Sem. Hrs.
Civil Engg.	525 537	Intro. to Struc. Anal.	4
Arch. Engg.	510 533	Timber Structures	3
Civil Engg.	525 522	Soil Mechanics I	3
Mech. Engg.	560 571	Fluid Mechanics	3
Arch. Engg.	510 020	Hum. or Soc. Sci. Elec.*	3
		Arch. Engg. Seminar	0
			16

## Spring Semester

Arch. Engg.	510 524	Theory of Struc. II (steel)	4
Mech. Engg.	560 513	Thermodynamics I	3
Arch. Engg.	510 536	Sanitation Systems	3
Arch. Engg.	510 537	Acoustic Systems	2
Arch. Engg.	510 020	Hum. or Soc. Sci. Elec.*	3
		Arch. Engg. Seminar	0
			15

## FIFTH YEAR

Fall Semester		Course	Sem. Hrs.
Arch. Engg.	510 528	Theory of Struc. III (concrete)	4
Elec. Engg.	530 519	Elec. Circuits & Control	4
Arch. Engg.	510 534	Thermal Systems	3
Arch. Engg.	510 020	Free Elective	3
		Arch. Engg. Seminar	0
			14

## Spring Semester

Arch. Engg.	510 780	Theory of Struc. IV	3
Arch. Engg.	510 535	Lighting Systems	3
Civil Engg.	525 528	Foundation Engg.	3
Arch. Engg.	510 020	Free Elective	4/3
		Arch. Engg. Seminar	0
			13/12

Number of hours required for graduation is 160.

\* Humanities and social science electives are to be selected from the approved catalog list.

\*\* Limited science electives are to be taken from the following: Operations Research (3), Series and Diff. Equations (4), and Elements of Statistics (3).

Any student is allowed to apply a maximum of four (4) hours of basic ROTC credit toward the degree without being required to take more credits than non-ROTC students.



## CURRICULUM IN CONSTRUCTION SCIENCE

B.S. in Construction Science

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
English	229 100	English Composition I	3
Mathematics	245 220	Anal. Geom. & Calc. I OR	4
Mathematics	245 210	Technical Calculus	5
Pre-des. Prof.	104 210	Des. Graph I	3
Speech	281 105	Oral Communication I	2
Economics	225 110	Economics I	3

15/16

## Spring Semester

English	229 120	English Composition II	3
Civil Engg.	525 212	El. Survey Engg.	3
Pre-des. Prof.	104 211	Des. Graph II	3
Const. Sci.	515 210	Intro. Const. Prog.	3
Physics	265 113	General Physics I	4
Phys. Ed.	261 101	Concepts in Phys. Ed.	1

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## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Const. Sci.	515 320	Const. Materials	2
Architecture	105 433	Arch. Construction I	3
Civil Engg.	525 231	Statics A	3
Const. Sci.	515 250	Site Construction	3
Geology	234 100	Geology I	3
Const. Sci.	515 016	Construction Seminar	0
		Hum. or Soc. Sci. Elec.*	3

17

## Spring Semester

Const. Sci.	515 325	Const. Drawing	3
Civil Engg.	525 331	Str. Matls. A	3
Civil Engg.	525 332	Str. Matls. A Lab	1
Architecture	105 301	Apprec. of Architecture	3
Bus. Admin.	305 260	Fund. of Accounting	4
Const. Sci.	515 016	Construction Seminar	0
		Hum. or Soc. Sci. Elec.*	3

17

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Arch. Engg.	510 522	Theory Str. I	3
Arch. Engg.	510 523	Timber Structures	3
Arch. Engg.	510 537	Acoustic Systems	2
Arch. Engg.	510 535	Lighting Systems	3
Const. Sci.	515 540	Const. Prob. I	3
Bus. Admin.	305 292	Business Law I	3
Const. Sci.	515 016	Construction Seminar	0

17

## Spring Semester

Arch. Engg.	510 524	Theory Str. II	4
Arch. Engg.	510 534	Thermal Systems	3
Ind. Engg.	550 501	Industrial Mgmt.	3
Statistics	285 320	El. Statistics OR	3
Statistics	285 350	Bus. & Econ. Stat.	3
Const. Sci.	515 016	Construction Seminar	0
		Hum. or Soc. Sci. Elec.*	3

16

## SENIOR

Fall Semester		Course	Sem. Hrs.
Arch. Engg.	510 528	Theory Str. III	4
Const. Sci.	515 541	Const. Estim.	3
Const. Sci.	515 542	Const. Mgmt. I	3
		Elective***	3/2
		Hum. or Soc. Sci. Elec.*	3
Const. Sci.	515 016	Construction Seminar	0

16/15

## Spring Semester

Civil Engg.	525 322	Soil & Fdn. Const.	3
Const. Sci.	515 543	Const. Mgmt. II	3
Arch. Engg.	510 536	Sanitation Systems	3
		Labor Elective**	3
		Elective***	3
Const. Sci.	515 016	Construction Seminar	0

15

Number of hours required for graduation is 130.

\* Humanities and social science electives are to be selected from the approved catalog list.

\*\* Labor elective can be selected from one of the following three courses: 225 620 Labor Economics (3), 305 530 Labor Legislation (3); or 305 630 Industrial Relations (3)

\*\*\*These electives to be selected and approved after consultation with student's faculty adviser.

Any student is allowed to apply a maximum of four (4) hours of basic ROTC credit toward the degree without being required to take more credits than non-ROTC students.

## CURRICULUM IN CHEMICAL ENGINEERING

B.S. in Chemical Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
English	229 100	English Composition I	3
Chemistry	221 210	Chemistry I	4
Mathematics	245 220	Anal. Geom. & Calc. I	4
Economics	225 110	Economics I	3
Speech	281 105	Oral Communication I	2
Phys. Ed.	261 101	Concepts in Phys. Ed.	1
Gen. Engg.	500 010	Engineering Lectures	0

17

## Spring Semester

English	229 120	English Composition II	3
Chemistry	221 230	Chemistry II	4
Chemistry	221 271	Chemical Analysis	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
		Elective*	3
Chem. Engg.	520 015	Engineering Assembly	0

18

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Mathematics	245 222	Anal. Geom. & Calc. III	4
Physics	265 213	Engg. Physics I	5
Chemistry	221 531	Organic Chemistry I	3
Chemistry	221 532	Organic Chem. I Lab	2
		Elective*	3
Chem. Engg.	520 015	Engineering Assembly	0

17

## Spring Semester

Mathematics	245 240	Series & Diff. Equations	4
Physics	265 214	Engg. Physics II	5
Chemistry	221 550	Organic Chemistry II	3
Chem. Engg.	520 314	Intro. to Proc. Anal.	3
Chem. Engg.	520 316	Ch. E. Computational Tech.	1
Chem. Engg.	520 015	Engineering Assembly	0

16

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Chemistry	221 585	Physical Chemistry I	3
Chemistry	221 586	Physical Chem. I Lab	2
Chem. Engg.	520 520	Ch. E. Thermodynamics I	2
Chem. Engg.	520 530	Transport Phenomena I	3
		Elective*	6
Chem. Engg.	520 015	Engineering Assembly	0

16

## Spring Semester

Chemistry	221 595	Physical Chemistry II	3
Chem. Engg.	520 522	Chem. Engg. Lab. I	2
Chem. Engg.	520 521	Ch. E. Thermodynamics II	3
Chem. Engg.	520 531	Transport Phenomena II	3
		Elective*	6
Chem. Engg.	520 015	Engineering Assembly	0

17

## SENIOR

Fall Semester		Course	Sem. Hrs.
Chem. Engg.	520 532	Chem. Engg. Lab. II	2
Chem. Engg.	520 560	Separational Proc. Des.	2
Chem. Engg.	520 550	Chemical Reaction Engg.	3
Chem. Engg.	520 570	Ch. E. Systems Design I	3
		Elective*	6
Chem. Engg.	520 015	Engineering Assembly	0

16

## Spring Semester

Chem. Engg.	520 542	Chem. Engg. Lab. III	2
Chem. Engg.	520 561	Ch. E. Proc. Dyn. & Control	3
Chem. Engg.	520 571	Ch. E. Systems Design II	3
		Elective*	9
Chem. Engg.	520 015	Engineering Assembly	0

17

Number of hours required for graduation is 134.

\* Fifteen hours of electives must be selected from the list of humanities and social science electives. The remaining 18 hours are technical electives, a tentative selection of which must be made in consultation with the faculty adviser prior to the junior year. All electives must have the approval of the department head and technical electives must meet the engineering science requirements.

Any student is allowed to apply a maximum of four (4) hours of basic ROTC credit toward a degree without being required to take more credits than non-ROTC students.



## CURRICULUM IN ELECTRICAL ENGINEERING

B.S. in Electrical Engineering

### FRESHMAN

Fall Semester		Course	Sem. Hrs.
English	229 100	English Composition I	3
Chemistry	221 210	Chemistry I	4
Mathematics	245 220	Anal. Geom. & Calc. I	4
Gen. Engg.	500 160	Engineering Concepts	2
Mech. Engg.	560 212	Graph. Comm., Anal. & Des. I	2
			15

### Spring Semester

English	229 120	English Composition II	3
Chemistry	221 230	Chemistry II	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Speech	281 105	Oral Communication I	2
Computer Sci.	286 200	Fund. of Comp. Prog.	2
Computer Sci.	286	Language Lab.	1
Phys. Ed	261 101	Concepts in Phys. Ed.	1
			17

### SOPHOMORE

Fall Semester			
Physics	265 213	Engg. Physics I	5
Mathematics	245 222	Anal. Geom. & Calc. III	4
Civil Engg	525 333	Statics	3
Elec. Engg	530 241	Intro. to Computer Engg.	3
Economics	225 110	Economics I	3
			18

### Spring Semester

Physics	265 214	Engg. Physics II	5
Mathematics	245 240	Series & Diff. Equations	4
Mech. Engg	560 512	Dynamics	3
Elec. Engg	530 510	Circuit Theory I	3
		Hum. or Soc. Sci. Elec.*	3
			18

### JUNIOR

Fall Semester			
Elec. Engg	530 511	Circuit Theory II	4
Elec. Engg	530 557	Electromag. Theory I	4
Elec. Engg	530 525	Electronics I	3
Elec. Engg	530 501	E.E. Lab I	2
		Hum. or Soc. Sci. Elec.*	3
			16

### Spring Semester

Elec. Engg	530 526	Electronics II	3
Elec. Engg	530 581	Energy Conversion I	3
Elec. Engg	530 502	E.E. Lab II	2
		Option Elective†	3
		Complementary Elective**	3
		Hum. or Soc. Sci. Elec.*	3
			17

### SENIOR

Fall Semester			
Mech. Engg	560 513	Thermodynamics I	3
Elec. Engg	530 530	Control Sys. Design	3
		Option Elec.†	3
		Complementary Elec.**	3
		Hum. or Soc. Sci. Elec.*	3
			15

### Spring Semester

Elec. Engg.	530 590	E.E. Seminar	1
		Option Elec.†	5
		Complementary Elec.**	8
		Hum. or Soc. Sci. Elec.*	3
			17

Number of hours required for graduation is 133.

\* Humanities and social science electives are to be selected from the approved list.

\*\* Twelve hours of technical electives are required. One course in computer programming or equivalent programming experience and one course from either the engineering materials or the circuits, fields and electronics engineering sciences groups are required. The remaining hours may be chosen upon consultation with the student's faculty adviser from the areas of mathematics, science or engineering.

\*\*\* Civil engineering electives are to be selected from the list approved by the department.

Any student may apply a maximum of four (4) hours of basic ROTC credit toward the degree without being required to take more credits than non-ROTC students.

## 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 enable concentration in one area. Examples of such areas are communications systems, digital systems, electromagnetic theory and applications, electronics, electric energy systems, linear systems theory and microelectronics.

### Bioengineering

A student pursuing the option of bioengineering within the Electrical Engineering Department can fulfill the requirements for a B.S. in electrical engineering by following the outlined core curriculum listed for electrical engineering. A suggested set of life science courses which should be included in the bioengineering option follows:

### Life Science Component of Bioengineering Option

*Chemistry	221 350	General Organic Chemistry	3
Chemistry	221 351	General Organic Chem. Lab.	2
*Biochemistry	211 521	General Biochemistry	3
Biology	215 505	Comp. Anat. of Vertebrates	4
		OR	
Biology	215 525	Human Physiology	4
*Physiology	740 530	Anatomy and Physiology	4

\* Minimum set of 10 semester hours that should be included in the Complementary Electives.

The above courses will be used as complementary electives in the electrical engineering curriculum. Upon consultation with an academic adviser the student must select from the list of option electives those which would complement a strong electrical engineering core curriculum and the bioengineering option.

### Computer Engineering

A student pursuing the option of computer engineering within the Electrical Engineering Department can fulfill the requirements for a B.S. in electrical engineering by following the outlined core curriculum listed for electrical engineering. The following courses will be required as complementary and option electives.

Computer Sci.	286 305	Comp. Org. & Prog. I	3
Elec. Engg.	530 649	Analog Computation	3
Elec. Engg.	530 641	Design of Digital Systems I	3
Elec. Engg.	530 643	Comp. Logic Lab.	1



## CURRICULUM IN INDUSTRIAL ENGINEERING

B.S. in Industrial Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
English	229 100	English Composition I	3
Mathematics	245 220	Anal. Geom. & Calc. I	4
Chemistry	221 210	Chemistry I	4
Economics	225 110	Economics I	3
Gen. Engg.	500 160	Engineering Concepts	2
Phys. Ed.	261 101	Concepts in Phys. Ed.	1
			17

Spring Semester		Course	Sem. Hrs.
English	229 120	English Composition II	3
Mathematics	245 221	Anal. Geom. & Calc. II	4
Chemistry	221 230	Chemistry II	4
Ind. Engg.	550 120	Intro. to Ind. Engg.	2
		Hum. or Soc. Sci. Elec.*	3
Ind. Engg.	550 015	Engineering Assembly	0
			16

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Physics	265 213	Engineering Physics I	5
Mathematics	245 222	Anal. Geom. & Calc. III	4
Bus. Admin.	305 260	Fund. of Accounting	4
Ind. Engg.	550 241	Production Processes	3
Ind. Engg.	550 372	Computers & Data Processing	2
Ind. Engg.	550 015	Engineering Assembly	0
			18

Spring Semester		Course	Sem. Hrs.
Physics	265 214	Engineering Physics II	5
Mathematics	245 240	Series & Diff. Equations	4
Ind. Engg.	550 352	Tool Engineering	3
		Hum. or Soc. Sci. Elec.*	3
Mech. Engg.	560 212	Graph. Comm., Anal. & Des. I	2
Ind. Engg.	550 015	Engineering Assembly	0
			17

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Elec. Engg.	530 519	Elec. Circuits & Controls	4
Statistics	285 510	Intro. Prob. & Stat. I	3
Ch. E Engg.	520 350	Engg. Materials	2
Ch. E Engg.	520 351	Engg. Materials Lab	1
Ind. Engg.	550 551	Work Design	3
Civil Engg.	525 530	Statics & Dynamics	4
Ind. Engg.	550 015	Engineering Assembly	0
			17

Spring Semester		Course	Sem. Hrs.
Civil Engg.	525 533	Mech. of Materials	3
Mech. Engg.	560 513	Thermodynamics I	3
Ind. Engg.	550 541	Engg. Rel. & Qual. Assur. I	3
Statistics	285 511	Intro. Prob. & Stat. II	3
Ind. Engg.	550 501	Industrial Management	3
Ind. Engg.	550 050	Ind. Plant Studies	0
Ind. Engg.	550 015	Engineering Assembly	0
			15

## SENIOR

Fall Semester		Course	Sem. Hrs.
Ind. Engg.	550 553	Prod. Plan. & Inv. Control	3
Ind. Engg.	550 530	Ind. Proj. Eval.	3
Ind. Engg.	550 571	Intro. Oper. Res. I	3
Ind. Engg.	550 502	Ind. Management II	3
		Hum. or Soc. Sci. Elec.*	6
Ind. Engg.	550 015	Engineering Assembly	0
			18

Spring Semester		Course	Sem. Hrs.
		Tech. Electives**	9
Ind. Engg.	550 554	Ind. Fac. Layout Des.	3
		Hum. or Soc. Sci. Elec.*	3
Ind. Engg.	550 015	Engineering Assembly	0
			15

Number of hours required for graduation is 133.

\* Humanities and social science electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

\*\* Must be selected from the following five courses: 550-552 Process Engineering (3); 550-572 Intro. to Oper. Res. II (3); 550-573 Indus. Simulation (3); 550-609 Occupational Safety and Health (3); or 550-625 The Man-Environment System (3).

Any student may apply a maximum of four (4) hours of basic ROTC credit toward the degree without being required to take more credits than non-ROTC students.

## CURRICULUM IN MECHANICAL ENGINEERING

B.S. in Mechanical Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
Chemistry	221 210	Chemistry I	4
English	229 100	English Composition I	3
Mathematics	245 220	Anal. Geom. & Calc. I	4
Phys. Ed.	261 101	Concepts in Phys. Ed.	1
Speech	281 105	Oral Communications I	2
Gen. Engg.	500 160	Engineering Concepts	2
			16

Spring Semester		Course	Sem. Hrs.
Chemistry	221 230	Chemistry II	4
English	229 120	English Composition II	3
Mathematics	245 221	Anal. Geom. & Calc. II	4
Ind. Engg.	550 241	Production Processes	3
Mech. Engg.	560 212	Graph. Comm., Anal. & Des. I	2
			16

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Economics	225 110	Economics I	3
Mathematics	245 222	Anal. Geom. & Calc. III	4
Physics	265 213	Engg. Physics I	5
Ind. Engg.	550 372	Comp. & Data Processing	2
Mech. Engg.	560 217	Graph. Comm., Anal. & Des. II	3
			17

Spring Semester		Course	Sem. Hrs.
Mathematics	245 240	Series & Diff. Equations	4
Physics	265 214	Engg. Physics II	5
Chem. Engg.	520 350	Engineering Materials	2
Civil Engg.	525 333	Statics	3
		Hum. or Soc. Sci. Elec.*	3
			17

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Civil Engg.	525 533	Mech. of Materials	3
Elec. Engg.	530 519	Electric Circuits & Control	4
Chem. Engg.	520 351	Engg. Materials Lab	1
Mech. Engg.	560 513	Thermodynamics	3
Mech. Engg.	560 512	Dynamics	3
		Hum. or Soc. Sci. Elec.*	3
			17

Spring Semester		Course	Sem. Hrs.
Elec. Engg.	530 589	Circuits & Machine Lab	2
Mech. Engg.	560 523	Thermodynamics II	3
Mech. Engg.	560 533	Machine Design I	3
Mech. Engg.	560 535	Mech. Engg. Lab I	3
Mech. Engg.	560 571	Fluid Mechanics	3
		Hum. or Soc. Sci. Elec.*	3
			17

## SENIOR

Fall Semester		Course	Sem. Hrs.
Mech. Engg.	560 527	Heat Transfer	3
Mech. Engg.	560 583	Mech. Engg. Lab II	2
Mech. Engg.	560 560	Engineering Economics	3
		Technical Elective**	6
		Hum. or Soc. Sci. Elec.*	3
			17

Spring Semester		Course	Sem. Hrs.
Mech. Engg.	560 563	Machine Design II	3
Mech. Engg.	560 575	Mech. Engg. Design Lab	2
		Technical Elective**	9
		Hum. or Soc. Sci. Elec.*	3
			17

Number of hours required for graduation is 134

\* Humanities and social science electives are to be selected from the approved list.

\*\* To be chosen with the advice and approval of the faculty adviser and department head. Of the fifteen 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.

The engineering science requirements will be satisfied by the required courses in this curriculum. Any student may apply a maximum of four (4) hours of basic ROTC credit toward a degree without being required to take more credits than non-ROTC students.



## CURRICULUM IN NUCLEAR ENGINEERING

B.S. in Nuclear Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
Nuc. Engg	580 110	Nuclear Engg Concepts	2
English	229 100	English Composition I	3
Economics	225 110	Economics I	3
Mathematics	245 220	Anal. Geom. & Calc. I	4
Phys. Ed	261 101	Concepts in Phys. Ed	1
Chemistry	221 210	Chemistry I	4
			17

## Spring Semester

Nuc. Engg	580 116	Nuc. Engg Seminar	1
English	229 120	English Composition II	3
Chemistry	221 230	Chemistry II	4
Mathematics	245 221	Anal. Geom. & Calc. II	4
Physics	265 213	Engineering Physics I	5
			17

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Nuc. Engg	580 325	Elem. Nuclear Engg.	3
Chem. Engg	520 350	Engg. Materials	2
Chem. Engg	520 351	Engg. Materials Lab	1
Physics	265 214	Engg. Physics II	5
Mathematics	245 222	Anal. Geom. & Calc. III	4
		Hum. or Soc. Sci. Elec. *	3
			18

## Spring Semester

Nuc. Engg	580 315	Intro Nuc. Engg. Analysis	3
Elec. Engg.	530 510	Circuit Theory I	3
Civil Engg.	525 530	Statics & Dynamics	4
		Hum. or Soc. Sci. Elec. *	6
			16

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Nuc. Engg	580 511	Rad. Appl. Engg.	2
Nuc. Engg.	580 500	App. Nuc. Engg. Anal.	3
Nuc. Engg	580 490	Neut. & Part. Inter. I	2
Mech. Engg.	560 513	Thermodynamics I	3
Elec. Engg	530 525	Electronics I	3
		Hum. or Soc. Sci. Elec. *	3
			16

## Spring Semester

Nuc. Engg	580 630	App. Reactor Theory	4
Nuc. Engg.	580 515	Nuclear Engg. Materials	2
Mech. Engg	560 571	Fluid Mechanics	3
		Technical Electives**	6
			15

## SENIOR

Fall Semester		Course	Sem. Hrs.
Nuc. Engg.	580 613	Nuclear Fuel Cycle	3
Nuc. Engg	580 555	Nuclear Reactor Fund.	3
Nuc. Engg	580 655	Rad. Prot. Engg.	3
Nuc. Engg	580 640	React. Oper. Lab.	2
		Technical Electives**	5
			16

## Spring Semester

Nuc. Engg.	580 692	Nuc. Reactor Design	3
Nuc. Engg	580 695	Nuc. Reactor Lab.	1
		Technical Electives**	9
		Hum. or Soc. Sci. Elec. *	3
			16

Number of hours required for graduation is 131

\* Humanities and social science electives are to be selected from the catalog list.

\*\* A technical elective program of study is chosen in consultation with the student's adviser and presented for approval to the departmental faculty no later than the second semester of the sophomore year.

Any student may apply a maximum of four (4) hours of basic ROTC credit toward a degree without being required to take more credits than non-ROTC students.

## CURRICULUM IN CIVIL ENGINEERING

B.S. in Civil Engineering

## FRESHMAN

Fall Semester		Course	Sem. Hrs.
Mathematics	245 220	Anal. Geom. & Calc. I	4
Chemistry	221 210	Chemistry I	4
English	229 100	English Composition I	3
Mech. Engg	560 212	Graphical Comm. Anal. & Des. I	2
Gen. Engg.	500 160	Engineering Concepts	2
Phys. Educ.	261 101	Concepts in Phys. Ed	1
			16

## Spring Semester

Mathematics	245 221	Anal. Geom. & Calc. II	4
Chemistry	221 230	Chemistry II	4
English	229 120	English Composition II	3
Speech	281 105	Oral Communication I	2
Economics	225 110	Economics I	3
Civil Engg	525 015	Engineering Assembly	0
			16

## SOPHOMORE

Fall Semester		Course	Sem. Hrs.
Mathematics	245 222	Anal. Geom. & Calc. III	4
Physics	265 213	Engg. Physics I	5
Civil Engg	525 333	Statics	3
		Technical Elective**	2
Civil Engg	525 212	Elem. Surveying Engg.	3
Civil Engg	525 015	Engineering Assembly	0
			17

## Spring Semester

Mathematics	245 240	Series & Diff. Equations	4
Physics	265 214	Engg. Physics II	5
Civil Engg	525 533	Mechanics of Materials	3
		Technical Elective**	2
Geology	234 100	Geology I	3
Civil Engg	525 015	Engineering Assembly	0
			17

## JUNIOR

Fall Semester		Course	Sem. Hrs.
Civil Engg	525 411	Route Location & Design	4
Mech. Engg	560 512	Dynamics	3
Mech. Engg	560 513	Thermodynamics I	3
Civil Engg	525 551	Hydrology	2
Civil Engg	525 553	Hydrologic Meth. Lab.	1
		Technical Elective**	3
Civil Engg	525 015	Engineering Assembly	0
Civil Engg	525 534	Mech. of Materials Lab.	1
			17

## Spring Semester

Civil Engg	525 537	Intro. to Structural Anal.	4
Mech. Engg	560 571	Fluid Mechanics	3
Civil Engg.	525 522	Soil Mechanics I	3
Civil Engg	525 563	Sanitary Engg. Fund.	3
		Hum. or Soc. Sci. Elec. *	3
Civil Engg	525 015	Engineering Assembly	0
			16

## SENIOR

Fall Semester		Course	Sem. Hrs.
Civil Engg	525 015	Engineering Assembly	0
		Civil Engg. Elec. ***	12
		Hum. or Soc. Sci. Elec. *	5
			17

## Spring Semester

Civil Engg	525 015	Engineering Assembly	0
		Civil Engg. Elec. ***	6
		Hum. or Soc. Sci. Elec. *	6
		Technical Elec. **	5
			17

Number of hours required for graduation is 133

\* 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.

\*\* Fourteen semester hours of complementary electives and Mechanical Engineering 212 or sixteen semester hours of complementary electives, including a minimum of 3 semester hours from mathematics or statistics, must be selected from an approved list of science and engineering courses upon consultation with the student's faculty adviser. Note should be taken of the engineering science requirements.

† Eleven semester hours of option electives must be selected from electrical engineering courses upon consultation with adviser.

Any student may apply a maximum of four (4) hours of basic ROTC credit toward a degree without being required to take more credits than non-ROTC students.



## Engineering Technology

B. S. in Engineering Technology 120 semester hours required.

Engineering technology is a new and 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 and less mathematical than that for the engineering students and is oriented more towards hardware and applications.

### I. General Requirements (50-51 hours)

229 100	English Composition I	3
229 120	English Composition II	3
281 105	Oral Communication I	2
245 100	College Algebra	3
245 150	Plane Trigonometry	3
245 210	Technical Calculus	5
265 113	General Physics I	4
265 114	General Physics II	4
221 110	General Chemistry	5
	OR	
221 210	Chemistry I	4
285 320	Elements of Statistics	3
261 101	Concepts in Phys. Ed	1
	Soc. Sci. or Hum. Electives	15
		<hr/> 50/51

### II. Engineering Technology Core (14 hours)

560 212	Graphical Communications I	2
550 372	Computers and Data Processing	2
540 510	Properties of Engineering Materials	3
540 530	Electrical Circuit Technology I	4
540 532	Instrumentation and Measurement Tech.	3
		<hr/> 14

### III. Management Electives (6 hours)

### IV. Free Electives (9/10 hours)

## AREA OF SPECIALIZATION

### Civil Engineering Technology

The field of civil engineering technology is very broad. It includes the areas of surveying and mapping, transportation, hydraulics, sanitary, structural, geotechnical, materials, and construction technology. The civil engineering technology program is planned to give the student basic background in all of these areas and to provide the opportunity for specialization in one or more of the areas. Employment opportunities for B.S. graduates include all levels of government, consulting engineering firms, and the construction industry.

#### Required Courses (20 hours)

Statics A	3
Strength of Materials A	3
Strength of Materials Lab.	1
Elem. Surveying Engg.	3
Graphical Com. Anal. & Des. II	3
Mechanics of Fluids	3
Route Location & Design	4
<hr/>	
20	

#### Area Electives (20 hours)

Elective topics include structures, water and waste treatment, construction, geology, building systems, etc.

## Computer Engineering Technology

This program is designed to provide a basic understanding of the area of digital computer technology. The major emphasis is placed on hardware aspects of the subject, but through use of required and elective courses in computer science, the student has an opportunity to become proficient with programming aspects as well.

Graduates will find initial employment closely paralleling the opportunities of an engineering graduate with a similar background, although with more emphasis on immediate applications such as production process development and process design. Opportunities also exist in the area of technical sales and service.

#### Required Courses (29 hours)

286 300	Algo. Processes	3
286 305	Comp. Org. & Prog. I	3
530 525	Electronics I	3
530 526	Electronics II	3
540 430	Electronic Fabrication Lab	2
540 531	Electrical Circuit Technology II	3
540 534	Auto. Controls Tech.	3
540 535	Dig. Logic Sys. I	4
540 536	Dig. Logic Sys. II	4
540 538	Seminar	1

#### Area Electives (11 hours)

## Electronic Engineering Technology

This program is designed to provide the basic education necessary for a career in one of the many areas of the electrical/electronics industry. Graduates will find initial employment closely paralleling the opportunities of the engineering graduate, although with more emphasis on immediate applications in production management, process and product development, quality control and process design. Opportunities also exist in the areas of technical sales and service.

#### Required Courses (30 hours)

530 525	Electronics I	3
530 526	Electronics II	3
530 625	Integrated Cir. Engg.	3
540 430	Electronic Fabrication Lab	2
540 531	Electrical Circuit Technology II	3
540 534	Auto Controls Tech.	3
540 535	Dig. Logic Sys. I	4
540 536	Dig. Logic Sys. II	4
540 537	Elec. Measurements Lab	1
540 538	Seminar	1
550 241	Production Processes	3

#### Area Electives (12 hours)

## Environmental Engineering Technology

Concern about environmental quality has resulted in a significant increase in the number of trained personnel needed to implement pollution prevention and control activities. Much of this activity relates to concern over providing safe supplies of water and safely disposing of domestic and industrial wastes, in addition to protecting and restoring the quality of the total environment.

Employment opportunities at the B.S. level include: inspection and field monitoring to assure compliance with the various pollution standards; assisting engineers in the design, construction, inspection and maintenance of facilities to handle



water supplies, sanitary wastes, storm runoff, etc.; performing chemical and biological laboratory tests incidental to the protection and restoration of the environment.

#### Required Courses (35 hours)

215 198	Principles of Biology	4
215 530	Ecology	3
221 230	Chemistry II	4
221 240	Environmental Chemistry Lab	1
500 412	Intro to Environmental Tech.	3
540 512	Mechanics of Fluids	3
540 514	Energy Conversion Technology	3
540 522	Air Pollution Control Tech. and (Water Quality)	2
525 563	Sanitary Engineering Fund	3
540 520	Wastewater Treatment Tech.	3
540 521	Water Treatment Technology	3
525 551	Hydrology	2
525 553	Hydrologic Methods Lab or (Radiation Protection)	1
540 580	Nuclear Engineering Tech.	4
540 581	Nuclear Radiation Meas.	3
540 582	Radiation Protection Tech.	5

#### Area Electives (5 hours)

### Food Engineering Technology

This program provides the student with an engineering technology education directed toward a career in the food industry. The food industry is large and of considerable economic and social significance in Kansas, the U.S., and the world. Employment opportunities at the B.S. level include production management, technical service, product and process development, process design, project engineering, and quality control. Food preservation operations, fermentation operations, soybean processing, freeze drying, cereal grain processing, processing of dairy products, processing of fruits and vegetables, and meat processing are examples of activities that require the skills of food scientists, food engineering technologists, and engineers.

#### Recommended Program (40 hours)

A	At least 10 additional hours of chemistry including courses in organic and biochemistry	10
B	Microbiology or Dairy Bacteriology	4
C	Engineering Technology Courses	
	Energy Conversion Technology	3
	Technology of Fluids	3
	Food Processing Operations I and II	8
D	Applied Food Science and Industry Electives	12

### Mechanical Engineering Technology

Industrial growth and the increased technical requirements associated with it have greatly increased the need for technically trained personnel. The mechanical engineering technologist, a vital member of the industrial design team, applies practical approaches to problems in many different technical fields. Component and system design in the aerospace, farm machinery, power and chemical industries are examples of opportunities that exist in Kansas and nationwide. Opportunities also exist in development and testing laboratories as well as in the design of products or production facilities.

#### Required Courses (32 hours)

560 217	Graphical Comm., Anal. & Des. II	3
525 231	Statics A	3
540 514	Energy Conversion Technology	3
550 241	Production Processes	3
525 331	Strength of Materials A	3
525 332	Strength of Materials A Lab.	1
540 560	Kinematics & Mechanism	3
540 561	Machine Design	3
540 562	Mechanical Design Lab I	2
540 563	Mechanical Design Lab II	2
540 534	Automatic Control Technology	3
540 512	Mechanics of Fluids	3

#### Area Electives (8 hours)

Elective topics include tool engineering, material processing, foundry, heat treatment, material testing, etc.

### Production Management Technology

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.

Graduates are prepared for employment in supervisory or staff positions in a variety of manufacturing organizations.

#### Required Courses (31 hours)

IE 241	Prod. Processes	3
IE 501	Ind. Mgmt. I	3
IE 530	Ind. Proj. Eval.	3
IE 352	Tool Engg.	3
IE 551	Work Design	3
IE 609	Occ. Safety & Health	3
IE 554	Indus. Facilities Layout & Des.	3
ET 551	Materials Processes	4
IE 541	Engg. Reliability & Quat. Assur. I	3
CE 231	Statics A	3

#### Area Electives (9 hours)

An elective program will be structured to meet the career plans of the student.

### 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:

1. A minimum of 30 semester hours of engineering science courses.
2. At least 12 semester hours of engineering science courses outside the student's major department.
3. At least four of the five subject areas in the following list must be represented in the 30 semester hours.

#### 1. Engineering Materials

- a. Ch. E. 350 Engineering Materials (2)
- b. NE 515 Nuclear Engineering Materials (2)
- c. EE 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, & Electronics

- a. EE 510 Circuit Theory I (3)
- b. EE 519 Elect. Circuits & Controls (4)
- c. EE 557 Electromagnetic Theory (4)



**4. Thermodynamics**

- a. ChE 515 Chem. Engg. Thermo. I (2)
- b. ME 513 Thermodynamics (3)

**5. Flow & Rate Processes**

- a. ME 571 Fluid Mechanics (3)
- b. ChE 530 Transport Phenomena I (3)

**Note**—It should be recognized that there are other courses in these subject areas which may properly be considered engineering sciences. In addition, there are areas of engineering science which are not listed.

## Humanities And Social Science Electives For College Of Engineering Students

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.

**Art**—Any course

**Economics**—Any course above Economics 110

**English**—Any course above those required

**Geography**—Any course

**History**—Any course

**Journalism**—289 235 Survey of the Mass Media (3)

**Modern Languages**—At least eight hours

**Music**—Any course

**Philosophy**—Any course except Philosophy 220

**Political Science**—Any course

**Psychology**—Any course

**Sociology and Anthropology**—Any course

**Speech**—Any course in "Theatre and Interpretation"

**Architecture and Design**—Any course in history or appreciation of architecture

**Engineering**—500 250 Impact of Engineering Technology on Society (3)

**Home Economics**—630 605 Consumers and the Market (3)

From the areas listed above at least two courses must be taken at the 400 level or above; however, not more than three credit hours may be taken in applied music and/or applied art. -

## Interdisciplinary Study

Although engineering curriculums 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 his adviser 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 on dual degrees could be appropriate technical electives for students with goals in the management area.

**Pre-Medicine.** Many of the recent advances in medical research techniques, patient monitoring systems, artificial limbs and organs, aerospace and undersea medicine have been developed from the partnership of medicine and engineering. It seems

certain that this interrelationship will continue to grow, and an education in both fields will be highly desirable. 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 (215 198 plus one of the following: 215 201, 215 535, 215 650). The pre-medicine adviser 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 adviser 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:**

286 200	Fundamentals of Computer Programming
286 300	Introduction to Algorithmic Processes
286 305	Computer Organization and Programming I
286 405	Introduction to Programming Language

**Design:**

530 241	Introduction to Computer Engineering
530 643	Computer Logic Design
530 644	Digital Circuits Laboratory
530 641	Design of Digital Systems I

**Computational Techniques:**

520 316	Ch E Computational Techniques
530 649	Analog Computation
550 571	Introduction to Operations Research
550 573	Industrial Simulation
560 760	Engineering Analysis I
580 720	Nuclear Systems Analysis

**Mathematics, Physics, Chemistry.** Engineering students with interests in research should plan on graduate study. Preparation at the B.S. level could be enhanced by additional courses in mathematics and the basic sciences. Refer to the departmental listings on pages 109, 145, and 164 for possible electives.

**Bio-Engineering.** Bio-engineering is a very broad field overlapping the life sciences and many engineering disciplines. Some of the sub-areas are bio-mechanics, ergonomics, bio-instrumentation, bio-materials, bio-energetics, water and waste treatment, food engineering, and environmental engineering. In addition to the courses listed in the pre-medicine section, other courses of interest are:

505 312	Biological Materials and Machine Functions in Agriculture
505 510	Environmental Design of Farm Buildings
505 520	Energy Use and Control in Agricultural Systems I
505 570	Energy Use and Control in Agricultural Systems II
505 700	Agricultural Process Engineering
520 715	Biochemical Engineering
520 725	Biotransport Phenomena
525 563	Sanitary Engineering Fundamentals
525 565	Sanitary Engineering Design
525 761	Sanitary Engineering Chemistry
525 762	Water Treatment Systems



525 766	Wastewater Treatment Systems I
530 771	Control Theory Applied to Bioengineering
530 772	Theory and Techniques of Bioinstrumentation
550 551	Work Design
550 609	Occupational Safety and Health
550 625	The Man-Environment System
560 622	Environmental Engineering I
560 722	Environmental Engineering II
560 742	Fine Particle Technology

**Food Engineering.** Engineers are needed in the food industry for process development and design, equipment design and management of operations. Students with this interest should select technical electives to augment their 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. Three programs of interest are listed below.

**Engineering and Business Administration.** Ordinarily the program must be commenced during the student's junior year and the following courses are required for the B.S. in Business Administration:

		Course	Sem. Hrs.
Bus. Admin.	305 260	Fund. of Accounting	4
Bus. Admin.	305 270	Managerial & Cost Controls	3
Economics	225 110	Economics I	3
Economics	225 120	Economics II	3
Bus. Admin.	305 292	Business Law I	3
Comp. Science	286 200	Fund. of Comp. Prog. *	3
Bus. Admin.	305 420	Management Concepts	3
Bus. Admin.	305 421	Production Management	3
Bus. Admin.	305 450	Business Finance	3
Bus. Admin.	305 440	Marketing	3
Bus. Admin.	305 695	Business Policy	3
Bus. Admin.	305 696	Business and Society	3
		Business electives	9
			46

\*including lab

**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 page 91).

2. Complete the following courses in geology:

	Course	Sem. Hrs.
234 200	Geology II	4
234 560	Mineralogy I	4
234 561	Mineralogy II	4
234 520	Geomorphology	4
234 630	Structural Geology	4
234 703	Stratigraphic Geology	4
234 718	Field Geology	6
		30

**Chemistry and Chemical Engineering.** In addition to the required courses in chemical engineering, interested students should take:

	Course	Sem. Hrs.
221 551	Organic Chemistry II Lab.	2
221 597	Structure & Bonding	2
221 545	Chemical Separations	2
221 666	Instrumental Analysis	3
221 599	Undergraduate Research	3
253 121	German I	4
253 122	German II	4
221 667	Instrumental Analysis Lab	1
		21

Electives should be chosen to satisfy the humanities and social sciences requirements on page 228 and the engineering science requirements on page 229.

**Architecture And Architectural Engineering.** For these 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 adviser.

## Information For Pre-Engineering 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 junior colleges. In general, two years of course-work will be transferable. However, there are small differences among the curricula so students electing this route should work closely with their advisers and KSU to ensure a proper selection of courses. Questions should be referred to The Dean's office, College of Engineering.

### BASIC PRE-ENGINEERING SUBJECTS

Use in Various Curricula - credit hours at KSU

	AgE	ArE	CE	ChE	CnS	EE	ET	IE	ME	NE
Accounting	4				4		4			
Biology										
Chemistry	8	8	8	8		8	5	8	8	8
Computer Programming	2	3		1	3	3	2	2	2	
Economics	3		3	3	3	3		3	3	3
English Composition	6	6	6	6	6	6	6	6	6	6
Geology				3	3					
Graphics	2	6	2		6	2	2	2	5	
Mathematics	16	16	16	16	5	16	5	16	16	16
(An. Gm & Calc & Diff. Equa.)										
Mathematics (Alg. & Trig.)				8			6			
Organic Chemistry										
Physics	10	10	10	10	4	10	8	10	10	10
Qualitative Analysis				4						
Social Science/Humanities Elective	15	12	14	15	12	15	15	15	15	15
Speech	2	2	2	2	2	2	2		2	2
Statics	3	3	3		3	3		3	3	3
Statistics							3	6		

#### \*Elective

Excess credit hours in courses listed above may possibly be used in elective areas after consultation with a KSU departmental adviser and the Dean's office.



**Summer Session**—Students transferring at the junior level may find it advantageous to attend the summer session preceding their fall enrollment. Engineering subjects that normally are offered include:

525 333—Statics  
 520 314—Introduction to Process Analysis  
 530 510—Circuit Theory I  
 550 372—Computers & Data Processing  
 550 501—Industrial Management I  
 560 512—Dynamics  
 560 513—Thermodynamics I  
 580 410—Introduction Nuclear Engineering

## 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 entrance examination 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.

The Engineering College has approved the implementation of an experimental program encouraging the development of individual programs for students qualifying for the honors program. Such programs will be developed between an individual student and a faculty member of that student's department. Engineering faculty will be encouraged to seek out honor students and with them develop programs of study that will meet the student's academic and professional interests. The academic programs developed must be approved only by the student's department chairman and the Engineering Dean's office.

Participation in the honors program will not shorten the time required for graduation for most students, but should be a stimulating experience. In addition to enrolling in honors sections in coursework, 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. While one student is a full-time employee in industry, the other studies in his 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 his college expenses. Participants are selected from students who are progressing satisfactorily toward a degree and have completed at least one semester in their 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.

## 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.

## Summer School

Many of the courses appearing in the engineering curriculums, 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 Analytic Geometry and Calculus I are urged to investigate the possibility of summer school to remove this mathematics deficiency. College Algebra and 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 each February for the coming summer.



## Departments and Course Offerings

### AGRICULTURAL ENGINEERING

*William H. Johnson,\* Head of Department*

Professors Clark\*, Fairbanks\*, Hodges\*, Holmes, Johnson\*, Larson\*, Lipper\*, and Wendling; Associate Professors Chung\*, Converse, Jepsen, Manges\*, Schindler, Spillman\*, and Stevenson\*; Assistant Professors Baugher, Hay, Murphy, TenEyck Thomas and Zerr; Instructors Gartung and Scharplaz. Emeritus: Professor Fenton.

Agricultural Engineering is the profession that applies the science of engineering principles to the food production and agricultural industry. Basic training enables the student to develop new ideas and methods as well as to further the application of engineering fundamentals in such areas as production mechanization; soil, water, and air resources; power and energy sources; plant and animal environment; and feed and waste handling, processing, and storage.

The curriculum includes all basic courses such as mathematics, physics, chemistry, and mechanics common to engineering curriculums, as well as specific courses in the field of agricultural engineering, some of which permit specialization in a particular area through technical electives available in the department.

Students completing this curriculum are prepared to do design, research, testing, sales promotion, teaching and extension work as applied to agriculture.

Federal and state agencies, colleges and universities, equipment manufacturers, rural electric power suppliers and many enterprises involving agriculture desire and need the services of the agricultural engineer.

#### Graduate Study

Major work leading to the Master of Science and Doctor of Philosophy degrees is offered in the fields of farm power and machinery, farm structures, soil and water engineering, rural electrification, animal waste management, and processing.

Excellent opportunities and capabilities exist for advanced study. In addition to modern departmental facilities, the U.S.D.A. Grain Marketing Research Center offers unique possibilities for specialization in the engineering of grain processing and handling systems.

### Courses in Agricultural Engineering

#### Undergraduate Credit

**505 160. Agricultural Engineering Concepts.** (2) I. An introduction to agricultural engineering and engineering design. Problems involving the basic concepts of engineering science are considered. One lec. and two hours lab. a week. 505-160-1-0903

**505 312. Biological Materials and Machine Functions in Agriculture.** (3) II. Physical properties of biological materials. Functional requirements of agricultural machines. Two hours rec. and three hours lab. a week. Pr.: Phys. 213. 505-312-1-0903

#### Undergraduate And Graduate Credit In Minor Field

**505 510. Environmental Design of Farm Buildings.** (3) I. Fundamentals of psychrometrics, heat flow through walls, and air flow plus weather data and requirements of animals or stored products needed for environmental design of farm buildings. Two hours rec. and three hours lab. a week. Pr.: I.E. 372. Pr. or conc.: M.E. 513. 505-510-1-0903

**505 520. Energy Use and Control in Agricultural Systems I.** (3) II. Theory and application of energy conversion devices; measurement methods and instrumentation; fundamental concepts of hydraulic, electronic, and pneumatic control systems. Two hours rec. and three hours lab. a week. Pr.: M.E. 513. 505-520-1-0903

**505 530. Soil and Water Engineering.** (3) I. Principles and measures for controlling stormwater 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.: Ag.E. 551, M.E. 571, and C.E. 522 or Agron. 745. 505-530-1-0903

**505 536. Design of Agricultural Machinery.** (3) I. Analysis and design of agricultural machines. Two hours rec. and three hours lab. a week. Pr.: Phys. 214. Pr. or conc.: C.E. 533, Ag.E. 312. 505-536-1-0903

**505 551. Hydrology.** (2) I, II. A study of the sources of supply and movement of underground and surface waters. Two hours rec. a week. Pr. or conc.: Phys. 214. (Cross listed with C.E. 551.) 505-551-0-0903

**505 566. Analysis of Agricultural Structures.** (3) II. Estimation of loads on agricultural structures; allowable unit stresses; structural systems in agricultural buildings. Three hours rec. a week. Pr.: C.E. 533. 505-566-0-0903

**505 570. Energy Use and Control in Agricultural Systems II.** (3) II. Application of energy to condition and process biological materials important to agriculture; to modify their environments; and to measure, modify, or induce certain characteristics. Two hours rec. and three hours lab. a week. Pr.: Ag.E. 520. and E.E. 510 or E.E. 519. 505-570-1-0903

**505 581. Professional Practice in Agricultural Engineering.** (1) II. Professional attitudes and ethics. Post-degree career planning and social responsibilities. One hour rec. a week. Pr.: Senior standing. 505-581-0-0903

#### Undergraduate And Graduate Credit

**505 620. 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. 505-620-3-0903

**505 650. 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.: Ag.E. 536, Ag.E. 566. 505-650-1-0903

**505 700. Agricultural Process Engineering.** (3) I. Theory, equipment, and design techniques in processing agricultural products. Two hours rec. and three hours lab. a week. Pr.: M.E. 571, M.E. 513. 505-700-1-0903

**505 705. Irrigation and Drainage.** (3) I, II. Design and operative problems involved in irrigation or drainage of agricultural land. Two hours rec. and three hours lab. a week. Pr.: Ag.E. 551, M.E. 571 and C.E. 522 or Agron. 745. 505-705-1-0903

**505 710. 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.: Ag.E. 536. 505-710-1-0903



**505 780. Measurement Systems.** (3) I. 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.: E.E. 510 or E.E. 519. 505-780-1-0903

### Graduate Credit

**505 810. 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. 505-810-4-0903

**505 815. 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. 505-815-0-0903

**505 898. Master's Report.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 505-898-3-0903

**505 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 505-899-4-0903

**505 999. Dissertation Research.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 505-999-4-0903

## Courses for Students in Agriculture

See page 51 for "Agricultural Engineering Courses for Students in Agriculture."

## ARCHITECTURAL ENGINEERING/ CONSTRUCTION SCIENCE

*I. Eugene Thorson, Head of Department*

Professor Thorson,\* Associate Professors Bissey\* and Blackman; Assistant Professors Burton,\* Goddard, Lage, and Dahl.\*

The construction science curriculum is designed to prepare graduates for responsible positions in the construction industry. The curriculum leads to the degree Bachelor of Science in construction science.

The architectural engineering program is offered for the student who is particularly interested in the engineering aspects of building design. After thorough instruction in mathematics and science, the student applies these principles to structural, mechanical and electrical problems in building design. The undergraduate curriculum leads to the degree Bachelor of Science in architectural engineering.

## Courses in Architectural Engineering

### Undergraduate Credit

**510 020. 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. per month. 510-020-0-0904.

### Undergraduate Credit And Graduate Credit In Minor Field

**510 522. 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.: C.E. 331. 510-522-1-0904

**510 523. Timber Structures.** (3) I, II. Analysis and design of timber structures using solid and laminated materials. Three hours rec. per week. Pr.: C.E. 331 or C.E. 533. Pr. or conc.: Arch. E. 522 or C.E. 537. 510-523-0-0904

**510 524. Theory of Structures II.** (4) I, II. Analysis and design of metal structures; emphasis on buildings. Six hours per week. Pr.: Arch. E. 522 or C.E. 537 and Arch. E. 523. 510-524-1-0904

**510 528. 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 per week. Pr.: Arch. E. 522 or C.E. 537. 510-528-1-0904

**510 534. Thermal Systems.** (3) I, II. 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 design. Three hours per week. Pr.: Phys. 113 or 213. 510-534-0-0904

**510 535. Lighting Systems.** (3) I, II. Vision, human psychophysical and psychological response, color, natural and artificial lighting design and light sources, lighting techniques and spatial relationships, as integral parts of architectural design. Three hours per week. Pr.: Phys. 113 or 213. 510-535-0-0904

**510 536. 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 per week. Pr.: Gen. Phys. 113, or Phys. 213. 510-536-0-0904

**510 537. Acoustic Systems.** (2) I, II. Hearing and the ear, sound generation, acoustical correction, noise reduction, sound transmission all as integral parts of architectural design. Two hours a week. Pr.: Phys. 113, or Phys. 213. 510-537-0-0904

**510 538. 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.: Junior Standing. 510-538-3-0904

### Undergraduate And Graduate Credit

**510 634. Building Thermal Systems Design.** (3) I, II. Design and specifications of selected thermal and mechanical systems for structures. The course is designed to utilize all the modern techniques of thermal/mechanical system design for buildings. Two hours rec. and three hours lab. a week. Pr.: Ar.E. 534. 510-634-1-0904

**510 635. Electrical System Design.** (3) I, II. Complete design and specifications of electrical systems for a selected structure. The course is designed to utilize 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.: Ar.E. 535. 510-635-1-0904

**510 638. 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.: Ar.E. 634, Ar.E. 635. 510-638-1-0904

**510 780. Theory of Structures IV.** (3) II. Cont. of Theory I, II, and III, with special emphasis being placed on the complete problem of the structure as a whole. Three hours a week. Pr.: C.E. 537 or Arch. E. 522, and 523, 524, and 528. 510-780-0-0904



**Graduate Credit**

**510 885. 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.: Arch. E. 780. 510-885-1;0904

**Courses in Construction Science****Undergraduate Credit**

**515 016. 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. per month. 515-016-0-0904

**515 210. Introduction to Construction Programming.** (3) I, II. Application of digital computer techniques to the solution of elementary problems in the field of Construction Science and Architecture. Pr.: Math. 150. Four hours per week. 515-210-0-0904

**515 250. Site Construction.** (3) I, II. Study of site construction problems and procedures, site survey and investigations, review of site plans, construction layouts, earth-work calculations; computer applications. Pr.: Arch. Pre-Pro. 211, Con. Sci. 210, C.E. 212. Four hours per week. 515-250-1-0904

**515 320. Construction Materials.** (2) I, II. Study and analysis of construction materials, their properties, selection and use. Two hours rec. a week. Pr.: P.D.P. 211 and conc.: Cn.S. 321. 515-320-0-0904

**515 325. 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.: Cn.S. 321, Cn.S. 250. 515-325-1-0904

**515 410 and 515 411. Structures I "A" and II "A".** Theory and applied structural analysis, design and planning; structural building systems of wood, steel and concrete. Six hours lec. and rec. per week.

**515 410. S.I "A".** I. Pr.: Arch. Pre-Pro. 291. 515-410-1-0904

**515 411. S.II "A".** (3) II. Pr.: Con. Sci. 410. 515-411-1-0904

**Undergraduate Credit And Graduate Credit In Minor Field**

**515 540. Construction Problems I.** (3) I, II. Practical problems encountered in the erection of buildings and use of construction equipment. Pr.: Con. Sci. 250 and 325. 515-540-0-0904

**515 541. Construction Estimating.** (3) I, II. Principles, theories and methods of building estimating. Nine hours lab. a week. Pr.: Con. Sci. 325 and 540. 515-541-1-0904

**515 542. Construction Management I.** (3) I, II. General business and management procedures of construction contracting; human relations and communications. Pr. or conc.: Con. Sci. 541. 515-542-0-0904

**515 543. Construction Management II.** (3) I, II. Construction safety; project planning and scheduling techniques. Computer applications. Pr.: Con. Sci. 210, 541, and 542. 515-543-0-0904

**515 544. 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. 515-544-3-0904

**CHEMICAL ENGINEERING**

*L. T. Fan,\* Head of Department*

Professors Akins,\* Bates,\* Erickson,\* Fan,\* Honstead,\* and Kyle;\* Associate Professors Matthews,\* Roth,\* Walwender,\* and Woodard; Assistant Professors Hall,\* and Lai.\*

Chemical engineers contribute to society through the useful application of knowledge and understanding of chemistry, physics, and mathematics. Devise and develop new products, design new processes, improve and manage existing manufacturing processes, sell chemical products and processing equipment, and provide liaison between industry and the consumer.

Employment opportunities exist in the chemical, petroleum, pharmaceutical, plastics, paper, and food processing industries, as well as in government service. During careers chemical engineer can expect to participate in many decisions crucial to the preservation and improvement of society, especially in the areas of energy and food production, resource management, and the specification and design of pollution control processes.

The chemical engineering curriculum is designed to give students the necessary breadth and depth of knowledge and scientific tools to perform these functions. It is also intended that the program be flexible enough to accommodate a broad range of educational interests. Sufficient electives have been provided so a student can emphasize areas such as chemistry, mathematics, material science, management, computer science, and bio-engineering. The curriculum also is well suited as a pre-law or pre-medicine program.

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 K-State, requiring a minimum of 150 credit hours, or a portion of the requirements may be completed at other colleges. In particular, a formal cooperative program exists between K-State and KSC of Pittsburg in which the student spends the first three years at KSC 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.

**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, optimization



techniques, and process development is regularly under way, 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 glass blower is available on the campus, and the College of Engineering and the University computing centers are used extensively by graduate students.

### Integrated Master's Degree Program

A five-year integrated program leading to a B.S. in chemical engineering at the end of four years and a Master of Science in chemical engineering at the end of five years is available for promising undergraduate students. 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 adviser 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.

## Courses in Chemical Engineering

### Undergraduate Credit

**520 015. Engineering Assembly.** 520-015-0-0906

**520 314. Introduction to Process Analysis.** (3) I, II, S. An introduction to the basic concepts of Chemical Engineering. Three hours rec. a week. Pr.: Chem. 230; Pr. or conc.: Math. 222 and Phys. 214. 520-314-0-0906

**520 316. Chemical Engineering Computational Techniques.** (1) I, II, S. Application of digital and analog computers, graphical methods, and statistics to chemical engineering problems. Three hours lab. a week. Pr. or conc.: Ch.E. 314 and Math. 240. 520-316-1-0906

**520 350. 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 non-equilibrium 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.: Chem. 230. Pr. or conc.: Phys. 213. 520-350-0-0913

**520 351. Engineering Materials Laboratory.** (1) I, II. Laboratory experiments supplementing Ch.E. 350. Pr. or conc.: Ch. E. 350. 520-351-1-0913

### Undergraduate And Graduate Credit In Minor Field

**520 520. 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.: Ch.E. 314 and Chem. 585. 520-520-0-0906

**520 521. 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.: Ch.E. 520. 520-521-0-0906

**520 522. Chemical Engineering Laboratory I.** (2) I, II. Principles and techniques of physical measurements such as temperature, pressure and concentration; basic principles of momentum transfer, heat transfer, and mass transfer; experiments in classical unit operations, e.g., distillation, evaporation, drying, fluidization, and in chemical kinetics, thermodynamics and process dynamics. Five hours lab. a week. Pr.: Ch.E. 520. Pr. or conc.: Ch.E. 530. 520-522-1-0906

**520 530. 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.: Ch.E. 314. 520-530-0-0906

**520 531. Transport Phenomena II.** (3) II. Cont. of Transport Phenomena I with special emphasis on mass transfer. Three hours rec. a week. Pr.: Ch.E. 530. 520-531-0-0906

**520 532. Chemical Engineering Laboratory II.** (2) I, II. Cont. of Chemical Engineering Laboratory I. Five hours lab. a week. Pr.: Ch.E. 522. 520-532-1-0906

**520 542. Chemical Engineering Laboratory III.** (2) II. Cont. of Chemical Engineering Laboratory II. Five hours lab. a week. Pr.: Ch.E. 532. 520-542-1-0906

**520 550. Chemical Reaction Engineering.** 1 (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.: Ch.E. 521 and Ch.E. 531. 520-550-0-0906

**520 560. 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.: Ch.E. 521 and Ch.E. 531. 520-560-0-0906

**520 561. Chemical Process Dynamics & Control.** (3) II. A study of the unsteady state behavior of chemical processes, modeling and simulation of chemical processes, classical control theory and design. Two hours rec. and three hours lab. a week. Pr.: Ch.E. 550. 520-561-1-0906

**520 570. Ch.E. Systems Design I.** (3) I. Basic concepts of optimization and process economics with application to the design of chemical processes. Two hours rec. and three hours lab. a week. Pr. or conc.: Ch.E. 550 and Ch.E. 560. 520-570-1-0906

**520 571. Ch.E. Systems Design II.** (3) II. The synthesis and design of chemical processing systems. Emphasis will be placed on the solution of comprehensive systems design problems. One hour rec. and six hours lab. a week. Pr.: Ch.E. 570. 520-571-1-0906

**520 580. Problems in Chemical Engineering.** (Var.) I, II, S. An introduction to chemical engineering research. Pr.: Approval of department head. 520-580-4-0906

### Undergraduate And Graduate Credit

**520 655. 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.: I.E. 241 and Ch.E. 350. 520-655-1-0913

**520 660. Material Imperfections.** (3) II. The nature of a crystal and the structures of materials; X-ray methods involved in the study of materials; preferred orientation and fiber textures; defects in crystals; phase transformation in the solid state; the effects of physical treatments on the crystal lattice of metals; defects in crystals. Two hours rec. and three hours lab. a week. Pr. Phys. 241, Ch.E. 350. 520-660-1-0913



**520 661. Industrial Metallurgy.** (3) II. The physical behavior of metals while undergoing various industrial fabrication processes; responses involving plastic flow, allotropic transformation, recrystallization, grain growth, diffusion, mechanical and crystallographic fibering, solid-state solution and precipitation. Two hours rec. and three hours lab. a week. Pr.: I.E. 241, Ch.E. 351. 520-661-1-0913

**520 663. Internal Structures of Metals.** (2) I. Studies of internal structural phenomena of ferrous and non-ferrous alloys using metallographic and microphysical analyses. One hour rec. and three hours lab. a week. Pr.: Ch.E. 351. 520-663-1-0913

**520 664. 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; consideration of corrosion problems and methods of combatting corrosion. Two hours rec. and three hours lab. a week. Pr.: Chem. 230, Phys. 213. 520-664-1-0913

**520 671. Structure of Engineering Materials.** (2) I. The physical theories of the structure of solids; binding forces in molecular and crystalline materials; crystallography; thermodynamic stability of matter; equilibrium diagrams and The Phase Rule; rate theory and kinetics of solid-state transformations. Two hours rec. a week. Pr.: Ch. E. 351. 520-671-0-0913

**520 672. Mechanical Behavior of Engineering Materials.** (2) II. The theoretical consideration of the mechanical behavior of solids; stress and strain; elastic and plastic deformation; dislocations; strength of solid materials; recovery, creep and flow; fracture mechanisms. Two hours rec. a week. Pr.: Ch. E. 671. 520-672-0-0913

**520 715. 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.: Ch.E. 550. 520-715-0-0906

**520 725. 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.: Ch.E. 530. 520-725-0-0906

**520 735. 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.: Ch.E. 530. 520-735-0-0906

**520 745. 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 process. Pr.: Ch.E. 550. 520-745-0-0906

**520 762. Advanced Metallurgy.** (Var.) II. Studies in specialized phases and current concepts of metallurgy. Pr.: Ch.E. 351. 520-762-3-0913

**520 766. Powder Metallurgy.** (3) II. Production of powders by mechanical and chemical methods; theoretical concepts associated with consolidation, heat treating and internal structural changes of parts produced from powder metals and cermets. Two hours rec. and three hours lab. a week. Pr.: Ch.E. 663. 520-766-1-0913

**520 795. Separation of Nuclear Fuels.** (4) II. A graduate level course investigating the chemical properties, the methods of separation, purification and reprocessing of uranium, thorium and plutonium. Three hours rec. and three hours lab. a week. Pr.: N.E. 613 or Ch.E. 560 (Cross-listed with Nuclear Engineering 580 795). 520-795-1-0906

## Graduate Credit

**520 805. 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.: Ch.E. 715. 520-805-0-0906

**520 810. 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. 520-810-4-0906

**520 815. 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. 520-815-0-0906

**520 822. 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.: Ch.E. 550. 520-822-0-0906

**520 826. Advanced Unit Operations I.** (3) I, II, S. Advanced study of mass transfer operations. Three hours rec. a week. Pr.: Ch.E. 560. 520-826-0-0906

**520 832. Advanced Unit Operations I.** (3) I, II, S. Advanced study of the operations involving mechanical separation of materials. Three hours rec. a week. Pr.: Ch.E. 560. 520-832-0-0906

**520 850. 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. 520-850-0-0906

**520 855. Chemical Engineering Analysis II.** (3) I, II, S. Cont. of Ch.E. 635. Mathematical and statistical methods applied to chemical engineering problems. Three hours rec. a week. Pr.: Ch.E. 735. 520-855-0-0906

**520 862. 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.: Ch.E. 735. 520-862-0-0906

**520 867. 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.: Ch.E. 862. 520-867-0-0906

**520 871. 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.: Ch.E. 571, Ch.E. 735. 520-871-0-0906

**520 875. Graduate Seminar in Chemical Engineering.** (1) I, II. Discussion of current advances and research in chemical engineering and related fields. 520-875-0-0906

**520 898. Master's Report.** (Var.) I, II, S. Topics selected with approval of department head and major professor. 520-898-4-0906

**520 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of department head and major professor. 520-899-4-0906



**520 901. 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.: Ch.E. 822 and one course in chemical engineering numbered 851 or higher. 520-901-0-0906

**520 910. Selected Topics in Transport Phenomena.** (3) I, II, S. Subjects of current interest such as surface phenomena, turbulent transport, droplet mechanics, multi-component systems. Three hours rec. a week. Pr.: Ch.E. 867. 520-910-0-0906

**520 915. 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.: Ch.E. 850 and one graduate course in chemical engineering numbered 851 or higher. 520-915-0-0906

**520 920. 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.: Ch.E. 826 or Ch.E. 832 and one course in chemical engineering numbered 851 or higher. 520-920-0-0906

**520 925. 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.: Ch.E. 871. 520-925-0-0906

**520 930. 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.: Ch.E. 815 and one course in chemical engineering numbered 851 or higher. 520-930-0-0906

**520 999. Dissertation Research.** (Var.) I, II, S. Topics selected with approval of department head and major professor. 520-999-4-0906

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## CIVIL ENGINEERING

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*Robert R. Snell,\* Head of Department*

Professors Best,\* Cooper,\* Rosebraugh,\* Smith,\* Snell,\* and Williams;\* Associate Professors Hu,\* Knostman,\* Lindly,\* Russell,\* Schmid,\* and Swartz;\* Assistant Professors Crary, Musterman,\* and Zovne.\* Emeritus: Professors Crawford, McCormick,\* and Morse.

The civil engineer designs and builds: structures, including buildings, bridges, tunnels, towers, air frames and space vehicles; transportation facilities, including highways, airports, waterways, railways and pipelines; water supply facilities, including treatment plants and distribution systems; waste disposal facilities, including treatment plants and collector systems; water resource facilities, including dams, canals and reservoirs; flood control facilities, including levees, dikes, retention basins and bank protection. The objectives of the curriculum in civil engineering are to prepare the student for participation in, and ultimately to assume responsibility for, the planning, analysis, location and design of the above-named types of civil engineering works.

## Graduate Study

Major work leading to the Master of Science and Doctor of Philosophy degree 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.

## Courses in Civil Engineering

### Undergraduate Credit

**525 015. Engineering Assembly.** (0) I, II. 525-015-0-0908

**525 212. 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. 525-212-1-0908

**525 231. 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. 210 or Math. 220. 525-231-0-0999

**525 322. 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. 525-322-0-0908

**525 331. 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.: C.E. 231. 525-331-0-0999

**525 332. Strength of Materials A Laboratory.** (1) I, II. Tests to determine the physical properties of various structural materials, including steel, aluminum, wood, and concrete. Analysis and interpretation of test data. Three hours lab. a week. Pr. or conc.: C.E. 331. 525-332-1-0999

**525 333. 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. or conc.: Math. 221. 525-333-0-0999

**525 411. Route Location and Desitn.** (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 hous lab. per week. Pr.: C.E. 212. 525-411-1-0908

### Undergraduate And Graduate Credit In Minor Field

**525 511. Photogrammetry.** (3) I, II. Principles of terrestrial and aerial photogrammetry; theory and use of stereoplotters; construction of mosaics, flight maps, and planimetric maps. Two hours rec. and three hours lab. a week. Pr.: C.E. 212. Pr. or conc.: C.E. 411. 525-511-1-0908



**525 522. 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.: C.E. 533. 525-522-1-0908

**525 528. Foundation Engineering.** (3) I, II. Prediction of soil variation; soil investigations; stress distribution and bearing capacity; dewatering analysis and procedures; retaining structures and lateral earth pressure; shallow foundations, pile foundations; underpinning and grouting. Two hours rec. and three hours lab. a week. Pr.: C.E. 522. Pr. or conc.: C.E. 544. 525-528-1-0908

**525 530. Statics and Dynamics.** (4) I, II, S. 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. 525-530-0-0999

**525 533. Mechanics of Materials.** (3) I, II, S. 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.: C.E. 333. Pr. or conc.: Math. 222. 525-533-0-0999

**525 534. Mechanics of Materials Laboratory.** (1) I, II, S. 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.: C.E. 533. 525-534-1-0999

**525 537. 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.: C.E. 533. 525-537-0-0908

**525 542. Structural Engineering In Steel.** (3) I, II, S. 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.: C.E. 537. 525-542-1-0908

**525 544. Structural Engineering In Concrete.** (3) I, II, S. 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. or conc.: C.E. 537. 525-544-1-0908

**525 551. 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. 214. (Joint listed with Ag.E. 551.) 525-551-0-0908

**525 552. Hydraulic Engineering.** (3) I, II. Applications of the principles of fluid mechanics to control and utilization 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.: M.E. 571. Pr. or conc.: C.E. 551. 525-552-1-0908

**525 553. Hydrologic Methods Laboratory.** (1) I. Application of hydrologic methods in design; precipitation data analysis; evapotranspiration; streamgaging; hydrograph generation and flood routing; rainfall and flood frequency analysis; design of multipurpose reservoirs; ground water flow analysis and water well design. Three hours lab. a week. Pr. or conc.: C.E. 551. 525-553-1-0908

**525 563. Sanitary Engineering Fundamentals.** (3) I, II. Basic concepts from chemistry and microbiology and their applications to the determination and control of water quality and to the techniques employed in biological waste treatment. Two hours rec. and three hours lab. a week. Pr.: Chem. 230. 525-563-1-0908

**525 565. Sanitary Engineering Design.** (3) I, 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.: C.E. 552 and C.E. 563. 525-565-1-0908

**525 571. Transportation Engineering.** (3) I, II. 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.: C.E. 411 and junior standing. 525-571-1-0908

**525 585. Civil Engineering Project.** (1-3) I, II. A laboratory design or research problem selected by the student. Requires a review of the literature; the preparation of a proposal which describes the project; the completion of the design or research; and the preparation of a report. Maximum cr. hrs.: 3. May be substituted for a required senior design course on recommendation of instructor and approval of the department head. 525-585-2-0908

### Undergraduate And Graduate Credit

**525 680. Economics of Design and Construction.** (3) I. 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 non-engineering majors. 525-680-0-0908

**525 718. Engineering Photo Interpretation.** (3) I. 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. 525-718-1-0908

**525 722. 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.: C.E. 522. 525-722-0-0908

**525 724. 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.: C.E. 522. 525-724-1-0908

**525 728. 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.: C.E. 544 and C.E. 528. 525-728-1-0908



**525 730. 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.: C.E. 533, Math. 240. 525-730-0-0999

**525 731. Experimental Stress Analysis.** (3) I. Experimental methods of investigating stress distributions. Photoelastic models, photoelastic coatings, brittle coatings, and resistance strain gages applied to static and dynamic problems. Two hours rec. and three hours lab. a week. Pr. or conc.: C.E. 533. 525-731-1-0999

**525 732. 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.: C.E. 537. 525-732-0-0908

**525 733. 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.: C.E. 537. 525-733-0-0908

**525 734. Experimental Techniques in Mechanics.** (1-3) I, II. Techniques and instrumentation for the experimental analysis of selected problems in vibrations, dynamics, fluid mechanics or engineering materials. Pr.: Senior standing in engineering and consent of instructor. 525-734-2-0999

**525 735. Numerical Solutions in Structural Mechanics.** (3) I in alt. 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.: C.E. 537. 525-735-0-0908

**525 736. Energy Methods In Engineering Mechanics.** (3) II. 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.: C.E. 533. 525-736-0-0999

**525 737. Elastic Stability.** (3) II. 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.: C.E. 533, Math. 240. 525-737-0-0999

**525 741. Behavior of Structural Materials.** (3) I. Studies of mechanical properties of structural engineering materials and their application to structural design. Effects of static and cyclic loadings and time-temperature variations. Aspects of statistical analysis of brittle fractures. Three hours rec. a week. Pr.: C.E. 534. 525-741-0-0908

**525 742. 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.: C.E. 542. 525-742-0-0908

**525 743. Advanced Reinforced Concrete Theory.** (3) II. Advanced theories and methods of design and analysis of reinforced concrete structures. Three hours rec. a week. Pr.: C.E. 544. 525-743-0-0908

**525 744. 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.: C.E. 544. 525-744-0-0908

**525 751. 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.: C.E. 552. 525-751-0-0908

**525 752. Advanced Hydrology.** (3) II. Review 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.: C.E. 551. 525-752-0-0908

**525 761. Sanitary Engineering Chemistry.** (3) I. Application of basic concepts of chemical equilibria, physical chemistry, organic chemistry and biochemistry to the field of sanitary engineering. Senior standing or consent of instructor. Three hours rec. a week. Pr.: C.E. 563. 525-761-0-0908

**525 762. Water Treatment Systems.** (3) II. An in-depth study of the basic physical, chemical, and biological factors and their application in the design of water supply and water quality control systems. Three hours rec. a week. Pr.: C.E. 565. 525-762-0-0908

**525 766. Wastewater Treatment Systems I.** (3) I. A study of wastewater treatment systems applied to domestic and industrial wastewaters. Emphasis is placed on the basic biological concepts applicable to the design of conventional wastewater treatment systems. Three hours rec. a week. Pr.: C.E. 565. 525-766-0-0908

**525 767. Wastewater Treatment Systems II.** (3) II. A study of advanced wastewater treatment systems including nutrient, suspended solids, and trace organic removals, along with treatment and disposal of the resultant solids. Emphasis is placed on synthesis of the various processes into the total treatment scheme. Pr.: C.E. 766 or consent of instructor. 525-767-0-0908

**525 770. Geometric Design of Highways.** (3) II. Criteria controlling geometric design of highways, vehicle requirements, speed volume, capacity of safe grades, alignment, and cross-section; intersections and interchanges. Two hours rec. and three hours lab. a week. Pr.: C.E. 571. 525-770-1-0908

**525 771. Urban Transportation Analysis I.** (3) I. 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.: C.E. 571 or consent of instructor. 525-771-1-0908

**525 773. Airport Design.** (3) I. On demand. Problems encountered in planning, design, construction, and maintenance of large airports. Two hours rec. and three hours lab. a week. Pr.: C.E. 571. 525-773-1-0908

**525 774. Pavement Design.** (3) II. On demand. Methods of evaluating the load-carrying capacity of soil subgrade, sub-base, 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.: C.E. 522. 525-774-1-0908

**525 775. Traffic Engineering I.** (3) I. 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.: C.E. 571 or consent of instructor. 525-775-1-0908

**525 786. 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. 525-786-1-0908

**525 790. Problems in Civil Engineering.** (Var.) I, II, S. Pr.: Approval of instructor. 525-790-3-0908



**Graduate Credit**

**525 810. 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. 525-810-3-0908

**525 822. 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.: C.E. 722. 525-822-1-0908

**525 823. Engineering Properties of Cohesive Soils.** (3) I. Mineralogy and structures of clay minerals; fabric and bonding of the clay particles; compressibility and strength characteristics of clays; moisture effects, retention and movement through clay. Two hours rec. and three hours lab. a week. Pr. or conc.: C.E. 722. 525-823-1-0908

**525 826. Engineering Properties of Cohesionless and Mixed Soils.** (3) II. Mineralogy and physical characteristics; fabric and bonding in mixed soils; compressibility and strength characteristics; moisture effects, retention, and movement. Two hours rec. and three hours lab. a week. Pr. or conc.: C.E. 724. 525-826-1-0908

**525 831. Advanced Structural Theory.** (3) I. On demand. Current and developing topics in advanced structural theory. Three hours rec. a week. Pr.: Approval of instructor. 525-831-0-0908

**525 835. Structural Dynamics.** (3) I: Analysis of structures subjected to dynamic loading. Three hours rec. a week. Pr.: C.E. 735. 525-835-0-0908

**525 838. Theory of Plates and Shells.** (3) I in alt. 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.: C.E. 730. 525-838-0-0999

**525 845. Analysis and Design of Folded Plate Structures.** (3) II. Theoretical foundation of folded plate analysis; bending theory for prismatic folded plate structures; matrix formulation; folded plates with non-symmetric loading; continuous folded plate structures; prismatic and triangular plate structures. Three hours rec. a week. Pr. C.E. 732, C.E. 730. 525-845-0-0908

**525 848. Advanced Structural Design.** (3) II. On demand. The design of complex steel and/or reinforced concrete structures; individual projects. Three hours rec. a week. Pr.: C.E. 732, minimum of nine hours graduate credit in structures and approval of instructor. 525-848-0-0908

**525 849. Design of Shell Structures.** (3) II in alt. 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.: C.E. 838. 525-849-0-0908

**525 851. Hydraulics of Open Channels II.** (3) II. Spatially varied flow; flow in channels of non-prismatic cross-section and nonlinear alignment (transitions); unsteady free-surface flow; flood routing; numerical simulation of unsteady open-channel flow. Three hours rec. a week. Pr.: C.E. 751. 525-851-0-0908

**525 854. 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.: C.E. 552. 525-854-0-0908

**525 863. Advanced Topics in Sanitary Engineering.** (1-3) On demand. For graduate students in Sanitary Engineering. The course provides a forum for the discussion of advanced topics in Sanitary Engineering. Research being conducted at this and other institutions is analyzed critically. 525-863-0-0908

**525 871. Urban Transportation Analysis II.** (3) II. Trip forecasting, trip generation, trip distribution and trip assignment; accuracy checks; planning parking facilities; study of models used in transportation planning; transportation systems and plans evaluation. Two hours rec. and three hours lab. a week. Pr.: C.E. 771. 525-871-1-0908

**525 875. 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.: C.E. 775. Pr. or conc.: Stat. 510. 525-875-1-0908

**525 898. Master's Report.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 525-898-4-0908

**525 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 525-899-4-0908

**525 999. Dissertation Research.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 525-999-4-0908

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## ELECTRICAL ENGINEERING

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*Everett E. Haft, \*Acting Head of Department*

Professors Ahmed,\* Casey,\* Haft,\* Koepsel,\* Lucas,\* Rathbone,\* and Ward, Jr.;;\* Associate Professors Gallagher,\* Harriis,\* Hummels,\* Johnson,\* and Lenhert;\* Assistant Professor Cottom;\* Instructors Hearn, Wakabayashi, and Walker. Emeritus: Professors Hunt, Jorgenson, Kerchner, and Sltz.

The program of study in electrical engineering prepares a student for a career in research, development, design, operation and plant engineering, manufacturing, technical sales and application engineering in the profession of electrical engineering. Fields of employment are in such areas as microelectronics and integrated circuits, communication systems, automatic control, analog and digital computers, energy systems, lasers, microwave devices and systems, bioengineering and solid state devices. An individual upon completing the program of study will find employment opportunities with industrial organizations, the government, utilities, consulting firms and educational institutions. Opportunities also exist for baccalaureate degree holders to enter such fields as medicine, law and business administration.

The first two years of the curriculum are mathematics and physical sciences oriented while the third year emphasizes analysis and the fundamental concepts of electrical engineering. The fourth and final year broadens the student's understanding of engineering and is an introduction to various aspects of electrical engineering design. Humanities and social science electives are available for the student as well as technical electives. The latter are usually chosen from such fields as communication systems, solid state engineering, integrated circuits, control systems, radar, power systems, energy conversion, computer systems and microwaves.



## Graduate Study

Major work is offered in programs of study leading to the Master of Science and Doctor of Philosophy degrees with areas of specialization in circuit theory, electromagnetic theory, bioengineering, information and communication systems, solid state engineering and integrated circuit technology, control systems and computer engineering. Well-equipped laboratory facilities are available for conducting original research in all of these areas.

Prerequisite to graduate study in the department is the completion of a program of study substantially equivalent to that required of undergraduate students in electrical engineering at this institution.

Special facilities available for graduate research include an electromagnetics research laboratory for research in scattering in the frequency range of 8.2 GHz to 18.0 GHz, and a solid state and thin film technology laboratory. The latter is equipped with a clean room, vacuum equipment, photographic reduction equipment, clean air benches, diffusion furnaces, and other specialized equipment for use in microelectronics. An analog and small digital computing facility is also available in the department. The University Computing Center, housing a digital computer, is available generally for graduate instruction and research.

## Courses in Electrical Engineering

### Undergraduate Credit

**530 241. Introduction to Computer Engineering.** (3) I, II. Simple coding schemes, Boolean algebra fundamentals, elements of digital building blocks such as gates, flip-flops, shift-registers, memories, etc., basic engineering aspects of computer architecture and elements of machine language. Three hours rec. a week. Pr.: Comp. Sci. 200. 530-241-0-0909

### Undergraduate And Graduate Credit In Minor Field

**530 501. 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. or conc.: E.E. 511, E.E. 525, E.E. 557. 530-501-1-0909

**530 502. Electrical Engineering Laboratory II.** (2) I, II. Cont. of Electrical Engineering Laboratory I. Three hours lab. a week. Pr.: E.E. 501; Pr. or conc.: E.E. 526, E.E. 581. 530-502-1-0909

**530 510. 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. or conc.: Math. 240, Phys. 214. 530-510-0-0909

**530 511. Circuit Theory II.** (4) I, II, S. Analysis of electric circuits using transform techniques. Four hours rec. a week. Pr.: Math. 240, E.E. 510. 530-511-1-0909

**530 519. 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. Pr.: Phys. 214. 530-519-0-0909

**530 525. Electronics I.** (3) I, II, S. Fundamentals of electronic components, devices, and circuits. Three hours rec. a week. Pr.: E.E. 510 or E.E. 519 or E.T. 530. 530-525-0-0909

**530 526. Electronics II.** (3) I, II, S. Continuation of Electronics I. Three hours rec. a week. Pr.: E.E. 511, E.E. 525. 530-526-0-0909

**530 530. Control Systems Design.** (3) I, II. Modeling, analysis, and design of control systems. Three hours rec. a week. Pr.: Senior standing. 530-530-0-0909

**530 557. 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, Math 240. Pr. or conc.: E.E. 510. 530-557-0-0909

**530 581. 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.: E.E. 511 and E.E. 557. 530-581-0-0909

**530 589. 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. Pr.: E.E. 519. 530-589-1-0909

**530 590. Electrical Engineering Seminar.** (1) I, II. Preparation and oral presentation of a written technical report. One hour rec. a week. Pr.: Senior standing in electrical engineering. 530-590-0-0909

### Undergraduate And Graduate Credit

**530 603. 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.: E.E. 502. 530-603-1-0909

**530 625. Integrated Circuits Engineering.** (3) I, 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. 530-625-1-0909

**530 627. Communication Electronics.** (3) I, II. An introduction to analog communication systems. Includes amplitude modulation (AM) and frequency modulation (FM) by analog signals and the determination signal-to-noise ratio in AM and FM systems. Design of simple oscillators, modulators, mixers, and detectors. Three hours rec. a week. Pr.: E.E. 526. 530-627-0-0909

**530 628. 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.: E.E. 526. 530-628-0-0909

**530 641. Design of Digital Systems I.** (3) II. Design considerations pertaining to computer organization, data representation, data flow circuits, storage organization, and input-output processes. Three hours rec. a week. Pr.: E.E. 241. 530-641-0-0909

**530 642. Design of Digital Systems II.** (3) I. 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.: E.E. 645 and E.E. 641. 530-642-1-0909

**530 643. Computer Logic Laboratory.** (1) II. Laboratory experience in the design, construction and debugging of simple digital systems and subsystems. Three hours lab. a week. Pr. or conc.: E.E. 641. 530-643-1-0909

**530 644. Digital Systems Design Laboratory.** (1) I. Practical aspects of digital system design including threshold voltage levels, propagation delay, clock requirements and interfacing problems associated with logic systems and analogic devices. Three hours lab. a week. Pr. or conc.: E.E. 642. 530-644-1-0909



**530 645. Digital Electronics.** (3) I, II. The characteristics and performance of the major contemporary digital logic families. Three hours rec. a week. Pr.: E.E. 526. 530-645-0-0909

**530 646. Fault Diagnosis in Digital Systems.** (3) I, II. 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.: E.E. 641. 530-646-0-0909

**530 647. Digital Network Theory.** (3) I. Difference equation characterization of digital networks, transient and steady-state analysis of digital networks using the Z-transform, transfer function representation of digital filters, implementation of digital filters. Three hours rec. a week. Pr.: E.E. 511. 530-647-0-0909

**530 648. Microcomputer Programming and Applications.** (2) I, II. Application of microprocessor-based microcomputers in data processing instrumentation, control and communications. One hour lec. and three hours lab. a week. Pr.: E.E. 241 plus concurrent enrollment in C.S. 658. 530-648-1-0909

**530 649. Analog Computation.** (3) II. Analog computer solution and simulation of engineering problems. Two hours rec. and three hours lab. a week. Pr.: Math. 240 or equiv.; Phys. 114 or 214, E.E. 526. 530-649-1-0909

**530 659. Wave Guides, Antennas and Propagation.** (3) I, II. Applications of Maxwell's equations to boundary value problems, guided transmission, cavities, radiation and propagation. Three hours rec. a week. Pr.: E.E. 557. 530-659-0-0909

**530 661. Digital Communication Systems.** (3) I, 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.: E.E. 526. 530-661-0-0909

**530 662. Design of Communication Circuits.** (3) 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.: E.E. 526, E.E. 502. 530-662-0-0909

**530 682. Energy Conversion II.** (3) I, II. Continuation of 530 581. Three hours rec. a week. Pr.: E.E. 581. 530-682-0-0909

**530 685. 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.: E.E. 581. 530-685-0-0909

**530 686. 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.: E.E. 530 and E.E. 685. 530-686-0-0909

**530 688. Power System Stability.** (3) II. The analysis of power systems under transient and steady-state conditions. Three hours rec. a week. Pr.: E.E. 682. 530-688-0-0909

**530 690. Problems in Electrical Engineering.** (Var.) I, II, S. 530-690-3-0909

**530 692. Operational Circuit Analysis.** (3) I. Properties and classification of linear systems, Fourier Series, Fourier transform and related power and phase spectra, energy density spectrum, Laplace transform of periodic and aperiodic signals, transform analysis of linear systems, ideal filters, two-port networks, system analysis by convolution. Three hours rec. a week. Pr.: E.E. 511. 530-692-0-0909

**530 695. Solid-State Engineering.** (3) I, II. Elastic, thermal, electric and magnetic properties of crystals and metals, conduction in metals and semiconductors; solid state devices. Three hours rec. a week. Pr.: E.E. 557; Phys. 551 or N.E. 410 or N.E. 325. 530-695-0-0909

**530 730. Control Systems Analysis and Design.** (3) II. Utilization 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.: E.E. 530 or M.E. 712. (Cross-listed with 560 730.) 530-730-0-0909

**530 747. Digital Signal Processing Laboratory.** (2) I, 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.: C.S. 200 and E.E. 647. 530-747-1-0909

**530 758. Electromagnetic Theory II.** (3) I, II. Continuation of 530 557. Three hours rec. a week. Pr.: E.E. 557. 530-758-0-0909

**530 759. Radar Systems.** (3) On sufficient demand. A study of radar systems including radar cross section, noise in target detection, doppler radar, scanning systems, propagation effects and error analysis; radar transmitters, receivers, antennas, and displays. Three hours rec. a week. Pr.: Consent of instructor. 530-759-0-0909

**530 761. 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.: Senior standing in Electrical Engineering. 530-761-0-0909

**530 771. Control Theory Applied to Bioengineering.** (3) I. 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.: E.E. 530 or M.E. 712. Also a basic physiology course. 530-771-0-0909

**530 772. Theory and Techniques of Bioinstrumentation.** (3) II. 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.: E.E. 771 or consent of instructor. 530-772-0-0909

**530 791. Matrix Methods Applied to Electrical Engineering.** (3) I. Applications of matrices and linear vector spaces to electrical systems. Three hours rec. a week. Pr.: E.E. 692. 530-791-0-0909

### Graduate Credit

**530 816. Network Synthesis I.** (3) I. Basic properties of network functions. Passive synthesis of driving point impedances, transfer functions and transfer impedances. Three hours rec. a week. Pr.: E.E. 692. 530-816-0-0909

**530 817. Network Synthesis II.** (3) II. Active synthesis of driving point impedances, transfer functions and transfer impedances using operational amplifiers, gyrators and negative immittance converters. Three hours rec. a week. Pr.: E.E. 816. 530-817-0-0909

**530 830. Advanced Feedback Control Systems.** (3) II. A second course in the analysis and design of feedback control systems using both classical and modern control theory. Both linear and nonlinear systems are considered. Three hours rec. a week. Pr.: E.E. 730. 530-830-0-0909



**530 836. Sampled-data Control Systems.** (3) On sufficient demand. Analysis and design of sampled-data control systems using Z-transforms; study of digital computer controlled systems. Three hours rec. a week. Pr.: E.E. 730. 530-836-0-0909

**530 838. Optimal Control Systems.** (3) On sufficient demand. A study of the methods of the optimization of feedback control systems, with particular emphasis placed on Pontryagin's maximum principles and Belman's functional analysis. Three hours rec. a week. Pr.: E.E. 730. 530-838-0-0909

**530 855. Advanced Electromagnetic Theory I.** (3) I. Mathematical development of electromagnetic wave theory. Three hours rec. a week. Pr.: E.E. 659. 530-855-0-0909

**530 856. Advanced Electromagnetic Theory II.** (3) II. Plane waves in unlimited isotropic media, cylindrical waves, spherical waves, radiation, and boundary value problems. Three hours rec. a week. Pr.: E.E. 855. 530-856-0-0909

**530 862. Modulation Theory.** (3) II in alt. years. A study of the most widely used modulation systems, with particular emphasis on the evaluation of their performances in modern communication systems. Three hours rec. a week. Pr.: E.E. 761. 530-862-0-0909

**530 865. 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.: E.E. 661. 530-865-0-0909

**530 866. Signal Processing and Classification.** (3) I, II. Theoretical considerations of orthogonal transforms in digital signal processing with emphasis on data compression, generalized Wiener filtering, and feature selection in pattern recognition. Three hours rec. a week. Pr.: E.E. 761. 530-866-0-0909

**530 881. 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.: E.E. 686. 530-881-0-0909

**530 890. Advanced Electrical Theory.** (Var.) I, II. For advanced study in specialized areas by M.S. students. Pr.: M.S. Student. 530-890-3-0909

**530 891. Graduate Seminar in Electrical Engineering.** (1) I, II. Discussion of current advances and research in Electrical Engineering. 530-891-3-0909

**530 897. Research In Electrical Engineering.** (Var.) I, II, S. Special research problems in electrical engineering. Pr.: Consent of instructor. 530-897-4-0909

**530 898. Master's Report.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 530-898-4-0909

**530 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 530-899-4-0909

**530 957. Advanced Electromagnetic Theory Seminar.** (3) On sufficient demand. Advanced topics in electromagnetic theory. Three hours rec. a week. Pr.: E.E. 856. 530-957-0-0909

**530 958. Antenna Theory.** (3) On sufficient demand. Principles of radiation, directivity, and other characteristics of antenna systems; linear, short-wave beam and fire, omnidirectional, wide-band, slot, horn, and parabolic antennas; reflectors and lenses. Three hours rec. a week. Pr.: E.E. 855. 530-958-0-0909

**530 961. Advanced Topics In Communications, Information and Controls.** (3) On sufficient demand. Study of advanced topics and recent developments in the areas of communication and information theory, information processing and control systems. May be repeated. Three hours rec. a week. Pr.: E.E. 761. 530-961-0-0909

**530 971. 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.: E.E. 771 or E.E. 772. 530-971-0-0909

**530 999. Dissertation Research.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 530-999-4-0909

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## ENGINEERING TECHNOLOGY

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*Kenneth K. Gowdy,\* Head of Department*

Professor Lindholm;\* Associate Professor Gowdy;\* Instructor Walker.

### Undergraduate Credit

**540 430. Electronic Fabrication Laboratory** (2) I, II. Laboratory experience in the layout, fabrication and assembly of electronic circuits. Project oriented with an emphasis on printed circuit boards. Six hours lab. a week. Pr. or conc.: Phys. 114. 540-430-0-0925

**540 499. Problems in Engineering Technology.** Credit arranged. I, II, S. Pr.: Approval of instructor. 540-499-3-0925

### Undergraduate And Graduate Credit In Minor Field

**540 510. Properties of Engineering Materials.** (3) I. Engineering requirements of materials: mechanical, thermal, electrical, and biological properties and behavior of materials. Two hours rec. and three hours lab. a week. Pr.: Chem. 110 or Chem. 210 and Phys. 113. 540-510-1-0925

**540 512. 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. Two hours rec. and three hours lab. a week. Pr.: Phys. 113. 540-512-1-0925

**540 514. Energy Conversion Technology.** (3) II. Introduction to energy conversion technology, energy, and power; thermodynamics, power cycles, and refrigeration. Three hours rec. a week. Pr.: Chem. 110 or Chem. 210, Phys. 113. 540-514-0-0925

**540 515. Materials Testing.** (4) I, II. Survey of ASTM testing procedures and laboratory application. Mechanical, thermal, electrical, optical, and chemical property determination. Analysis of structure through x-ray, electron microscopy, spectral analysis, thermal analysis, rheology and other methods. Introduction to experimental stress analysis. Three hours lec. and three hours lab. a week. Pr.: E.T. 510, C.E. 331. 540-515-1-0925

**540 520. Wastewater Treatment Technology.** (3) II. Application of waste treatment technology for pollution control. Emphasis is placed upon process operation and monitoring, field sampling and data interpretation. Field trips and laboratory experiments are a major portion of the course. One hour rec. and six hours lab. a week. Pr.: C.E. 563. 540-520-1-0925

**540 521. Water Treatment Technology.** (3) I. Application of water treatment technology to design, operation, and monitoring in the water treatment industry. Emphasis is placed on process understanding through field trips and laboratory experience. Two hours rec. and three hours lab. a week. Pr.: C.E. 563. 540-521-1-0925



**540 522. Air Pollution Control Technology.** (2) I, II. 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 lectures a week. Pr.: Consent of instructor. 540-522-0-0925

**540 530. Electrical Circuit Technology I.** (4) I, II. D-C and A-C steady state circuit analysis. Study of resistance, capacitance and inductance. Basic magnetic circuits. Polyphase steady state circuits. Brief study of A-C machinery with emphasis on selection and applications. Not for graduate credit for students in the College of Engineering. Three hours lec. and three hours lab. a week. Pr.: Phys. 114, Math. 210 or 220. 540-530-1-0925

**540 531. Electrical Circuit Technology II.** (3) II. Additional study in circuit analysis including resonant circuits, coupled circuits nonsinusoidal analysis and transient analysis. A brief introduction to LaPlace transform techniques. Not for graduate credit for students in the College of Engineering. Two hours lec. and three hours lab. a week. Pr.: E.T. 530. 540-531-3-0925

**540 532. Instrumentation and Measurement Technology.** (3) I, II. Principles and application of instrumentation and measurement equipment. One hour rec. and six hours lab. a week. Pr.: E.T. 530. 540-532-1-0925

**540 534. Automatic Control Technology.** (3) II. Application oriented control systems technology including basic systems dynamics, regulatory, servo, and computer control; and system specifications. Two hours rec. and three hours lab. a week. Pr.: E.T. 530. 540-534-1-0925

**540 535. Digital Logic Systems I.** (4) I. Use of combinational and sequential circuits in the fashioning of digital systems and sub-systems. Three hours lec. and one three-hour lab. a week. Pr.: E.E. 525 and E.T. 530. 540-535-1-0925

**540 536. Digital Logic Systems II.** (4) II. 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.: E.T. 535. Pr. or conc.: E.E. 526. 540-536-1-0925

**540 537. Electronic Measurements Laboratory.** (1) I, II. Practical experience in the theory and techniques associated with commonly used electronic measuring instruments. Major emphasis is placed on use of instruments in measurement or performance of various electronic circuits and devices. One three-hour lab. a week. Pr.: E.T. 530. Pr. or conc.: E.E. 525. 540-537-1-0925

**540 538. Computer and Instrumentation Technology Seminar.** (1) I, II. Preparation and oral presentation of a written technical report. One hour a week. Pr.: Senior standing in Engineering Technology. 540-538-0-0925

**540 550. Heat Treatment—Tool & Die Steels.** (3) I, II. Classification, selection, heat treating and testing of steels in tool and die applications. Two hours rec. and three hours lab. a week. Pr.: E.T. 510. 540-550-1-0925

**540 551. Materials Processing.** (4) I, II. Study of the fabrication techniques employed in the manufacture of consumer products. Discussion of forming operations including drawing, molding, casting, rolling, heat treatment and extrusion. Preparation of coatings, fibers, and composites. Discussion of machinability and surface finish characteristics. Two hours lec. and six hours lab. a week. Pr.: E.T. 510, I.E. 241. 540-551-1-0925

**540 560. 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.: C.E. 231. 540-560-1-0925

**540 561. 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.: E.T. 560 and C.E. 331. 540-561-0-0925

**540 562. Mechanical Design Lab I.** (2) I, II. 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. or conc.: E.T. 561. 540-562-1-0925

**540 563. Mechanical Design Lab II.** (2) I, II. Continuation of Mech. Des. Lab I project with completion of detail design and drawings. Possibly building and testing components designed. Six hours lab. a week. Pr.: E.T. 562. 540-563-1-0925

**540 580. Nuclear Engineering Technology.** (4) II. Concepts of nuclear energies, nuclear reactions, nuclear radiation, radioisotope application, nuclear reactors and associated plant facilities, waste disposal, radiation protection, and economics as applied to nuclear engineering. Three hours rec. and three hours lab. a week. Pr.: Math. 210 or Math. 220 and Phys. 113. 540-580-1-0925

**540 581. Nuclear Radiation Measurements.** (3) I. Principles of nuclear radiation detection. Detectors and measurement systems. Application to radiation dosimetry and spectroscopy. Instrumentation for data analysis and system control with emphasis on reactor control. Two hours rec. and three hours lab. a week. Pr.: E.T. 537 and E.T. 580. 540-581-1-0925

**540 582. Radiation Protection Technology.** (5) II. Concepts of radiation protection. Radiation dosimetry; radiation shielding and exposure control; radiation biological effects. Licensing and regulation procedures. Three hours rec. and six hours lab. a week. Pr.: E.T. 581. 540-582-1-0925

**540 640. Food Processing Operations I.** (4) I, II. A study of food processing unit operations and their applications with emphasis on heat transfer operations such as evaporation, drying, sterilization, freezing and thawing. Three hours rec. and three hours lab. a week. Pr.: E.T. 512 and E.T. 514. 540-640-1-0925

**540 641. Food Processing Operations II.** (4) I, II. Continuation of 540 640 with emphasis on mass transfer operations such as distillation, extraction, adsorption, and ultrafiltration. Three hours rec. and three hours lab. a week. Pr.: E.T. 640. 540-641-1-0925

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## GENERAL ENGINEERING

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*Donald E. Rathbone, Dean*

### Undergraduate Credit

**500 010. Engineering Lectures.** (0) I. Designed to acquaint freshman engineers with fundamental principles of their profession and to give a general survey of career opportunities in engineering. One hour of lecture a month. The dean, other members of the faculty, and visiting practicing engineers will present the lectures. 500-010-0-0901

**500 160. 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. 500-160-1-0901

**500 200. 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. 500-200-2-0901

**500 202. Introduction to Environmental Technology.** (3). An introductory course designed primarily for nonengineering students. An introduction to the technology employed in analyzing environmental and ecological processes, the technology of pollution control and materials recycle, and the technology of energy and power generation. Two hours lec. and one hour rec. a week. 500-202-0-0901



**500 250. Impact of Engineering Technology on Society.** (3) I, II. A study of social, economic and environmental problems as a function of technology. Study of 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. 500-250-0-0901

**500 299. Honors Seminar in Engineering.** (1) I, II. Selected topics of general interest. Open to sophomores in the Engineering Honors Program for two semesters. 500-299-0-0901

**500 310. Perspectives in Energy.** (2) I. Introduction to the uses and technological concepts of energy. Types of energy sources in current use, transformation of energy from one form to another, nuclear power reactor safety, energy conservation, and cost/benefit concepts. The laboratory includes experiments on radiation protection and energy conservation. One hour rec. and three hours lab. a week. Open to all non-engineering majors. 500-310-0-0901

**500 325. Cooperative Work Experience.** (1) I, II, S. Industrial assignment on Engineering Work-Study Program. May not be taken for more than four sessions for credit. Pr.: Approval of program coordinator. 500-325-2-0901

**500 380. 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. 500-380-0-0910.

**500 399. Honors Colloquium in Engineering.** (1) I, II. Selected topics of general interest. Open to juniors in the Engineering Honors Program for two semesters. 500-399-0-0901

**500 401. Seminar in Engineering.** (1) I, II, S. Selected topics of general interest. Open to undergraduate students from all colleges. 500-401-0-0901

**500 402. Research in Engineering.** (Var.) I, II, S. Individual or group research problem selected with approval of faculty adviser. 500-402-4-0901

**500 420. 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 non-engineering and first and second year engineering students. 500-420-0-0901

**500 499. Honors Research in Engineering.** (1) I, II. Individual research problem selected with approval of faculty adviser. Open to seniors in the Engineering Honors Program for two semesters. Written report is presented at end of second semester. 500-499-4-0901

**500 740. Applied Linear Analysis.** (3) I. The application of linear analysis to engineering problems, including derivations of equations, exact and approximate solutions for 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. 500-740-0-0901

**500 745. Applied Nonlinear Analysis.** (3) II. Study of mechanical or electrical systems governed by nonlinear equations, elliptic integrals, geometry of integral curves, and phase plane, Lienard's graphical construction, Poincaré's classification of singular points, stability and instability. Three hours rec. a week. Pr.: Math 240. 500-745-0-0901

**500 870. Transform Calculus Applied to Engineering Problems.** (3) II. The Laplace, sine, cosine, Hankel, Legendre, Fourier, and Jacobi transforms applied to the solution of initial and boundary value problems in the ordinary and partial differential equations arising in engineering. Three hours rec. a week. Pr.: Math. 550. 500-870-0-0901

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## INDUSTRIAL ENGINEERING

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*Frank A. Tillman,\* Head of Department*

Professors Bennett,\* Hwang,\* Konz,\* Lee,\* Smaltz,\* and Tillman;\* Associate Professors Bussey,\* D. Grosh,\* L. Grosh,\* Roth,\* and Woodard;\* Assistant Professors Byers; Emeritus: Professors Clifton, Darby, Hansen, Hostetter, and Nelson.

The curriculum in Industrial Engineering emphasizes the design, improvement, and installation of integrated systems of men, 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.

Industrial engineers find opportunities in all types of businesses and industries and in many different activities. Graduates may be engaged in staff positions in work study, work flow design, safety engineering, economic analysis, process design, process control, cost control, manufacturing management, ergonomics, production processes, operations research, and many other areas.

In addition, their unique background makes them unusually well-fitted for positions in manufacturing management. Managers need factual information arranged to define different alternatives and their consequences to help recognize and solve existing problems. Industrial engineering collects, analyzes and arranges this information in such a way as to fulfill this need, at the same time continuing to search for better ways to do the job at less financial and human cost.

The remarkable strides made by the industrial engineering profession during the past several years are reflected in the demand for industrial engineering graduates. 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 varied industrial areas including processing and control systems, and human factors engineering. Several strong 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.



Facilities and equipment for advanced study and research are extensive and majors in the department have essential access to the University Computing Center.

A University remote computing laboratory is located in Seaton Hall. This adjunct facility contains a card reader and printer in addition to typewriter units connected directly to the University's IBM 370/158 computing system.

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.

## Courses in Industrial Engineering

### Undergraduate Credit

**550 015. 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. 550-015-0-0913

**550 050. 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. 550-050-2-0913

**550 120. 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. 550-120-0-0913

**550 241. Production Processes.** (3) I, II. The study of modern industrial processes for production. Basic mechanics of metal machining and forming; flow and solidification of molten alloys; welding and heat treatment. Emphasis will be placed on actual production operations. One hour rec. and six hours lab. a week. 550-241-1-0913

**550 271. Computer Applications in Engineering.** (1) I, II. Brief introduction to Fortran IV using the WATFIV Compiler. Examples using application programs such as APT, ECAP, ICES, and MPS/360. Three hours lab. a week. 550-271-1-0913

**550 352. Tool Engineering.** (3) II. Study of basic metal working processes and the new developments in metal cutting and forming. Design of jigs, fixtures, dies and other tooling for effective production. Two hours rec. and three hours lab. a week. Pr.: I.E. 241. 550-352-1-0913

**550 372. Computers and Data Processing.** (2) I, II, S. The use of computers in the solution of engineering and management problems. One hour rec. and three hours lab. a week. 550-372-1-0913

### Undergraduate And Graduate Credit In Minor Field

**550 501. 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 in engineering or consent of instructor. 550-501-0-0913

**550 502. Industrial Management II.** (3) I. Job analysis and evaluation, selection, training, and other considerations for new employees from the industrial engineering standpoint. Three hours rec. a week. Pr.: Junior standing in engineering 550-502-0-0913

**550 530. 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. 550-530-0-0913

**550 533. 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. 550-533-0-0913

**550 541. Engineering Reliability and Quality Assurance I.** (3) I, II. Quantitative and qualitative controls required by manufacturing industries, with special emphasis on controlling process quality and costs. Three hours rec. a week. 550-541-0-0913

**550 551. Work Design.** (3) I, II. Motion and time study; process analysis and charting; principles of motion economy and ergonomics; work stations and environments; biomechanics; micro-motion analysis and an introduction to standard data systems. Two hours rec. and three hours lab. a week. Pr.: I.E. 241. 550-551-1-0913

**550 552. 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.: I.E. 352. 550-552-0-0913

**550 553. Production Planning and Inventory Control.** (3) I. Principles, techniques and applications of production planning and control, and inventory control. Two hours rec. a week. Pr.: I.E. 372 and Math. 222. 550-553-0-0913

**550 554. Industrial Facilities Layout and Design.** (3) II. Comprehensive design of an industrial production system; application of undergraduate industrial engineering sequence. Two hours rec. and three hours lab. a week. Pr.: I.E. 553. 550-554-1-0913

**550-571. 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.: Math. 222. 550-571-0-0913

**550 572. 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.: I.E. 571, and Stat. 510. 550-572-0-0913

**550 573. 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.: I.E. 372, Stat. 510. 550-573-0-0913

**550 575. 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. 550-575-0-0913



**Undergraduate And Graduate Credit**

**550 601. Introduction to Systems Management.** (3) I, II. A general introduction to the formulation and mathematical solution of management and business problems. Includes the formulation of business and management problems and their solutions, utilizing optimization theory, finite mathematics and statistical techniques. Three hours rec. a week. Pr.: Math. 222 and consent of instructor. 550-601-0-0913

**550 603. 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.: I.E. 501, I.E. 571, or consent of instructor. 550-603-0-0913

**550 609. Occupational Safety and Health.** (3) I, II. Hazards in occupational environments and their elimination or mitigation through quantitative analyses and engineering design. Two hours rec. and three hours lab. a week. Pr.: Junior standing. 550-609-1-0913

**550 625. The Man-Environment System.** (3) II. Basic structure and performance of the human, viewed as a component in information processing and control systems. Effect of visual, auditory and thermal environments. Two hours rec. and two hours lab. a week. (Cross listed with M.E. 625). Pr.: Senior standing in engineering. 550-625-0-0913

**550 651. Standard Data Systems.** (3) I. Microscopic and macroscopic standard data systems; commercial versions; company-developed plans; programmed standard data systems. Three hours rec. a week. Pr.: I.E. 372. 550-651-0-0913

**550 652. Industrial Ergonomics.** (3) I, II. The design process, work analysis techniques, principles of work organization, work station and hand tools. Facilities management. Lighting, noise and industrial hygiene. Time determination. Work standards. Three hours rec. a week. Pr.: Math. 222 and consent of instructor. 550-652-0-0913

**550 721. Numerical Control of Machine Tools.** (3) II. 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.: I.E. 352, I.E. 372. 550-721-1-0913

**Graduate Credit**

**550 801. Problems in Industrial Engineering.** (Var.) I, II, S. Pr.: Graduate standing. 550-801-3-0913

**550 805. Engineering Administration.** (3) I. Engineering project administration; organization dynamics; quantitative factors in decision-making; application of computerized and non-computerized games. Two hours rec. and three hours lab. a week. Pr.: I.E. 502 or consent of instructor. 550-805-1-0913

**550 811. 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.: I.E. 553 or consent of instructor. 550-811-0-0913

**550 830. Industrial Project Selection.** (3) I. The determination of policy that optimally allocates resources to industrial alternatives. Deterministic and probabilistic model formulation with and without constraints. Applications of linear, nonlinear and branch-and-bound zero-one optimization methods. Rational selection criteria. Three hours rec. a week. Pr.: I.E. 530. 550-830-0-0913

**550 842. Engineering Reliability and Quality Assurance II.** (3) II. Design and management of reliability programs and quality assurance systems; mathematics of reliability, case studies of reliability evaluation programs. Three hours rec. a week. Pr.: I.E. 541 or consent of instructor. 550-842-0-0913

**550 850. Human Factors Engineering I.** (3) I. The design and analysis of applied experimental research on human behavior as applied to engineering systems. Two hours rec. and three hours lab. a week. Pr.: Stat. 702 or 703. 550-850-0-0913

**550 865. Simulation of Industrial and Management Systems.** (3) II. This course is concerned with simulating industrial management systems on computers utilizing Monte Carlo techniques and simulation languages. Numerical methods related to simulation are to be covered. Three hours rec. a week. Pr. or conc.: Stat. 770 or consent of instructor. 550-865-0-0913

**550 872. 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 will be studied in solving industrial engineering problems. Three hours rec. a week. Pr.: Stat. 511 or 705. 550-872-0-0913

**550 874. Operations Research I.** (3) I. 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.: I.E. 572. 550-874-0-0913

**550 881. 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.: I.E. 575. 550-881-0-0913

**550 892. Graduate Seminar in Industrial Engineering.** (1) I, II. Max. total: three credit hours. Presentation and discussion of papers on industrial engineering subjects. One two-hour seminar a week. 550-892-0-0913

**550 898. Master's Report.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 550-898-4-0913

**550 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 550-899-4-0913

**550 930. Industrial Resource Management.** (3) II. Applications of mathematical optimization methods and simulation techniques to the problems of industrial resource acquisition, retention and management. Associated individual student minor research topic. Three hours rec. a week. Pr.: I.E. 573 (or I.E. 865) and I.E. 830. 550-930-0-0913

**550 950. Human Factors Engineering II.** (3) II. The design and analysis of applied experimental research on human behavior as applied to engineering systems. An experimental project. Three hours rec. a week. Pr.: Stat. 702 or 703. 550-950-0-0913

**550 951. Applied Decision Theory.** (3) II. Bayes theorem, Bayesian estimators, utility, loss function and risk, minimax strategies, elementary game theory and linear programming. Pr.: Stat. 511 or Stat. 770. 550-951-0-0913

**550 971. Industrial Queueing Processes.** (3) I, II. Introduction to the queueing process and theory of queues; analysis of single and multi-station queues; application to production, materials handling, inventory and maintenance systems. Three hours rec. a week. Pr.: Stat. 770. 550-971-0-0913

**550 973. Industrial Systems Analysis.** (3) 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 sensitivity of industrial management systems. Three hours rec. a week. Pr. or conc.: I.E. 575. 550-973-0-0913



**550 975. Operations Research II.** (3) II. A continuation of I.E. 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.: I.E. 874, Stat. 770. 550-975-0-0913

**550 976. 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. 550-976-0-0913

**550 982. 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.: I.E. 975. 550-982-0-0913

**550 983. 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.: I.E. 874, Stat. 770. 550-983-0-0913

**550 985. The Application of the Maximum Principle to Industrial Systems.** (3) I. A study of multistage systems optimization by the discrete maximum principle and a study of optimal decision and optimal control of continuous systems by the continuous maximum principle. Applications to production scheduling, inventory controls, transportation problems, economic systems and other industrial management problems. Three hours rec. a week. Pr. or conc.: I.E. 874. 550-985-0-0913

**550 990. Advanced Topics in Operations Research.** (Var.) I, II, S (6 hrs. maximum). 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. 550-990-0-0913

**550 999. Dissertation Research.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 550-999-4-0913

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## MECHANICAL ENGINEERING

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*Paul L. Miller,\* Head of Department*

Professors Appl,\* Azer,\* Crank,\* Duncan,\* Gorton,\* Huang,\* Lindholm,\* Miller,\* Rohles,\* Turnquist,\* and Wood; Associate Professors Annis,\* Gowdy,\* Kipp,\* Nesmith, Thompson,\* and Walker,\* Assistant Professors Ball,\* Hayter,\* and Pauli. Emeritus: Dean Durland; Professors Brainard, Flinner, Helander, Hobson, Messenheimer, and Tripp.

Mechanical engineering graduates render professional services that vary from the development of machines to the management of industrial operations; from theoretical systems to the satisfaction of societal needs.

Mechanical engineering deals with the conversion, transfer and control of energy for the benefit of man. Mechanical engineers design, develop, create, supervise, manufacture and sell components and systems which are utilized in the processes involving energy. KSU graduates are contributing to the benefit of mankind by their work in pollution control, computers, food supply and processing, communication systems, power generation and distribution, petroleum location and production, aircraft, environmental control, transportation, construction, atomic energy, etc.

To provide a background for this wide range of activities the mechanical engineering curriculum is founded on a broad base of the basic sciences of mathematics, physics, chemistry and mechanics. 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 integrated through 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 an authentic engineering problem supplied by an industrial sponsor. Considerations of cost, social impact, economics, product life, and the like are usually involved, as well as the technical solution of the problem. At the end of the project a written report is prepared and a verbal presentation made to engineers and officials of the sponsoring company. Frequently a working model is fabricated and demonstrated. 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. Professionals with this type of interdisciplinary background are ideally prepared to contribute to the solutions of the most pressing social and technological problems of our day.

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 the areas of heat transfer, thermodynamics, air conditioning, energy conversion, automatic control, fluid and gas dynamics, aerodynamics, environmental engineering, biomedical engineering, propulsion systems, engineering design, kinematics and vibrations. Laboratory facilities and basic instrumentation are available for experimental work in these areas. Graduate students also have access to the University's digital and analog computers, and the various engineering laboratories and shops.

Many research and teaching assistantships and free-grant fellowships are available to graduate students.



## Courses in Mechanical Engineering

### Undergraduate Credit

**560 212. Graphical Communications, Analysis and Design I.** (2) I, II, S. Technical sketching; study of basic principles of projective geometry; multi-view drawings; pictorials; reading and interpreting drawings; and creative or conceptual design. Three hours lab. and one hour rec. a week. Pr.: Plane Geometry. 560-212-1-0910

**560 217. Graphical Communications, Analysis and Design II.** (3) I, II, S. 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.: M.E. 212. 560-217-1-0910

**560 390. 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. 560-390-0-0910

**560 440. Engineering Systems Analysis.** (3) I, II. Application of physical laws, mathematical methods and computers to the 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. 560-440-0-0910

### Undergraduate And Graduate Credit In Minor Field

**560 512. 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.: C.E. 333, Math. 222. 560-512-0-0910

**560 513. 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. 560-513-0-0910

**560 523. Thermodynamics II.** (3) I, II. Continuation of Thermodynamics I. Gas mixtures, psychrometry, generalized thermodynamic relations and reactive systems. Three hours rec. a week. Pr.: M.E. 513. 560-523-0-0910

**560 527. 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.: M.E. 571, Math. 240. 560-527-0-0910

**560 533. 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.: M.E. 512. 560-533-0-0910

**560 535. Mechanical Engineering Laboratory I.** (3) I, II. Theory and application of mechanical engineering instrumentation and measurements. One hour rec. and six hours lab. a week. Pr.: M.E. 513, E.E. 510. 560-535-1-0910

**560 560. Engineering Economics.** (3) I, II. Economic analysis of problems as applied in engineering. Three hours rec. a week. Pr.: Econ. 110, M.E. 513. 560-560-0-0910

**560 563. 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.: C.E. 533, M.E. 533. 560-563-0-0910

**560 571. 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.: M.E. 512. Pr. or conc.: M.E. 513. 560-571-0-0910

**560 575. Mechanical Engineering Design Laboratory.** (2) 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.: M.E. 527, M.E. 533. 560-575-1-0910

**560 583. Mechanical Engineering Laboratory II.** (2) I, II. Analysis of heat transfer and fluid flow processes, mechanical systems, automatic control; instrumentation, design of experiments. Six hours lab. a week. Pr.: M.E. 535. 560-583-1-0910

### Undergraduate And Graduate Credit

**560 606. Patents and Inventions.** (3) II. A brief consideration of the fundamental principles of U.S. patents and their relationship to the engineer; the inception and development of inventions. Three hours rec. a week. Pr.: Junior standing. 560-606-0-0910

**560 613. Thermodynamics III.** (3) On sufficient demand. Direct energy conversion, compressible fluid flow, rotating and reciprocating machinery, thrust systems, cycle analysis and topics of current and continuing interest with emphasis on application of thermodynamic principles. Three hours rec. a week. Pr.: M.E. 523. 560-613-0-0910

**560 620. Internal Combustion Engines.** (3) II. Analysis of cycles, design and performance characteristics. Three hours rec. a week. Pr.: M.E. 523. 560-620-0-0910

**560 622. Environmental Engineering I.** (3) I, II. Psychrometry; heating-cooling system design; air quality measurement and control; effect of air pollution. Three hours rec. a week. Pr.: M.E. 527. 560-622-0-0910

**560 625. The Man-Environment System.** (3) II. Basic structure and performance of the human, viewed as a component in information processing and control systems. Effect of visual, auditory and thermal environments. Two hours rec. and two hours lab. a week. (Cross listed with I.E. 625.) Pr.: Senior standing in engineering. 560-625-1-0910

**560 628. Aerodynamics I.** (4) II. A general introduction to aerodynamics; operation of wind tunnel. Three hours rec. and three hours lab. a week. Pr.: M.E. 571, Math. 240. 560-628-1-0910

**560 631. Aircraft and Missile Propulsion.** (3) II. Analysis of aircraft and missile propulsion systems; fundamentals of jet propulsion including rocket engines. Three hours rec. a week. Pr.: M.E. 523, M.E. 571, Math. 240. 560-631-0-0910

**560 633. Thermodynamics of Modern Power Cycles.** (3) II. 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.: M.E. 513. 560-633-0-0913

**560 651. Mechanical Engineering Design.** (3) II. Professional-type problems involving thermal, thermodynamic, electrical, mechanical, and economic factors. One hour rec. and six hours lab. a week. Pr.: M.E. 527, M.E. 563. 560-651-1-0910

**560 656. 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.: M.E. 512, Math. 240. 560-656-0-0910

**560 671. Petroleum Production.** (3) I. Engineering problems in drilling and completion of wells; principles of drainage; production methods and secondary recovery. Three hours rec. a week. Pr.: Senior standing in Department of Mechanical Engineering or approval of department head. 560-671-0-0910



**560 680. 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 flat plate 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.: M.E. 527. 560-680-0-0910

**560 699. Problems in Mechanical Engineering.** (Var.) I, II, S. Pr.: Approval of department head. 560-699-3-0910

**560 712. Automatic Controls.** (3) I, II. Analysis of the dynamic behavior of mechanical, thermal, fluid and electrical elements using the basic physical laws. Transient and frequency response characteristics, stability and sensitivity analysis. Design of automatic control systems. Three hours rec. a week. Pr.: M.E. 535. 560-712-0-0910

**560 713. 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.: M.E. 523, M.E. 571, Math. 240. 560-713-0-0910

**560 715. Gas Dynamics I.** (3) II. Properties of compressible fluids, subsonic and supersonic flow, steady and non-steady motion, with emphasis on one-dimensional flow. Three hours rec. a week. Pr.: Math. 240, M.E. 523, M.E. 571. 560-715-0-0910

**560 716. Intermediate Dynamics.** (3) On sufficient demand. General vector principles of the dynamics of particles and rigid bodies; applications to orbital calculations, gyrostatics and rocket performance; introduction to the energy methods of advanced dynamics. Three hours rec. a week. Pr.: M.E. 512, Math. 240. 560-716-0-0910

**560 718. 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.: M.E. 512, Math. 240. 560-718-0-0910

**560 719. 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, M.E. 512 or C.E. 530. 560-719-0-0910

**560 720. 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.: M.E. 571, Math. 240. 560-720-0-0910

**560 722. Environmental Engineering II.** (3) II. Study and analysis of environmental factors and man's response to these factors; air pollution, air cleaning, biological heat transfer; factors affecting comfort, health, learning and productivity. Two hours rec. and three hours lab. a week. Pr.: Four hours biological science or consent of instructor. Pr.: M.E. 622. 560-722-0-0910

**560 725. Combustion.** (3) I. Dynamics and thermodynamics of combustion processes; solid, liquid, and gaseous fuels. Three hours rec. a week. Pr.: M.E. 527. 560-725-0-0910

**560 728. Aerodynamics II.** (4) I. Compressibility phenomena, power requirements, airplane performance; stability and control. Three hours rec. and three hours lab. a week. Pr.: M.E. 628. 560-728-1-0910

**560 730. Control Systems Analysis and Design.** (3) II. Utilization 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.: E.E. 530 or M.E. 712. (Cross-listed with E.E. 730.) 560-730-0-0910

**560 733. Automatic Controls Laboratory.** (3) II. Experimental methods for automatic control systems and components. Six hours lab. a week. Pr. or conc.: M.E. 730. 560-733-1-0910

**560 735. Fluid Control Systems.** (3) I. Analysis and design of control devices and systems which utilize gases or liquids as the working media; formulation of non-linear and linearized mathematical models; laboratory projects applying analytical and experimental design techniques. Two hours rec. and three hours lab. a week. Pr.: M.E. 535. 560-735-1-0910

**560 736. Applied Elasticity.** (3) II. 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.: C.E. 533. 560-736-0-0910

**560 742. Fine Particle Technology.** (3) II. Definition, theory and measurement of particle properties, particle dynamics, size distribution and characteristics of powders encountered in particle transport, gas cleaning, air pollution sampling and particle processing; the physics of air ion generation, transport and decay; and requisites of accurate sampling of airborne contaminants. Three hours rec. a week. Pr.: M.E. 571 and one course in statistics or consent of instructor. 560-742-0-0910

**560 746. 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.: M.E. 656. 560-746-0-0910

**560 756. 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.: M.E. 656. 560-756-0-0910

**560 757. Kinematics.** (3) II in odd years. Geometry of constrained motion applied to point paths, specific input-output relations, function generators, kinematic synthesis. Three hours rec. a week. Pr.: M.E. 533. 560-757-0-0910

**560 758. Mechanics of Machines.** (3) On sufficient demand. Analysis of inertia effects in rotating discs, gyroscopes, cams and gear trains. Three hours rec. a week. Pr.: M.E. 533. 560-758-0-0910

**560 760. Engineering Analysis I.** (3) I, II. Methods of analysis employed in the solution of problems selected from various branches of engineering. Emphasis is placed on discrete systems. Three hours rec. a week. Pr.: Math. 240 and senior standing in engineering. 560-760-0-0910

**560 761. Engineering Acoustics.** (3) II. 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.: M.E. 756; or M.E. 718, M.E. 736 or G.E. 740 or consent of instructor. 560-761-0-0910

**560 766. Aeronautical Engineering Design.** (2) I. Design problems related to aircraft, missiles, and space vehicles. Six hours lab. a week. Pr.: M.E. 527, M.E. 631, M.E. 728. 560-766-1-0910

**560 771. Reservoir Engineering.** (3) II. Reservoir fluid properties, forces, and energies; mechanics of fluid flow in porous media; control of reservoir performance. Two hours rec. and three hours lab. a week. Pr.: M.E. 671, Math. 240, M.E. 571. 560-771-1-0910

### Graduate Credit

**560 813. Advanced Thermodynamics II.** (3) II. Kinetic theory and statistical thermodynamics, with emphasis on transport properties and engineering applications. Selected topics from classical thermodynamics. Pr.: M.E. 523, M.E. 527 or consent of instructor. 560-813-0-0910



**560 819. 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.: M.E. 719, M.E. 718 or M.E. 756. 560-819-0-0910

**560 822. 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.: M.E. 718. 560-822-0-0910

**560 830. Thermoelasticity.** (3) On sufficient demand. Theory and analysis of thermal stresses in elastic and inelastic systems. Pr.: M.E. 718, M.E. 736 or M.E. 822. 560-830-0-0910

**560 831. Boundary Layer Theory I.** (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.: M.E. 527. 560-831-0-0910

**560 850. Advanced Power Plant Engineering.** (Var.) On sufficient demand. An advanced course in the economic problems in the design of power plants and in the generation of power, selection of equipment, choice of station heat balance, generation of by-product power in industries, and interconnections between utilities and industrial plants for the economical interchange of power. Pr.: M.E. 560 or M.E. 513. 560-850-0-0910

**560 851. Vibration of Elastic Bodies.** (3) On sufficient demand. Longitudinal, torsional, and lateral vibration of bars; testing of samples of materials by dynamic methods; the Ritz method; vibration of membranes and plates; waves in isotropic elastic mediums; vibration of pavement slabs. Three hours rec. a week. Pr.: M.E. 656. Pr. or conc.: M.E. 736 or M.E. 822. 560-851-0-0910

**560 860. Engineering Analysis II.** (3) II. Cont. of Engineering Analysis I. Emphasis placed on continuous systems. Three hours rec. a week. Pr.: M.E. 760 or consent of instructor. 560-860-0-0910

**560 862. 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.: M.E. 718, M.E. 736 or M.E. 822. 560-862-0-0910

**560 880. Advanced Fluid Mechanics.** (3) On sufficient demand. Potential flow in three dimensions, vortex motion, the equations of viscous flow, hydrodynamic stability, turbulence. Three hours rec. a week. Pr.: M.E. 718 or M.E. 720, Math. 551. 560-880-0-0910

**560 890. Laboratory Investigations in Mechanical Engineering.** (Var.) I, II, S. Pr.: Approval of department head. 560-890-4-0910

**560 898. Master's Report.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 560-898-4-0910

**560 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 560-899-4-0910

**560 915. Gas Dynamics II.** (3) I. An extension of Gas Dynamics I, with emphasis on two- and three-dimensional problems, shock waves. Three hours rec. a week. Pr.: M.E. 715. 560-915-0-0910

**560 916. Advanced Topics in Mechanical Engineering.** (Var.) I, II, S. A course reserved for study of current topics in Mechanical Engineering. Particular subject areas 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. 560-916-0-0910

**560 922. Advanced Air Conditioning.** (3) I. Advanced psychrometric analysis; physiological factors; biotechnology and heat transfer. Three hours rec. a week. Pr.: M.E. 622. 560-922-0-0910

**560 925. Advanced Machine Design.** (Var.) On sufficient demand. At the option of the student this course may include a study of some advanced subject related to courses in this area. Pr.: Twelve hours of course work in this area. 560-925-0-0910

**560 931. Boundary Layer Theory II.** (3) On sufficient demand. Study of boundary layer transition; the development and solution of various turbulent boundary layer problems involving momentum, heat, and mass transfer and chemical reactions for compressible viscous fluid. Three hours rec. a week. Pr.: M.E. 831. 560-931-0-0910

**560 935. Heat Conduction in Solids.** (3) I. General differential equation of heat conduction and methods of solution for two-dimensional steady-state transient heat flow, periodic heat flow, and internal heat sources. Three hours rec. a week. Pr.: M.E. 527. 560-935-0-0910

**560 942. Convection Heat Transfer.** (3) II. Energy and momentum equations in convective heat transfer, laminar and turbulent thermal boundary layers, steady and non-steady convection problems. Three hours rec. a week. Pr.: M.E. 527. 560-942-0-0910

**560 943. Radiation Heat Transfer.** (3) I.; 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 non-absorbing medium. Three hours rec. a week. Pr.: M.E. 527. 560-943-0-0910

**560 965. Approximate Methods of Higher Analysis.** (3) II in alt. years. Approximate procedures for solving differential and integral equations encountered in engineering analysis; emphasis on continuous and discrete methods of approximation, convergence and error analysis. Three hours rec. a week. Pr.: Math. 622. 560-965-0-0910

**560 999. Dissertation Research in Mechanical Engineering.** Ph.D. level. (Var.) I, II, S. Pr.: Approval of department head and major professor. 560-999-4-0910

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## NUCLEAR ENGINEERING

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*N. Dean Eckhoff,\* Head of Department*

Professors Donnert,\* Eckhoff,\* Faw,\* and Mingle;\* Associate Professors Merklin,\* and Shultzis;\* Assistant Professors Hightower, and Lester.\*

The curriculum leading to the B.S. degree in nuclear engineering is designed to prepare students for professional positions in industry, government and private practice. Through technical electives, the student may organize a program suited to his particular needs and interests. For example, the student may elect a program leading to engineering practice with various specialties or to postgraduate study in engineering, science, medicine, or law.

As a profession, nuclear engineering requires understanding and competence in many and diverse disciplines. Hence, undergraduate nuclear engineering students at Kansas State University take engineering science courses in materials, thermodynamics, particle and continuum dynamics, electronics, circuit theory, and economics. With background established in these courses, able students will then be prepared for course work in the Department of Nuclear Engineering involving



nuclear reactor design principles, neutron and charged particle interactions, radiation detection, radiation protection, radiation effects on materials, nuclear fuel management, industrial isotope applications, nuclear power cycle thermodynamics and siting, regulation and environmental impact assessment of nuclear power plants.

### Graduate Study

Major work is offered leading to the degrees Master of Science and Doctor of Philosophy.

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; **Radiation Shielding Facility** on a 180-acre remote site with a full scale house and other experimental shielding test structures; **Neutron Activation Analysis Laboratory** with two 4096-channel analyzers, an on-line mini-computer, gamma-ray spectrometers (GeLi, SiLi, and NaI), high speed printers, plotters and magnetic tape recorders; **Nuclear Instrumentation Laboratory** with lab stations containing digital logic training systems, instrumentation modules for pulse analysis and systems timing, dual-beam oscilloscopes, pulse and waveform generators; **Radioisotope Application Laboratory** with instructional equipment for radiation detection and analysis, neutron and beta radiography, material density and thickness gaging, mechanical wear studies, radioactive tracer techniques; **Shock-Tube Laboratory** with instrumentation for studies of combustion kinetics, molecular rate processes, and transient thermal and hydraulic phenomena; **Environmental Monitoring Laboratory** with radiation survey meters, two thermoluminescent dosimetry systems, air samplers, Tri-Carb liquid scintillation spectrometer, and chemical separation facilities; **Radiation Effects and Fuel Processing Laboratory** with two gas chromatographs, an atomic absorption spectrometer, a Cary-14 spectrophotometer, a DU-spectrophotometer, a spinning band distillation column, and a zone refiner; **Other**: pressurized water heat transfer loop, graphite subcritical pile, gamma irradiator (1,000Ci), an auto- and cross-correlation noise analysis system and three analog computers.

## Courses in Nuclear Engineering

### Undergraduate Credit

**580 110. Nuclear Engineering Concepts.** (2) I. This first course in the Nuclear Engineering curriculum acquaints freshman students with the professional activities and responsibilities of nuclear engineers. It presents this information through lectures, recitations, and laboratory demonstrations. Two hours lec. a week. 580-110-0-0920

**580 116. Nuclear Engineering Seminar.** (1) II. Introduction to professional nuclear engineering. Student career planning. One hour rec. a week. 580-116-0-0920

**580 315. Introduction to Nuclear Engineering Analysis.** (3) II. Introduction to analytical, statistical, and numerical analysis as applied to nuclear engineering, including computer programming. Three hours rec. a week. 580-315-0-0920

**580 325. Elements of Nuclear Engineering.** (3) I, II. Nuclear reactions, nuclear energy releases, ionizing radiation, radiation attenuation; introduction to nuclear reactor concepts of criticality, multiplication factor, period, reactivity, neutron lifetime, fission product poisoning; introduction to reactor instrumentation and control, standards for protection against radiation, health physics, nuclear safety, licensing, survey and monitoring instrumentation, instrument calibration, calculation of dose, dose rates, determination of maximum permissible concentrations and body burdens. Three hours lec. a week. Pr.: Math. 221, Phys. 213. 580-325-0-0920

**580 410. Introduction to Nuclear Engineering.** (3) I, II, S. A course to acquaint non-nuclear engineers with introductory aspects of nuclear engineering; a study of nuclear reactions, reactor core calculations, reactor safety and dynamics, shielding, fuels, waste disposal, electric power generation and radioisotope applications engineering. Three hours rec. a week. Pr.: Junior standing in engineering or consent of instructor. 580-410-0-0920

**580 490. Neutron and Particle Interactions I.** (2) I. Engineering approach to the classical mechanics of the interaction of neutrons and other radiation with matter; production and detection of neutrons and other types of nuclear radiation. Two hours rec. a week. Pr.: N.E. 325. 580-490-0-0920

### Undergraduate And Graduate Credit In Minor Field

**580 500. Applied Nuclear Engineering Analysis.** (3) I. Methods and applications of analytical, statistical, and numerical analysis as applied to nuclear engineering including computer programming. Three hours rec. a week. Pr.: Junior standing in engineering. 580-500-0-0920

**580 510. Neutron Activation Analysis.** (3) II. Basic nuclear properties, neutron flux characteristics, nonreactor neutron sources, radio-chemical separations, radiation detectors and counting statistics, gamma-ray spectroscopy, analysis of gamma-ray spectroscopic data, case studies. Two hours rec. and three hours lab. a week. Pr.: Junior standing in engineering or physical science. 580-510-1-0920

**580 511. Radioisotope Applications Engineering.** (2) I, II. A laboratory course designed to familiarize the student with experimental parameters of importance in the design of engineering systems which make use of radioisotopes. Six hours of lab. per week. Pr.: N.E. 325 or N.E. 410. 580-511-1-0920

**580 515. Nuclear Engineering Materials.** (2) II. An investigation of the properties and behavior of structural materials, fuels, and components in nuclear radiation environments. Two hours lec. per week. Pr.: N.E. 325, Ch.E. 350 and Ch.E. 351. 580-515-0-0920

**580 555. Nuclear Reactor Fundamentals.** (3) I. Introduction to reactor cooling. Analysis of power cycles. Basic reactor thermal design. Three hours rec. a week. Pr.: N.E. 325, M.E. 571, M.E. 513. 580-555-0-0920

### Undergraduate And Graduate Credit

**580 613. Nuclear Fuel Cycle.** (3) I. A course to familiarize the student with uranium conversion procedures, enrichment techniques, nuclear fuel burnup, spent fuel transport, reprocessing of spent fuel, fission product disposal methods, and economics of the nuclear fuel cycle. Three hours rec. per week. Pr.: N.E. 515. 580-613-0-0970



**580 615. Nuclear Materials Control and Safeguards.** (3) II. The management, control, measurement, accounting, and protection of nuclear fuel and strategic materials in the nuclear fuel cycle. Pr.: Senior or graduate standing in engineering, physical science, or business administration. 580-615-0-0920

**580 620. 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. 580-620-3-0920

**580 630. Applied Reactor Theory.** (4) II. Theory of diffusion and slowing down of neutrons with application to critical and sub-critical nuclear reactors. Measurement of various reactor physics parameters. Three hours rec. and three hours lab. a week. Pr.: N.E. 490. 580-630-0-0920

**580 635. Plasma Physics.** (3) I. Fundamental properties of plasmas; motion of ions and electrons in electromagnetic fields; plasmas as magneto-hydrodynamic fluids; plasma waves; diffusion phenomenon 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 E.E. 557, and Phys. 621. 580-635-0-0920.

**580 640. Reactor Operations Planning.** (2) I, II. Licensing, nuclear safety, and reactor operations. Measurement of nuclear reactor parameters. One hour lec. and three hours lab. a week. Pr. or conc.: N.E. 655. 580-640-0-0920

**580 650. Environmental Radiation.** (3) I. Radionuclides and ionizing radiation in the environment of natural and artificial origin. Biological effects of radiation. Detection and measurement of environmental radiation. Licensing and regulation pertaining to environmental radiation. Pr.: N.E. 325 or N.E. 410 or consent of instructor. 580-650-0-0920

**580 655. Radiation Protection Engineering.** (3) I. Principles of radiation protection. Radiation shielding, radiation dosimetry, and administrative aspects of radiation protection. Special applications in nuclear plant design, fuel transportation, and fuel reprocessing. Three hours rec. a week. Pr.: N.E. 325, N.E. 511 or consent of instructor. 580-655-0-0970

**580 675. 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.: N.E. 490, N.E. 500. 580-675-0-0920

**580 692. Nuclear Reactor Technology.** (3) II. Thermal and neutronic design analysis of nuclear reactors. Nuclear quality assurance. Safety analysis reports. Three hours rec. a week. Pr.: N.E. 555, N.E. 630. 580-692-0-0920

**580 695. Nuclear Reactor Laboratory.** (1) I, II. Experimental investigation of thermal and hydraulic characteristics of nuclear reactors. Three hours lab. a week. Pr. or conc.: N.E. 692. 580-695-1-0920

**580 699. Constructive Uses of Nuclear Explosives.** (3) II. Characteristics and effects of nuclear explosives; Plowshare tests; industrial uses of nuclear explosives; scientific applications of nuclear explosions. Pr.: N.E. 630, N.E. 490 or consent of instructor. 580-699-0-0920

**580 708. Nuclear Fuel Processing Laboratory.** (1) I. Experimental investigation of the methods and principles of separation and purification as they apply to the production and recovery of nuclear fuel and materials. Three hours lab. a week. Pr.: N.E. 515. 580-708-1-0920

**580 715. Radiation Shielding.** (3) II. Introduction to important sources of radiation, kernel concepts, and application of diffusion and ray theory to shielding calculations, applications principally in the field of stationary nuclear reactor shielding. Three hours rec. a week. Pr.: N.E. 630. 580-715-0-0920

**580 720. Nuclear Systems Analysis.** (3) II. Introduction to nuclear reactor kinetics and simulation. Linear stability of reactor systems. Noise analysis. Application of hybrid computers to nuclear systems analysis. Three hours rec. per week. Pr.: N.E. 630. 580-720-0-0920

**580 750. Direct Energy Conversion.** (3) II. Principles and analysis of direct conversion phenomena, with special emphasis on direct conversion of nuclear energy including thermoelectric, thermionic, photovoltaic, magneto-hydrodynamic and electrochemical processes. Three hours rec. a week. Pr.: N.E. 555. 580-750-0-0920

**580 761. Radiation Detection and Measurement.** (4) I. Theory of detection of nuclear radiation. Measurement devices and systems. Applications to radiation dosimetry and spectroscopy, and instrumentation systems for nuclear reactors. Three hours rec. and three hours lab. per week. Pr.: N.E. 511. 580-761-0-0920

**580 762. 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. per week. Pr.: E.E. 511 or 526. 580-762-1-0920

**580 772. 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. per week. Pr.: N.E. 490. 580-772-0-0920

**580 774. 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.: N.E. 490 or Chem. 595. 580-774-0-0920

**580 791. Controlled Thermonuclear Reactions I.** (3) II. Principles of controlled thermonuclear processes; fuel cycles; energy-balance considerations; magnetic and inertial confinement; plasma instabilities; plasma heating; neutronics; radiation damage and materials problems; design of experimental power reactors and power-reactor systems. Three hours rec. a week. Pr.: N.E. 490, and N.E. 635 or Phys. 635. 580-791-0-0920

**580 795. Separation of Nuclear Fuels.** (4) II. A graduate level course investigating the chemical properties, the methods of separation, purification and reprocessing of uranium, thorium and plutonium. Three hours rec. and three hours lab. a week. Pr.: N.E. 613 or Ch.E. 560 (Cross-listed with Chemical Engineering, Ch.E. 795). 580-795-1-0970

### Graduate Credit

**580 806. Neutronics I.** (3) I. Particle transport, theories of diffusion, numerical analysis of diffusion, transient core analysis. Three hours rec. a week. Pr.: N.E. 630. 580-806-0-0920

**580 808. Neutronics II.** (3) II. Perturbation theory, core neutronic design, spatially dependent kinetics, reactor control. Three hours rec. a week. Pr.: N.E. 806. 580-808-0-0920

**580 810. 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. 580-810-4-0920

**580 847. Nuclear Power Engineering I.** (3) I. Principles of hydraulic and thermal analysis for nuclear power reactors. Advanced core design. Three hours rec. a week. Pr.: N.E. 692. 580-847-0-0920

**580 851. Nuclear Engineering Laboratory.** (2) I. Reactor kinetics, reactor noise analysis determinations of B/I, reactor power calibration, auto and cross-correlation techniques, pulsed neutron measurement, radiation shielding, radiation effects, activation analysis, neutron diffraction, and heat transfer. Six hours lab. a week. Pr. or conc.: N.E. 806. 580-851-1-0920



**580 860. 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. 580-860-0-0920

**580 865. Numerical Engineering Analysis.** (3) I. Engineering analysis approached from the viewpoint of those numerical analysis procedures especially useful with large capacity computer facilities. Three hours rec. per week. Pr.: G.E. 740 or Math. 761. 580-865-0-0920

**580 890. 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. 580-890-0-0920

**580 899. Master's Thesis.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 580-899-4-0920

**580 925. Transport Theory I.** (3) I. Principles of transport theory, approximation theory, numerical transport algorithms, gamma ray transport. Three hours rec. a week. Pr.: N.E. 806. 580-925-0-0920

**580 926. Transport Theory II.** (3) II. Advanced approximation theories, transport code development. Three hours rec. a week. Pr.: N.E. 925. 580-926-0-0920

**580 947. Nuclear Power Engineering II.** (3) II. Nuclear system analysis and design with computational considerations. System safety analysis. Three hours rec. a week. Pr.: N.E. 847. 580-947-0-0920

**580 955. Computational Methods in Nuclear Engineering.** (3) II. An analysis of the algorithms utilized in nuclear engineering computations; requirements of generalized computational programs, design of a typical program. Three hours rec. a week. Pr.: N.E. 806, N.E. 847. 580-955-0-0920

**580 970. The Interaction of Radiation with Matter.** (3) II. Classical and quantum theories of the interaction of radiation with matter. Energy and charge transfer processes. Applications to nuclear reactor theory, radiation shielding, and nuclear instrumentation. Three hours rec. per week. Pr.: N.E. 675. 580-970-0-0920

**580 991. Controlled Thermonuclear Reactions II.** (3) I. Continuation of N.E. 791. Collisionless plasmas; theory of plasma waves and instabilities; plasma diagnostics, experimental approaches. Other topics of current interest. Three hours rec. a week. Pr.: N.E. 791. 580-991-0-0920

**580 999. Dissertation Research.** (Var.) I, II, S. Topics selected with approval of major professor and department head. 580-999-4-0920

## ENGINEERING EXPERIMENT STATION

*Teddy O. Hodges, 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. The Experiment Station is the division of the College responsible for the administration of research.

The Experiment Station was established March 10, 1910 by the Board of Regents for the purpose of performing research of engineering and manufacturing value to the State of Kansas, and for collecting and presenting technical information for the use of industry and the people of the state. While the Experiment Station still functions to meet the obligations of its original charge, its activities have expanded to include research of national and international significance. This, of course, is consistent with the interdependence of people at all

governmental levels, including community, state, national, and world.

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 about 1.5 million dollars, with approximately 27 percent appropriated by the state and the remainder from other sources. Research now being carried on includes:

- Structural characteristics of concrete panels and of beams with web openings.
- Waste disposal and energy generation from wastes.
- Food science and grain processing.
- Electromagnetic wave propagation.
- Evaluation of information concerning resources from earth satellites.
- Positive aspects of nuclear energy including studies of radiation effects of materials, the production of new materials and analysis.
- Concrete pavement surface failures and methods of preventing them.
- Application of integrated circuits to problem solution
- Air and water pollution control.
- Water use efficiency.
- Wind and solar energy.
- Heat, mass and momentum transfer.
- Effects of environmental factors on human work performance and health.
- Systems engineering.
- Bioengineering.
- Gasification and liquefaction of coal and wastes.
- Transportation engineering
- Materials science.

## INSTITUTE FOR ENVIRONMENTAL RESEARCH

*Frederick H. Rohles, Jr., Director*

### Objectives

1. Provide a focal point for interdisciplinary research relevant to the effect of normal and altered environments on man including living and working conditions under the ocean and in space.

2. Determine response of human and other organisms to environmental factors affecting health, comfort, affectivity, productivity and learning, including—but not limited to—thermal factors, air composition, sound, light, color, and spatial relationships.

3. Investigate methods of environmental control and modification including cost studies for optimum system performance and energy conservation.

4. Provide opportunities and facilities for M.S. and Ph.D. research projects and specialized graduate level courses and seminars.

5. Collect and disseminate data and provide research and service to industry and governmental agencies interested in environmental problems.

### Organization

The Institute for Environmental Research is organized to provide opportunities and facilities for research into man's relation and response to environmental factors. University staff and graduate



students carry out projects and research using the facilities of the Institute and with the assistance of its staff. The Institute is under the Dean of the College of Engineering, and its research is administered through the Engineering Experiment Station.

The Institute is composed of a director, an executive council, research associates from the university faculty, graduate research assistants, technicians and clerical workers. The 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 also members of their respective major departments throughout the University and members of the graduate faculty.

Interested faculty from the areas of mechanical, electrical, chemical and industrial engineering, psychology, physiological sciences, architecture, family and child development, clothing, textiles and interior design, foods and nutrition, grain science and industries, infectious diseases, pathology, statistics, and education are research associates of the Institute staff. 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 the area of 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.

Two centers, the Center for Energy Studies and the Center for Transportation Research and Training, are authorized as interdisciplinary research and educational units under the auspices of the Institute for Systems Design and Optimization.

### **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, 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.

The mission of the Center is fulfilled using systems analysis and synthesis techniques. Implicit in this mission is the consideration of economics, safety, and environmental and aesthetic aspects of the energy systems and policy considerations.

### **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**

*J.O. Mingle, Director*

*H.S. Walker, Associate Director*

The Institute for Computational Research in Engineering 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 ENGINEERING SHIELDING FACILITY**

*Richard E. Faw, Director*

Through the Department of Nuclear Engineering, Kansas State University operates a 180-acre radiation shielding test site for large-scale experimental work in radiation shielding and related areas. Research facilities at the test site include full-scale as well as scale-model buildings for experimental studies in structure shielding. A wide variety of nuclear instrumentation and calibration installations are available. In addition to its use in research, the test site is used during Nuclear Engineering Department summer institutes in such areas as industrial radiography and nuclear defense design.

## **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 non-destructive 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**

*William H. Honstead, Director*

The Kansas Industrial Extension Service uses the facilities of the College of Engineering to assist Kansas manufacturing industries. Information, technical assistance, and continuing education are the areas of activity through which the Extension Service functions. The Farrell Library on the campus, the Linda Hall Library in Kansas City, and other informational sources can be utilized. The laboratory 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 engineers and manufacturing personnel.

To use the service, write or call Kansas Industrial Extension Service, 150 Seaton Hall, Kansas State University, Manhattan, Kansas 66506, 913-532-5720.







# College of Home Economics

*Ruth Hoeflin,\* Dean*

*Evelyn Senecal, Associate Dean*

*Jean Reehling, Assistant Dean*

*Jean Sego, Assistant to the Dean*

K-State offered the first home economics course in the U.S. for college credit in 1873. This great heritage has served as a basis for dynamic and innovative home economics programs in higher education. Today, the College of Home Economics at Kansas State University is recognized as one of the largest and most progressive institutions for the education of professional home economists in the United States.

Home economics at Kansas State University is an exciting and challenging educational experience. Students learn to solve everyday problems and to become involved in the future needs of all people. The uniqueness of home economics involves the integration of knowledge gained from the basic liberal arts as applied in courses that focus on the home, family, and quality of living for each individual.

The College of Home Economics participates in the Intercollegiate Program in Women's Studies, page 40.

## An Undergraduate Degree In Home Economics

Programs of study leading to the Bachelor of Science degree are offered within the five curriculums in the College of Home Economics. These curriculums are designed to interest students with varying academic and professional objectives. The curriculums and options are listed and described on the following pages.

### 1. Curriculum in home economics with options

Fashion Marketing  
Textile Science  
Fashion Design  
Interior Design  
Family Life and Human Development  
Early Childhood Education  
Consumer Interest  
Housing and Equipment  
Foods and Nutrition in Business  
Foods and Nutrition Science  
Dietetics, Restaurant and Institutional  
Management  
Home Economics Education—Vocational  
Teaching  
Home Economics Extension  
General Home Economics

### 2. Curriculum in home economics and mass communications (journalism, radio and television)

### 3. Curriculum in home economics with liberal arts

### 4. Curriculum in restaurant management

### 5. Curriculum in food science and industry (offered jointly with College of Agriculture)

Entering students who are undecided about a specific major may enroll in general home economics. Students in this area may take courses from all fields of general education and home economics. The program allows time for students to consider the many possibilities available before they make the final decision of a college major. Special advisers work with these students to select courses that will later apply to almost any curriculum at Kansas State University.



## Field Study Opportunities

Each Department in the College of Home Economics offers field study experience for interested and qualified students. They earn university credit and gain valuable on-the-job experience in a variety of locations. Guidance and supervision for these programs come from university faculty in cooperation with professionals in the field. The length of time devoted to a field study experience may vary from one or two weeks to a complete semester. Students may earn some salary on certain work-study programs.

Examples of field study opportunities include: a six to eight week internship in a retail store for students majoring in fashion marketing. The interior design field experience may be done in a variety of locations where students can gain business and customer experiences in the design and merchandising of interiors and furnishings. Students in family and child development gain teaching experience by participating in a fully-equipped child development laboratory or the infant and child-care center located on campus and by working in child-care centers in urban settings. Students who have chosen to concentrate in the community services area live in Wichita for one semester and are involved in private and public agencies concerned with families, youth, and children. Agencies include: Mid-American All Indian Center, Neighborhood Youth Corps, Elks Training Center, Store Front Counseling Center, Sedgwick County Mental Health Center, Community Action Program, and the American Red Cross. Family economics students work with individuals and families in financial counseling, coordinated with the Army Community Services at nearby Fort Riley. Through the Consumer Relations Board on campus and the Manhattan Consumer-Business Relations Center, students gain experience in handling consumer complaints and working with business. A foods and nutrition practicum is available for students to gain experience in the business field or in community nutrition and public health. Dietetic students have extensive field work through clinical and administrative experiences at the University of Kansas Medical Center and in Wichita hospitals and health care facilities. Foodservice centers on campus and in business establishments provide on-the-job training for those in restaurant management.

## The Merrill-Palmer Program

Selected undergraduate and graduate students may attend Merrill-Palmer Institute of Human Development and Family Life for one semester. This program provides course and field study in the metropolitan setting of Detroit, Michigan. All plans must be approved in advance by the Dean of the College of Home Economics.

## Dual Degree Programs

The College of Home Economics offers a special dual degree program with the College of Arts and Sciences in the area of social work. Students may major in either family and child development or consumer interest combined with social work. This

special program of 135 credit hours results in both a degree in home economics and one in arts and sciences. See pages 263 and 264 for required courses.

There are many other possible combinations for dual degrees under the usual University policy of at least 30 additional hours beyond the number required for the first degree. Questions should be referred to the Dean's office faculty.

## Honors Program And Advanced Degree Project

Students with outstanding academic records are invited to participate in the home economics honors program. High school students are selected according to their rank in the upper percent of their class and scores on the American College Test. Transfer students and upperclassmen with a 3.5 cumulative grade point average who are recommended by faculty members also are eligible. Special advisers help honor students plan their individual programs of study which include honors courses, seminars, and independent study.

The home economics advanced degree project is for outstanding students with demonstrated ability for graduate work. Students with a "B" average or better their first semester on campus are invited to join. Selected members of the graduate faculty advise those who choose to participate. The student and graduate faculty adviser plan educational experiences that can lead to a graduate program in the area of the student's choice.

## Organizations And Activities

Students participate in a wide range of professional and honorary societies sponsored by local and national organizations. The K-State student member section of the American Home Economics Association, available to all students majoring in home economics, encourages leadership and professional development.

Qualified students are invited to join the home economics honoraries, Phi Upsilon Omicron and Omicron Nu, as well as the honors program. They also may be elected to serve as representatives of the Home Economics Council, the official home economics student governing body, or all may participate in Hospitality Day, an annual open house in the College of Home Economics.

## Placement

Employment is extremely high for home economics graduates. A survey conducted in October of 1976 found 85% of the May, 1976 home economics graduates with a bachelor's degree employed. Most of these graduates were earning between \$7,500-10,000 in the areas of business, education, government and community services. An advanced degree in home economics expands career opportunities. The demand for home economists with the M.S. or Ph.D. degree, far exceeds the available supply. Salary levels for those with an advanced degree is commensurate with prior experience. For example graduates with the Master's receive salary offers over \$15,000.



## Graduate Study Opportunities

The College of Home Economics offers excellent opportunities for graduate study for the student who wishes to continue beyond the Bachelor of Science degree. All departments in the College of Home Economics, as well as general home economics, and home economics education, offer the Master of Science degree. Two Doctor of Philosophy degrees are available: one in foods and nutrition and an interdepartmental one that includes areas of emphasis in clothing, textiles and interior design; family and child development; family economics; or institutional management (refer to page 38).

Graduate research and teaching assistantships are available to qualified students. Application forms and additional information can be obtained from the Dean's Office, College of Home Economics, Justin Hall, Kansas State University, Manhattan, Kansas 66506.

## Transfer Students

Careful planning enables a student to transfer without loss of credit. A student who plans to transfer for the junior year should write for suggestions or preferably come to the KSU campus for a conference before beginning the sophomore year. The courses listed below can be transferred to the College of Home Economics, although not all courses are required for every major. A list of required courses for each major is available from the Home Economics Dean's office.

Courses Required in All Home Economics Majors:	Credit Hours*
English Composition	6
Speech	2
General Psychology	3
Economics	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
Literature or Modern Language	6
Art Appreciation	3
Design I	2
Drawing I	2
College Algebra	3
General Chemistry**	5
Organic Chemistry	5
Biology (with lab)	4
Human Growth and Development	3
Meal Management	3
Nutrition***	3
Socio-economics of Clothing	3
Clothing Construction	3
Family Relations	3
Child Development	3
Textiles	3

\*Credit hours given above apply to courses at KSU. Some transfer courses have more or fewer hours; substitutions or readjustments usually can be made for the difference in credit hours. Up to 62 hours may be transferred from a two-year college; 124 hours are required for graduation from the KSU College of Home Economics.

\*\*Many home economics majors do not specifically require chemistry to fulfill the physical science requirement. Write for a list of required courses for major area of interest.

\*\*\*Students planning to major in foods and nutrition, dietetics, or home economics education should take Principles of Nutrition after transferring to KSU.

## Curriculum In Home Economics With Options

### B.S. in Home Economics

This curriculum consists of a wide choice of options from which a student may select a major. All options consist of the following: (1) a broad general education that includes courses from the humanities, social, biological and physical sciences; (2) a home economics core that is a small group of home economics courses planned to introduce students to the total profession; (3) an area of specialization, to give the student the opportunity to develop interest and ability in a specific field of home economics; and (4) unrestricted electives that permit students to take courses in any KSU department.

#### Liberal-General Education Courses, 34 Hours

Communications, 8 Hours			
English	229 100	English Composition I	3
English	229 120	English Composition II	3
Speech	281 105	Oral Communication I	2
Social Science, 6 Hours			
Economics	225 110	Economics I	3
Psychology	273 110	General Psychology	3

#### Additional Requirements, 20 Hours

Four disciplines of humanities, social, biological, and physical sciences shall be represented in liberal-general education and/or supporting courses. (One discipline, not represented in supporting courses, shall include 8-12 credit hours, with two courses in sequence plus one additional course.)

#### Home Economics Core, 14-15 Hours\*

I.Des.	611 101	Design for Contemp. Living	3
F.C.D.	620 230	Intro. Human Development	3
		OR	
F.C.D.	620 272	The Helping Relationship	3
		OR	
F.C.D.	620 310	The Preschool Child	3
		OR	
F.C.D.	620 350	Family Relationships	3
F.Ec.	630 400	Family Economics	3
F.&N.	640 132	Basic Nutrition	3
		OR	
F.&N.	640 133	Food for Man	3
		OR	
F.&N.	640 301	Trends in Food Products	3
Gen. H.E.	650 120	Dimensions of Home Ec.	1-2
Gen. H.E.	650 400	Home Ec. Seminar	1

#### Professional and Supporting Courses, 53-70 Hours

(See specific option)

#### Unrestricted Electives, 4 to 23 Hours

#### Other

Concepts in Phys. Ed.	1
Total for Graduation	125

\*Not required in Home Economics Education



## Option in Fashion Marketing

Department of Clothing, Textiles, and Interior Design

Concentration in fashion marketing prepares students for careers in apparel production management; retail management, including buying; sales promotion at industry and retail levels; and with fashion publications, trade associations, and consultant services. A highlight of the senior year is the fashion marketing field experience, in which students work for 6-8 weeks in a department or specialty store under supervision of the retailer and the university. See page 270 for further departmental information.

Option requirements in addition to courses in basic curriculum:

### Liberal-General Education Courses

Hist	241 501	Heritage of Western World	4
Math.	245 100	College Algebra	3
Chem.	221 110	General Chemistry	5
Chem	221 190	Elem. Organic Chemistry	3
Chem.	221 191	Elem. Organic Chem Lab	2
		Communications Elective	3

### Professional and Supporting Courses

Art	209 100	Design I	2
C.S.	286 200	Fund. of Comp. Prog.	2
C.S.	286 202	PL/1 Lang Lab	1
Bus. Ad.	305 260	Fund. of Accounting	4
Bus. Ad.	305 420	Management Concepts	3
Bus. Ad	305 440	Marketing	3
Bus. Ad.	305 540	Consumer Behavior	3
C.&T.	610 131	Clothing and Society	3
		OR	
C.&T.	610 440	Socio-Psychological Aspects of Clothing	3
C.&T.	610 150	Principles of Clothing Construction	3
C.&T	611 215	Fundamentals of Interior Design	2
		OR	
C.&T.	610 220	Fundamentals of Costume Design	3
C.&T.	610 230	Fashion Marketing	3
C.&T.	610 260	Textiles	3
C.&T.	610 395	Visual Merchandising	3
		OR	
C & T	610 735	Fashion Promotion	3
C.&T.	610 636	Fashion Merchandising	4
C.&T.	610 450	Fashion Marketing Field Experience	5
		OR	
Bus Ad	305 531	Personnel and Wage Administration	3
		AND	
Bus Ad	305	Business Elective	3
C.&T	610 730	History of Costume	3

Six hours to be selected from:

C.&T	610 360	Textile Testing	3
C.&T	610 645	Textile and Apparel Industry	3
C & T	610 670	Textiles for Merchandising	3

Unrestricted Electives 14-17

## Option In Textile Science

Department of Clothing, Textiles, and Interior Design

The textile science option is designed specifically for students interested in one of the many textile areas such as quality control, fiber and fabric development, and textile testing. The option also is designed for students interested in pursuing graduate degrees for teaching, research and extension service.

Concentration is focused on courses which will prepare the student for rewarding careers in the textile industry. Positions are available in areas of quality control, textile technology, technical services, promotion and sales, research and product development. See page 270 for further departmental information.

Option requirements in addition to courses in basic curriculum:

### Professional and Supporting Courses

Art	209 100	Design I	2
Chemistry	221 210	Chemistry I	4
Chemistry	221 230	Chemistry II	4
Chemistry	221 350	Gen Org Chemistry	3
Chemistry	221 351	Gen Org Chem Lab	2
		OR	
Chemistry	221 190	Elem. Organic Chem	3
Chemistry	221 191	Elem. Organic Chem Lab	2
		OR	
Chemistry	221 531	Organic Chem I	3
Chemistry	221 532	Organic Chem I Lab	2
Chemistry	221 271	Chemical Analysis	4
		OR	
Biochemistry	211 521	Gen Biochemistry	3
		OR	
Chem	221 540	Research Techniques	3
Mathematics	245 100	College Algebra	3
Physics	265 115	Des Physics	4
Statistics	285 320	Elements of Statistics	3
C S	286 200	Fund. Computer Prog	2
C S	286 202	PL/1 Lang Lab	1
C & T	610 131	Clothing and Society	3
		OR	
C & T	610 440	Socio-Psych Aspects of Clothing	3
C & T	610 150	Prin. Clothing Construction	3
C & T	610 260	Textiles	3
C & T	610 645	Textile and Apparel Ind	3
C & T	610 650	Textile Fibers	3
C & T	610 756	Phys. Analysis of Textiles	3
I Des	611 215	Fund. of Interior Design	2
F Ec.	630 420	The House	3
		OR	
F. Ec	630 605	Consumer and the Mkt	3

Unrestricted Electives 20-22

## Option In Fashion Design

Department of Clothing, Textiles, and Interior Design

The fashion design option initiates students in the basic skills and knowledge required in careers in custom designing, fashion design at industry level, fashion illustration and pattern drafting. Students take courses in the areas of clothing construction and design, art, pattern development, textiles, and costume history. An extensive historic textile and costume collection is available for study. See page 270 for further departmental information.



## Option requirements in addition to courses in basic curriculum:

## Liberal-General Education Courses

Chem	221	11D	General Chemistry	5
Chem	221	19D	Elem Organic Chemistry	3
			DR	
Phys	265	101	Man's Physical World I	3
Phys	265	103	Man's Phys World I Lab	1
Phys	265	102	Man's Physical World II	3
Phys	265	104	Man's Phys World II Lab	1
Hist.	241	501	Heritage Western World	4
Soc	277	211	Intro Sociology	3
			Biological Science	3
			Modern Language Sequence	6-8

## Professional and Supporting Courses

Art	209	100	Design I	2
Art	209	190	Drawing I	2
Art	209	195	Survey of Art Hist. I	3
Art	209	196	Survey of Art Hist. II	3
Art	209	210	Drawing II	2
Art	209	220	Water Color I	2
Art	209	225	Fig Drawing I	2
C.&T	610	131	Clothing and Society	3
			OR	
C.&T	610	44D	Socio-Psych Aspects of Clothing	3
C.&T	610	150	Prin. Clothing Construction	3
C.&T	610	22D	Fund Costume Design	3
C.&T	610	260	Textiles	3
C.&T	610	300	Adv Clothing Construction	3
C.&T	610	315	Costume Illustration	2
C.&T	610	400	Tailoring	3
C.&T	610	500	Inter Costume Design	3
C.&T	610	61D	Theory of Pattern Design	3
C.&T	610	720	Design by Draping	3
C.&T	610	73D	History of Costume	3
C.&T	610	74D	Advanced Costume Design	3
I. Des.	611	740	History of Fabric Design	3

Unrestricted Electives ..... 14-17

## Option In Interior Design

## Department of Clothing, Textiles, and Interior Design

The course of study prepares students for professional practice as interior designers. Opportunities for graduates exist in residential interior design, design consulting, specialized merchandising, extension, and research.

Students participate in a series of studio exercises and lecture courses. Practical insights into the profession are gained through an interior design field experience. See page 270 for further departmental information.

## Option requirements in addition to courses in basic curriculum:

## Liberal-General Education Courses

Art	209	195	Survey Art Hist. I	3
Art	209	196	Survey Art Hist. II	3
Hist.	241	504	Heritage Western World	4
Pre-Des Prot	104	210	Design Graphics I	3
Pre-Des Prot	104	211	Design Graphics II	3
Art	209	100	Design I	2
Art	209	19D	Drawing I	2
Art	209	20D	Design II	2
Art	209	230	Sculpture I	2
			OR	
Art	209	265	Ceramics I	2
Art	209	260	Design in Crafts	2
			OR	
Art	209	27D	Metalcrafts and Jewelry	2
Pre-Des Prot	104	510	Man and His Surroundings	3
			OR	
Ind Engg.	55D	533	Interior Ergonomics	3
			Arch & Des Elective	3
C.&T	61D	26D	Textiles	3
C.&T.	61D	565	Weaving	2
I. Des	611	24D	Interior Design I	3
I. Des	611	54D	Interior Design II	3
I. Des	611	545	Interior Des Practicum	3
I. Des.	611	65D	Contemporary Homes	3
I. Des	611	73D	Interior Design III	3
I. Des	611	74D	Historic Fabric Design	3
I. Des	611	745	Historic Furniture Design	3
I. Des	611	78D	Interior Design Seminar	2

## Professional Electives

I. Des.	611	6D0	I. Des. Field Exper.	4
Bus. Ad	305		Bus. Admin. Electives	6
			DR	
Bus. Ad.	305		Bus. Admin Elective	3
F. Ec.	630	420	The House	3
			Additional hours to be selected with approval of adviser	2-6

Unrestricted Electives ..... 13-18

## Option In Early Childhood Education

## Department of Family and Child Development

This option is for students who wish to work in pre-kindergarten education programs in administrative or teaching positions. Such positions include work with parents and community resources as well as with young children. See page 272 for further departmental information.

## Option requirements in addition to courses in basic curriculum:

## Liberal-General Education Courses

Biol.	215	198	Prin. of Biology	4
Soc.	277	211	Intro to Sociology	3
			Literature and/or Language	6
			Music or Art Apprec. Elective	2-3
			Additional Humanities	5-6
			Math Elective*	3
			Additional Biological & Physical Science	5
			Social Science Electives at 300 level or above	6

## Professional Courses

Health	261	373	First Aid	1
Sp Path & Aud	283	555	Language Development	3
F. C. Dev	620	235	Infancy	3
F. C. Dev	620	310	The Preschool Child	3
F. C. Dev	620	311	The Preschool Child Lab	1
F. C. Dev	62D	335	Expressive Media	2
F. C. Dev	62D	35D	Family Relationships	3
F. C. Dev	62D	42D	Interactional Techniques	3
F & N	64D	6D3	Maternal and Child Nutrition	3
F. C. Dev	62D	61D	Devel. Prog. Pl. Young Child	2
F. C. Dev	62D	611	Devel. Prog. Pl. Young Child Lab	1
F. C. Dev	620	53D	Advanced Study of Children	3
F. C. Dev	620	625	Directed Experiences	8
F. C. Dev	620	626	Child Dev't. Center Prog.	3
F. C. Dev	62D	65D	The Family	3
F. C. Dev	62D	67D	Parent Education	3
F. C. Dev	620		FCD Prof. Elective	3
			Family/Community Health Elective	3

Unrestricted Electives ..... 8-9

## Option In Family Life And Human Development

## Department of Family and Child Development

This option is for students interested in youth and family life programs and in the total life span approach to understanding development. See page 272 for further departmental information.



## Option requirements in addition to courses in basic curriculum:

## Liberal-General Education Courses

Soc.	277 211	Intro. to Sociology	3
		Social Science Electives at 300 level or above	6
		Biological & Physical Sci.	12
		Humanities	6

## Professional and Supporting Courses

F. C. Dev.	620 230	Intro. to Human Development	3
F. C. Dev.	620 310	Preschool Child	3
F. C. Dev.	620 311	Preschool Child Lab	1
F. C. Dev.	620 350	Family Relationships	3
F. C. Dev.	620 430	Middle Child	2
F. C. Dev.	620 431	Middle Child Lab	1
F. C. Dev.	620 520	The Adolescent	2
F. C. Dev.	620 521	The Adolescent Lab	1
F. C. Dev.	620 650	The Family	3

## CHOOSE EITHER AREA A OR AREA B

## Area A. Individual &amp; Family Development

F. C. Dev.	620 235	Infancy	3
F. C. Dev.	620 250	You & Your Sexuality	3
F. C. Dev.	620 272	Helping Relationships	3
F. C. Dev.	620 352	Concepts Family Health	3
F. C. Dev.	620 370	Parenting	3
		Prof. Electives*	20
		(Include Basic Nutr. if not taken in core.)	

## Area B. Community Services

Soc. Wk	279 260	Intro. Social Work	3
F. C. Dev.	620 272	Helping Relationships	3
F. C. Dev.	620 400	Field Study	8
F. C. Dev.	620 670	Parent Education	3
F. C. Dev.	620 750	Low Income Families	3
		Prof. Electives*	15
		(Include Basic Nutr. if not taken in core.)	

Unrestricted Electives 17-18

\* Selected in consultation with faculty adviser and to include at least 3 hours from the College of Home Economics (other than the FCD department.)

## Dual Degree: Family And Child Development And Social Work

This 135-hour program will lead to a degree in home economics with a major in family and child development and to a degree in arts and sciences with a major in social work.

## Liberal-General Education Courses (45-46 hours)

## Communications (8 Hours)

Engl.	229 100	English Composition I	3
Engl.	229 120	English Composition II	3
Speech	281 105	Oral Communication I	2

## Social Sciences (15 Hours)

Psych	273 110	General Psychology	3
Econ.	225 110	Economics I	3
Soc.	277 211	Intro. to Sociology	3
Psych.	273 520	Personality Development	3
Soc.	277 411	Social Problems	3

## Biological and Physical Science (13-14 Hours)

Biol.	215 198	Prin. of Biology	4
Biol.	215	Biology Elective	3-4
Math	245 100	College Algebra	3
Stat	285 330	Stat. for Soc. Sci.	3

## Humanities (9 Hours)

Phil.	259	Philosophy Elective	3
		Additional Humanities electives 500 level or above	6

## Home Economics Core (10-12 Hours)

Gen. H. E.	650 120	Dim. of H. E.	1-2
I. Des.	611 101	Des. for Contemp. Living	3
F&N	640 132	Basic Nutrition	3
F. Ec.	630 400	Family Economics	3
Gen. H. E.	650 400	Home Ec. Seminar	1

NOTE: Dimensions of Home Economics may be waived for those students entering program after freshman year.

## Family and Child Development (19 Hours)

F. C. Dev.	620 230	Intro. Human Dev	3
F. C. Dev.	620 310	Preschool Child	3
F. C. Dev.	620 311	Preschool Child Lab	1
F. C. Dev.	620 350	Family Relationships	3
F. C. Dev.	620 430	Middle Child	2
F. C. Dev.	620 431	Middle Child Lab	1
F. C. Dev.	620 520	The Adolescent	2
F. C. Dev.	620 521	The Adolescent Lab	1
F. C. Dev.	620 650	The Family	3

## Professional Area (43 Hours)

Soc.	277 510	Soc. Welfare as Soc. Instit.	3
Soc.	277 520	Methods Soc. Research	4
Soc.	277 532	Comm. Organization	3
Soc.	277 550	Group Proc. & Soc. Beh.	3
Soc. Wk	279 260	Intro. Soc. Work	3
Soc. Wk	279 560	Skills & Tech. I	3
Soc. Wk	279 561	Skills & Tech. II	3
Soc. Wk	279 562	Field Placement	9
Soc. Wk	279 564	Prof. Sem. in Soc. Work	3
Soc. Wk	279 565	Prog. & Policy Form.	3
F. C. Dev.	620 272	Helping Relationships	3
F. C. Dev.	620 670	Parent Education	3

## Unrestricted Electives, 14-17 Hours

## Other

Concepts in Phys. Ed. 1

Total for Graduation 135

## Option In Consumer Interest

## Department of Family Economics

This option allows 30 hours of 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 in business or government. See page 275 for further departmental information.

## Option requirements in addition to courses in basic curriculum:

## Liberal-General Education Courses

Econ	225 120	Economics II	3
Math	245 100	College Algebra	3
Pol. Sci.	269 110	Prin. Pol. Sci.	3
		OR	
Pol. Sci.	269 325	U. S. Politics	3
Soc.	277 211	Intro. to Sociology	3
Stat.	285 330	Elem. Stat. for Soc. Sci.	3
		Social Science Electives	9

## Professional and Supporting Courses

C & T	610 131	Clothing and Society	3
		OR	
C & T	610 260	Textiles	3
		OR	
C & T	610 440	Socio-Psych. Aspects of Clothing	3
F. C. Dev.	620 310	Preschool Child	3
		OR	
F. C. Dev.	620 650	The Family	3
F. Ec.	630 405	Family Finance	3
F. Ec.	630 420	The House	3
F. Ec.	630 440	Household Equipment	3
		OR	
F. Ec.	630 630	Household Equip. Theory	3
F. Ec.	630 460	Family Resource Mgmt. Theory & Application	2
F. Ec.	630 465	Home Management Lab	2
		OR	
F. Ec.	630 705	Fin. Prob. of Families	2
F. Ec.	630 605	Consumers & The Market	3
F. Ec.	630 700	Families in Amer. Econ.	3
F & N	640 132	Basic Nutrition	3
		Prof. Electives*	15

Unrestricted Electives 14-15

\* Selected in consultation with faculty adviser



## Dual Degree: Consumer Interest And Social Work

This 135-hour program will lead to a degree in home economics with a major in consumer interest and to a degree in arts and sciences with a major in social work.

### Liberal-General Education (54-55 Hours)

#### Communications (8 Hours)

Engl.	229 100
Engl	229 120
Speech	281 105

#### Social Science (24 Hours)

Psych	273 110
Econ	225 110
Econ	225 120
Soc	277 211
Pol. Sci.	269 110
Pol. Sci.	269 325
Additional 9 hours Social Science	
Soc. Wk	279 260
Soc	277 510
Soc	277 411

#### Physical Science (6 Hours)

Math	245 100
Stat	285 330

#### Biological Science (8 Hours)

Biol	215 198
Biol	215

#### Humanities (9 Hours)

Phil	259
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### Home Economics Core (14-15 Hours)

Gen. H. E.	650 120
I. Oes.	611 101
F. & N.	640 133
F. & N.	640 301
F. C. Dev.	620 310
F. C. Dev.	620 230
F. C. Dev.	620 272
F. C. Dev.	620 350
F. Ec.	630 400
Gen. H. E.	650 400

### Supporting Home Economics Courses (9 Hours)

F. & N.	640 132
F. C. Dev.	620 310
F. C. Dev.	620 650
C. & T.	610 131
C. & T.	610 260

### Family Economics (19 Hours)

F. Ec.	630 405
F. Ec.	630 420
F. Ec.	630 440
F. Ec.	630 460
F. Ec.	630 465
F. Ec.	630 605
F. Ec.	630 700
F. Ec.	630 705

### Social Work (37 Hours)

Psych.	273 280
Psych.	273 520
Soc.	277 420
Soc.	277 550
Soc.	277 565
Soc.	277 532
Soc. Wk	279 560
Soc. Wk	279 561
Soc. Wk	279 562
Soc. Wk	279 564

English Composition I	3
English Composition II	3
Oral Communication I	2

General Psychology	3
Economics I	3
Economics II	3
Intro. to Sociology	3
Prin. of Pol. Sci.	3
OR	
U.S. Politics	3
Intro. Social Work	3
Soc. Welfare as Soc. Instit	3
Social Problems	3

College Algebra	3
Stat. for Soc. Sci.	3

Prin. of Biology	4
Biology Elective	3-4

Philosophy Elective	3
Additional Soc. Sci. and/or Humanities, 500 level or above	6

Oim. of H. E.	1-2
Des. for Contemp. Living	3
Food for Man	3
OR	
Trends in Food Products	3
Preschool Child	3
OR	
Intro. Human Dev.	3
OR	
Helping Relationship	3
OR	
Family Relations	3
Family Economics	3
Home Ec. Seminar	1

Basic Nutrition	3
Preschool Child	3
OR	
The Family	3
Clothing & Society	3
OR	
Textiles	3

Family Finance	3
The House	3
Household Equipment	3
Family Resource Mgmt.	
Theory & Application	2
Home Management Lab.	2
OR	
Consumer and the Market	3
Fam. in Amer. Econ.	3
Fin. Prob. of Families	2

Psych. of Child. and Adol.	3
Personality Development	3
Meth. of Soc. Research	4
Group Proc. & Soc. Beh.	3
Prog. & Policy Form.	3
Comm. Organization	3
Skill & Tech. I	3
Skill & Tech. II	3
Field Placement	9
Prof. Sem. in Soc. Work	3

Concepts in Phys. Ed. . . . . 1

Total for Graduation . . . . . 135

## Option In Housing And Equipment

### Department of Family Economics

This option permits specialization. Professional electives allow for further choice: in equipment for those interested in design and evaluation of household equipment and education; in housing for those interested in house planning, kitchen designing or research; and in home management for those interested in developing homemaker/home health aide services and home management services, and in positions as consultants in business, government, and communications. This option also provides basic training for those who wish to prepare for research. See page 275 for further departmental information.

### Option requirements in addition to courses in basic curriculum:

#### Liberal-General Education Courses

Biol.	215 198	Prin. of Biology	4
Math.	245 100	College Algebra	3
Stat	285 320	Elem. of Statistics	3
		Humanities Elective	3

### Students concentrating in Housing are required to take:

Pol. Sci.	269 320	State & Local Govt.	3
Soc.	277 211	Intro. to Sociology	3
Soc.	277 430	Population and Human Ecol.	3

### Students concentrating in Household Equipment are required to take:

Chem	221 110	Gen. Chemistry	5
Biochem.	211 120	Intro. Organic & Biochem.	5
Physics	265 115	Descriptive Physics	4

### Professional and Supporting Courses

F. C. Dev.	620 650	The Family	3
F. Ec.	630 405	Family Finance	3
F. Ec.	630 420	The House	3
F. Ec.	630 440	Household Equipment	3
F. Ec.	630 460	Family Resource Mgmt.	
		Theory & Application	2
F. Ec.	630 700	Families in Amer. Econ.	3
F. Ec.	630 605	OR	
		Consumers and the Market	3
		Prof. Electives*	16-23

### Students concentrating in Household Equipment are required to take:

Biology	215 220	Bact. of Man	3
		OR	
Biology	215 550	Microbiology	4
C. & T.	610 260	Textiles	3
F. Ec.	630 465	Home Management Lab.	2
F. Ec.	630 650	Product Safety	3
F. Ec.	630 740	Adv. Household Equipment	3
F. & N.	640 400	Food Preparation	3
F. & N.	640 616	Prin. of Food Demonstration	3

### Students concentrating in Housing are required to take:

Arch.	109 315	Intro. to Planning	3
Soc.	277 531	Urban Sociology	3
F. Ec.	630 620	Soc. Effect of Housing Envir.	3
F. Ec.	630 720	Housing Req. of Families	3

Unrestricted Electives . . . . . 14-22

\* Selected in consultation with faculty adviser



## Option In Foods And Nutrition In Business

### Department of Foods and Nutrition

Graduates take positions with food processors, food promotional agencies, utility companies and other business organizations. Home economists in these positions do educational work, giving demonstrations and illustrated talks, writing food columns for newspapers, and taking part in radio and television programs. See page 277 for further departmental information.

Option requirements in addition to courses in basic curriculum:

#### Liberal-General Education Courses

Soc.	277 211	Intro. to Sociology	3
JMC	289 235	Survey Mass Media	3
		OR	
JMC	290 260	Radio-TV Continuity	3
		Communication Electives	5
		Humanities Elective (minimum)	6

#### Supporting Courses

Biology	215 198	Principles of Biology	4
Biology	215 555	General Microbiology	4
		OR	
Chemistry	215 220	Bacteriology and Man	3
Chemistry	221 110	Gen. Chem.	5
Chemistry	221 190	El. Org. Chem.	3
		with	
Chemistry	221 191	El. Org. Chem. Lab	2
		OR	
Biochemistry	211 120	Intro. Org. & Biochem.	5
Physics		Physics Course	4

#### CHOOSE ONE OF THE PROFESSIONAL AREAS I, II, III

##### Area I — Business Organization

F.&N.	640 300	Meal Management	3
F.&N.	640 301	Trends in Food Products*	3
F.&N.	640 616	Principles of Food Demonstration	3
F.&N.	640 601	Food Science	4
F.&N.	640 602	Principles of Nutrition	3
F.&N.	640 612	Prin. Food Prod. Dev. & Control	3
F.&N.	640 680	Seminar in Foods and Nutrition	2
F.&N.	640 790	Food Research Techniques	3
DRIM	660 440	Fund. Quant. Fd. Prod.	4
		Business Electives	6
		Professional Electives	2-5

##### Area II — Extension Service

A.&O.	410 605	Ext. Organ. and Prog.	3
A.&O.	410 752	Prin. Tch. Adults in Ext.	3
F. Ec.	630 405	Family Finance	3
F.&N.	640 300	Meal Management	3
F.&N.	640 301	Trends in Food Products*	3
F.&N.	640 616	Principles of Food Demonstration	3
F.&N.	640 601	Food Science	4
F.&N.	640 602	Principles of Nutrition	3
F.&N.	640 680	Seminar in Foods & Nutrition	2
DRIM	660 440	Fund. Quant. Fd. Prod.	4
		Professional Electives	8-11

##### Area III—Communication Services

JMC	289 275	Reporting I and Lab.	3
JMC	289 320	Principles of Advertising	3
		OR	
JMC	289 630	Public Relations	3
JMC	289 330	Editing I	3
JMC	289 525	Jlsm. for Mod. Living	3
F.&N.	640 300	Meal Management	3
F.&N.	640 301	Trends in Food Products*	3
F.&N.	640 616	Principles of Food Demonstration	3
F.&N.	640 601	Food Science	4
F.&N.	640 602	Principles of Nutrition	3
F.&N.	640 680	Seminar in Foods & Nutrition	2
DRIM	660 440	Fund. Quant. Fd. Prod.	4
		Professional Electives	5-8

Unrestricted Electives 11-19

## Option In Foods And Nutrition Science

### Department of Foods and Nutrition

Students prepare for positions as assistants or technologists in university or government research laboratories, as home economists in test kitchens, food product development laboratories, or food promotional agencies, or as nutritionists in business or governmental agencies. Many university research positions offer opportunity for graduate study. See page 277 for further departmental information.

Option requirements in addition to courses in basic curriculum:

#### Liberal-General Education Courses

Biol.	215 198	Prin. of Biology	4
Biol.	215 220	Bacteriology & Man	3
		OR	
Biol.	215 555	Microbiology	4
Math.	245 100	College Algebra	3
		OR	
Math	245 220	Anal. Geom. & Calc. I	4

#### Supporting Courses

Biochemistry	211 201	Elem. Biochemistry	3
Biochemistry	211 202	Elem. Biochemistry Lab	2
Biology	215 240	Human Body	6
Chemistry	221 110	General Chemistry	5
Chemistry	221 190	El. Org. Chem.	3
		with	
Chemistry	221 191	El. Org. Chem. Lab	2
Physics	265 115	Descriptive Physics	4

#### CHOOSE ONE OF THE PROFESSIONAL AREAS I, II

##### Area I — Community Nutrition

F.&N.	640 133	Food for Man*	3
		OR	
F.&N.	640 301	Trends in Food Products*	3
F.&N.	640 300	Meal Management	3
F.&N.	640 601	Food Science	4
F.&N.	640 602	Prin. of Nutrition	3
F.&N.	640	Foods and Nutrition Elective	3

Plus Required Courses in Group I or Group II

##### Group I

F.&N.	640 613	Applied Normal Nutrition	3
F.&N.	640 614	Nutrition in Medical Science	6
F.&N.	640 615	Nutr. Care of Patients	6
		OR	

##### Group II

F.&N.	640 500	Practicum in Foods and Nutr.	5
F.&N.	640 680	Seminar Foods and Nutr.	2
F.&N.	640 700	Community Nutrition	3
F.&N.	640 710	Nutr. Throughout Life Cycle	3
F.&N.	640 712	Diet Therapy	3

##### Area II — Foods and Nutrition Science

F.&N.	640 133	Food for Man*	3
		OR	
F.&N.	640 301	Trends in Food Products*	3
F.&N.	640 300	Meal Management	3
F.&N.	640 601	Food Science	4
F.&N.	640 602	Prin. of Nutrition	3
F.&N.	640 680	Seminar in Foods and Nutrition	2
F.&N.	640 710	Nutr. Throughout Life Cycle	3
F.&N.	640 790	Food Research Tech.	3
		Home Economics Elective	3
		Foods and Nutr. Elective	6

Unrestricted Electives 18-22

\* Take course not included in home economics core.

\* Option requirement, unless taken as part of Home Economics Core.



## Option In Dietetics And Institutional Management

### Department of Dietetics, Restaurant and Institutional Management

Opportunities exist for dietitians or food service managers in health care facilities, colleges and universities, schools and other types of foodservice. Three separate programs are available in this option. The coordinated undergraduate program in dietetics which combines classroom and clinical experience leads to a B.S. degree and active membership in the American Dietetic Association (ADA). The program in traditional dietetics leads to a B.S. degree and active membership in ADA upon completion of an approved internship or traineeship. The college and school foodservice program culminates in a B.S. degree and individual student programs can be arranged to satisfy ADA requirements. See page 278 for further departmental information.

#### Option requirements in addition to courses in basic curriculum:

##### Liberal-General Education Courses

Soc	277 211	Intro to Sociology	3
		Humanities Electives	3

##### Supporting Courses\*

Biology	215 198	Prin. Biology	4
Biology	720 650	Fundamentals of Veterinary Public Health	3
		DR	
Biology	215 220	Bacteriology and Man	3
		OR	
Biology	215 555	Microbiology	3
Biol	215 240	Human Body	6
Chem	221 110	Gen Chemistry	5
Biochem	211 120	Intro Organic & Biochem	5
		DR	
Chem	221 190	Elem Organic Chem	3
		AND	
Chem	221 191	Elem Organic Chem. Lab	2
		AND	
Biochem	211 201	Elem Biochem	3

\* Two units of high school algebra required DR 245 010, Intermediate Algebra, must be taken

#### CHOOSE ONE OF THE PROFESSIONAL PROGRAMS I, II, III

##### Program I — Coordinated Undergraduate Program In Dietetics.

Selected admission (See below)

Bus. Ad	305 531	Personnel and Wage Admin	3
F & N	640 601	Food Science	4
F & N	640 602	Principles of Nutrition	3
F & N	640 710	Nutr Life Cycle	3
DRIM	660 430	Intro Prof Diet Prac.	1
DRIM	660 440	Fund Duant Fd Prod.	4
DRIM	660 460	Instr Comp Diet Pract.	3
DRIM	660 635	Foodserv Equip & Layout	2
DRIM	660 650	Foodservice Systems	6
DRIM	660 660	Mgmt. in Dietetics	9
DRIM	660 665	Comp -Asst. Foodserv.	
		Mgmt.	1
DRIM	660 670	Seminar in Dietetics	1-2

##### Clinical Experience in Wichita

F & N	640 613	Applied Normal Nutr	3
F & N	640 614	Nutr in Medical Science	6
F & N	640 615	Nutritional Care of Patients	6
DRIM	660 670	Seminar in Dietetics	1-2

(Clinical or administrative experience at the University of Kansas Medical Center may be arranged.)

##### Program II — Traditional Dietetics

ASI	005 671	Meat Sel. Utiliz.	3
Bus. Ad.	305 531	Personnel and Wage Admin.	3
F & N	640 601	Food Science	3
F & N	640 602	Principles of Nutrition	3
F & N	640 710	Nutr. Life Cycle	3
F & N	640 712	Diet Therapy	3
DRIM	660 430	Intro. Prof. Diet. Prac.	1
DRIM	660 440	Fund. Duant. Fd. Prod.	4
DRIM	660 460	Instr. Comp. Diet. Pract.	3
DRIM	660 635	Foodservice Equip. & Layout	2
DRIM	660 640	Org. & Mgt. of Food Serv.	3
DRIM	660 650	Foodservice Systems	6
DRIM	660 665	Comp.-Asst. Foodservice	
		Mgt.	1
F & N	640	Foods & Nutr. elective above 600 level	3

##### Program III—College and School Food Service

ASI	005 671	Meat Sel. Utiliz.	3
Bus. Ad	305 260	Fund. of Accounting	4
Bus. Ad	305 370	Managerial Cost Controls	3
Bus. Ad	305 531	Personnel and Wage Admin.	3
F & N	640 601	Food Science	4
F & N	640 602	Principles of Nutrition	3
ORIM	660 440	Fund. Quant. Fd. Prod.	4
DRIM	660 460	Instr. Comp. Diet. Pract.	3
DRIM	660 635	Foodserv. Equip. & Layout	2
DRIM	660 640	Org. & Mgmt. of Food Services	3
DRIM	660 650	Foodservice Systems	6
DRIM	660 665	Comp.-Asst. Foodserv.	
		Mgmt.	1
		Additional Business courses	6

#### Criteria for Admission to and Continuation In Coordinated Program:

1. Transfer students must satisfy KSU admission requirements.
2. G.P.A. of 2.2 on a 4.0 scale for the first two years
3. Provide health report and personal references with application which must be filed at the end of the sophomore year.
4. Approval of the dietetics executive committee.
5. G.P.A. of 2.5 in professional courses at the end of the junior year for continuation in the program.

Unrestricted Electives 6-25

## Cooperative Extension Service

The Cooperative Extension Service, with educational programs designed to improve the quality of life of individuals and families and to improve communities, is an integral part of the Land-Grant Institution. The extension service provides professional opportunities for home economics graduates in home economics-family living programs and 4-H youth programs.

State extension services need personnel with different kinds of competencies. Some positions in extension home economics require that the individual have a broad background in all subject-matter areas of home economics. Some require that the individual be specialized in one or more closely related home economics subject-matter areas. Course work in educational program development and teaching-learning methods and procedures is desirable.

A student interested in a position with the Cooperative Extension Service may wish to confer with a county, area, or state extension employee to learn about job responsibilities.

## Option in Home Economics Extension

### Department of General Home Economics

This option prepares a student to become a County extension home economist. On graduation the student is prepared to join the Cooperative Extension Service for work in a county in Kansas or another state.



## Option requirements in addition to courses in basic curriculum:

## Liberal-General Education Courses

Biol.	215 198	Prin. Biology	4
Chem.	221 110	Gen. Chemistry	5
Chem.	221 190	Elem. Organic Chem.	3
		WITH	
Chem.	221 191	Elem. Organic Chem. Lab.	2
		OR	
Biochem.	211 120	Intro. Organic & Biochem.	5
Soc.	277 211	Intro. to Sociology	3

## Professional and Supporting Courses

Art	209 100	Design I	2
A.&O.	410 605	Ext. Organ. & Prog.	3
A.&O.	410 752	Prin. Teach. Adults in Ext.	3
C.&T.	610 150	Prin. Cloth. Const.	3
C.&T.	610 260	Textiles	3
I.Oes.	611 215	Fund. Interior Design	2
F.C. Dev.	620 230	Intro. to Human Development*	3
F.C. Dev.	620 310	The Preschool Child*	3
F.C. Dev.	620 350	Family Relationships*	3
F.C. Dev.	620 650	The Family	2-3
F.Ec.	630 460	Family Resource Mgmt. Theory & Appl.	2
F.Ec.	630 420	The House	3
F.Ec.	630 440	Household Equipment	3
		OR	
F.Ec.	630 630	Household Equipment Theory	2-3
F.&N.	640 300	Meal Management	3
F.&N.	640 601	Food Science	3
F.&N.	640 602	Prin. Nutrition	3
		Communications Elective	2-3

Select 6-7 hours from the following.

A.&O.	410 636	Pract. in Exten. Education	5
F.C. Dev.	620 352	Concepts of Family Health	3
F.Ec.	630 405	Family Finance	3
		or other approved home economics courses	

Unrestricted Electives 13-20

\*If not taken in Home Economics core.

## Option in Home Economics Education—Vocational Teaching

This option prepares the student for teaching home economics in Kansas secondary schools. With a B.S. degree, the student is eligible for a secondary three-year certificate to teach home economics in any Kansas junior or senior high school and with the approval to teach in a vocational homemaking department.

Refer to pages 200-206 for admission requirements to teacher education and the professional semester.

## Option requirements in addition to courses in basic curriculum:\*

## Liberal-General Education Courses

Art	209 100	Design I	2
Biol.	215 198	Prin. Biology	4
Chem.	221 110	Gen. Chemistry	5
Chem.	221 190	Elem. Organic Chem.	3
		WITH	
Chem.	221 191	Elem. Organic Chem. Lab.	2
		OR	
Biochem.	211 120	Intro. Organic & Biochem.	5
Pol. Sci.	269 110	Prin. Pol. Science	3
		OR	
Pol. Sci.	269 325	U.S. Politics	3
Soc.	277 211	Intro. to Sociology	3
		Literature or Language	6
		Social Science Elective	3
		Liberal-General Educ. Electives	5

## Professional Courses

A.&F.	405 215	Educ. Psych. I	3
A.&F.	405 315	Educ. Psych. II	3
A.&O.	410 586	Teaching Part. Sec. School	8
A.&O.	410 550	Methods of Teaching Home Ec.	2
A.&O.	410 620	Principles and Philosophy of Vocational Education	3
A.&O.	410 621	Program Planning in Vocational Education	3
A.&O.	410 637	Practica in Home Economics Related Occupations	1-3
A.&O.	410 610	Occup. Home Econ.	3
C.&T.	610 150	Prin. Clothing Const.	3
C.&T.	610 260	Textiles	3
I. Des.	611 215	Fund. Int. Design	2
F.C. Dev.	620 310	Preschool Child	3
F.C. Dev.	620 311	Preschool Child Lab	1
F.C. Dev.	620 350	Family Relations	3
F.C. Dev.	620 520	The Adolescent	2
F.C. Dev.	620 521	The Adolescent Lab	1
F.Ec.	630 400	Family Economics	3
F.Ec.	630 420	The House	3
F.Ec.	630 440	Household Equipment	3
		OR	
F.Ec.	630 630	Household Equipment Theory	3
F.Ec.	630 460	Family Resource Mgt. Theory & Appl.	2
F.Ec.	630 465	Home Management Lab	2
F.&N.	640 601	Food Science	4
F.&N.	640 602	Principles of Nutrition	3

Unrestricted Electives 4-6

\*Home Economics Core not required.

## Curriculum In Home Economics And Mass Communications

## B.S. in Home Economics and Mass Communications

This curriculum provides for a specialization in either the print media or broadcast media. Students take courses in journalism, radio and television to prepare for careers with newspapers, magazines, radio-television, and in public relations and promotion with business and industry or government. A home economics background, plus courses in mass communications, gives graduates in this curriculum a broad base when making a career decision.

## Liberal-General Education Courses, 34 Hours

Communications			8
English	229 100	English Composition I	3
English	229 120	English Composition II	3
Speech	281 105	Oral Communication	2
Social Science*			12-15
Econ.	225 110	Economics I	3
Pol. Sci.	269 110	Prin. Pol. Sci.	3
		OR	
Pol. Sci.	269 225	U. S. Politics	3
Psych.	273 110	General Psychology	3
Soc.	277 211	Intro. to Sociology	3

Biological Science\*  
Physical Science\*  
Humanities\*

\*At least 26 hours among the starred disciplines with one course in each area; and in one area, two courses in sequence plus one other course.

## Home Economics Core (14-15 Hours)

I. Oes.	611 101	Design for Contemp. Living	3
F.C. Dev.	620 310	The Preschool Child	3
		OR	
F.C. Dev.	620 230	Intro. Human Develop.	3
		OR	
F.C. Dev.	620 272	The Helping Relationship	3
		OR	
F.C. Dev.	620 350	Family Relationships	3
F.Ec.	630 400	Family Economics	3
F.&N.	640 132	Basic Nutrition	3
		OR	
F.&N.	640 133	Food for Man	3
		OR	
F.&N.	640 301	Trends in Food Products	3
General H.E.	650 120	Dimensions of Home Ec.	1-2
General H.E.	650 400	Home Ec. Seminar	1



## 268 Home Economics

### Professional and Supporting Courses, 61-70 Hours

#### Home Economics Courses, \* 22-26 Hours

Area of Concentration (14-16)

Courses selected from at least one area other than concentration (8-10)

#### Basic Disciplines, Business Admin., and/or Education, \* 9-10 Hours

Courses selected to support home economics areas

#### SELECT AREA "A" OR "B"

##### A. Print Media Emphasis (30-34 Hours)

JMC	289 275	Reporting I	3
JMC	289 285	Reporting II	3
JMC	289 330	Editing I	3
JMC	289 525	Jlsm. for Mod. Living	3

#### Professional Electives In Journalism and Mass

Communications\* 18-22

##### B. Broadcast Media Emphasis (31-34 Hours)

JMC	290 240	Fund. of R-TV Prod.	3
JMC	290 250	Fund. of R-TV Perf.	3
JMC	290 260	R-TV Continuity	3
JMC	289 275	Reporting I	3
JMC	290 330	Reporting II (R-TV)	3

Remaining 16-19 hours selected from the following course groupings in consultation with adviser.

#### Group I (4-7 Hours)

(Students may take not more than four hours of participation courses and not more than three hours in either course.)

JMC	290 355	KSDB-FM Participation	1
JMC	290 375	Cable TV Participation	1
JMC	290 640	Advanced Radio Prod.	3
JMC	290 650	Advanced TV Prod.	3

#### Group II (3-9 Hours)

JMC	290 660	History of Broadcasting	3
JMC	290 665	R-TV Regulation and Responsibility	3
JMC	290 630	R-TV Programming	3
JMC	290 685	R-TV Management	3

#### Group III (3-9 Hours)

JMC	290 675	R-TV Criticism	3
JMC	290 610	R-TV Drama Writing	3
JMC	290 615	R-TV Series Writing	3
JMC	290 620	R-TV Advertising	3

#### Unrestricted Electives, 5-15 Hours

##### Other

Concepts in Phys. Ed.	1
Total for Graduation	125

\*Selected in consultation with faculty adviser.

## Curriculum In Home Economics With Liberal Arts

### B.S. in Home Economics

This curriculum is for the student who wishes to combine a broad liberal arts education with home economics. Maximum flexibility is provided for the selection of courses best suited to individual abilities and interests. The student in consultation with a faculty adviser selects a sequence of courses for concentration in one or more academic areas. This curriculum provides excellent background for professional careers, graduate study, and the responsibilities of homemaking and citizenship.

### Liberal-General Education Courses, 65-68 Hours

Communications				8
English	229	100	English Composition I	3
English	229	120	English Composition II	3
Speech	281	105	Oral Communication I	2
Social Science				12
Economics	225	110	Economics I	3
Psychology	273	110	General Psychology	3
			Electives in Soc. Sci.	6
Humanities				17-18
Philosophy, Mathematics, Logic				3
Literature or History				6
Electives in Humanities				8-9
Physical Science				8-10
Biological Science				8
Concentration in one subject matter area				12

### Home Economics, 34-35 Hours

I. Des.	611 101	Design for Contemp. Living	3
F. C. Dev.	620 310	The Preschool Child	3
		OR	
F. C. Dev.	620 230	Intro. Human Development	3
		OR	
F. C. Dev.	620 272	The Helping Relationship	3
		OR	
F. C. Dev.	620 350	Family Relationships	3
F. Ec.	630 400	Family Economics	3
F. & N.	640 132	Basic Nutrition	3
		OR	
F. & N.	640 133	Food for Man	3
		OR	
F. & N.	640 301	Trends in Food Products	3
General H. E.	650 120	Dimensions of Home Ec.	1-2
General H. E.	650 400	Home Economics Seminar	1

Courses in home economics in one of the following areas of concentration 20

a. Clothing, textiles, and interior design. C. & T. 131 (3), C. & T. 260 (3), courses in fashion and interior design, construction and related areas in home economics (14).

b. Family and child development: F. C. Dev. 310 (3), F. C. Dev. 350 (3), F. C. Dev. 650 (3), courses in Family and Child Development and related areas in home economics (12).

c. Family economics: F. Ec. 405 (3), F. Ec. 460 (2), F. Ec. 605 (3), courses in family economics and related areas in home economics (12).

d. General home economics: F. & N. 132 (3), F. Ec. 460 (2), F. C. Dev. 310 (3) and selected home economics courses (12).

### Unrestricted Electives, 21-25 Hours

#### Other

Concepts in Phys. Ed.	1
Total for Graduation	125

## Curriculum In Restaurant Management

### B.S. in Restaurant Management

Qualified men and women fill administrative positions in commercial and industrial food services, such as restaurants, hotels, coffee shops, cafeterias, and tea rooms. Summer experience under approved conditions is advised throughout the time students are enrolled in this curriculum.

### Liberal-General Education Courses, 47 Hours

Communications				11
English	229	100	English Composition I	3
English	229	120	English Composition II	3
Speech	281	105	Oral Communication I	2
			Communication Elective	3
Humanities Electives				Minimum 3
Social Science				12
Economics	225	110	Economics I	3
Economics	225	120	Economics II	3
Psychology	265	110	General Psychology	3
Sociology	277	211	Intro. to Sociology	3
Biological Science				4
Biology	215	198	Principles of Biology	4
Physical Science				10
Chemistry	221	110	General Chemistry	5
Biochemistry	211	120	Intro. Org. & Biochem.	5



## Professional and Supporting Courses, 60-61 Hours

ASI	005 671	Meat. Sel. and Util. ....	3
Biology	720 650	Fund. of Veterinary Public Health ....	3
		OR	
Biology	215 555	Microbiology ....	4
		OR	
Biology	215 220	Bacteriology and Man ....	3
Bus. Ad.	305 260	Fund. of Accounting ....	4
Bus. Ad.	305 370	Managerial & Cost Controls ....	3
Bus. Ad.	305 420	Management Concepts ....	3
Bus. Ad.	305 390	Business Law I ....	3
Bus. Ad.	305 531	Personnel and Wage Admin. ....	3
Bus. Ad.	305 440	Marketing ....	3
I. Des.	611 101	Design for Contemp. Living ....	3
F.&N.	640 132	Basic Nutrition ....	3
		OR	
F.&N.	640 133	Food for Man ....	3
		OR	
F.&N.	640 301	Trends in Food Products ....	3
F.&N.	640 601	Food Science ....	4
ORIM.	660 440	Fund. Quant. Fd. Prod. ....	4
ORIM.	660 650	Foodserv. Systems ....	6
ORIM.	660 635	Foodserv. Equip. and Layout ....	2
DRIM.	660 640	Org. and Mgmt. of Food Serv. ....	3
ORIM.	660 780	Prob. in Inst. Mgmt. ....	3
		Electives in Bus. Admin. or related areas ....	9

## Unrestricted Electives, 14-15 Hours

Other			
Concepts in Phys. Ed.			1
Total for Graduation			125

## Curriculum in Food Science and Industry

Science option—joint program with Colleges of Agriculture and Home Economics

## B.S. in food science and industry

Students wishing to fulfill the requirements for Institute of Food Technologists may choose this option. Food scientists are concerned 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 applications of food theory within a flexible program that permits each student to tailor his or her education to fit personal career goals.

## Liberal-General Education Courses, 23 Hours

Engl.	229 100	English Comp. I ....	3
Engl.	229 120	English Comp. II ....	3
Speech	281 105	Oral Communication I ....	2
Math.	245 100	College Algebra ....	3
Econ.	225 110	Economics I ....	3
		Electives in Social Science or Humanities ....	9

## Biological Science, 8 Hours

BIOL.	215 198	Prin. of Biology ....	4
BIOL.	215 555	Microbiology ....	4

## Physical Science, 37 Hours

Biochem.	211 521	Gen. Biochem. ....	3
Biochem.	211 522	Gen. Biochem. Lab. ....	2
Chem.	221 210	Chemistry I ....	4
Chem.	221 230	Chemistry II ....	4
Chem.	221 271	Chem. Analysis ....	4
Chem.	221 350	Gen. Org. Chem. ....	3
Chem.	221 351	Gen. Org. Chem. Lab. ....	2
Math.	245 150	Plane Trig. ....	3
Math.	245 220	Anal. Geom. & Calc. I ....	4
Physics	265 113	Gen. Physics I ....	4
Physics	265 114	Gen. Physics II ....	4

## Home Economics Core

## Choose 6-8 Hours

I. Des.	611 101	Design for Contemp. Living ....	3
F.C. Dev.	620 310	The Preschool Child ....	3
		OR	
F.C. Dev.	620 230	Intro. Human Development ....	3
		OR	
F.C. Dev.	620 272	The Helping Relationship ....	3
		OR	
F.C. Dev.	620 350	Family Relationships ....	3
F.Ec.	630 400	Family Economics ....	3
F.&N.	640 132	Basic Nutrition ....	3
		OR	
F.&N.	640 133	Food for Man ....	3
		OR	
F.&N.	640 301	Trends in Food Products ....	3
General H.E.	650 120	Dimensions of Home Ec. ....	1-2
General H.E.	650 400	Home Ec. Seminar ....	1

## Professional Courses, 23-24 Hours

ASI	005 305	Fund. of Food Processing ....	3
		(Course also numbered 025 305 and 045 305)	
Dy. Sc.	025 311	Intr. Food Chemistry ....	3
Gen. Ag.	035 301	Intro. to Food Sc. & Tech. ....	3
Gr. Sc.	045 651	Food and Feed Plant Sanitation ....	4
		OR	
Dy. Sc.	025 690	Practical Quality Control of Dairy and Food Products ....	3
BIOL.	215 520	Microbiology of Foods ....	4
F.&N.	640 601	Food Science ....	4
F.&N.	640 602	Pnn. of Nutrition ....	3

## Professional Electives, 14-17 Hours

## Choose 5-8 hours of the following:

ASI	005 250	Elements of Meat Processing ....	2
		AND	
ASI	005 261	Meat Processing (conc. assign.) ....	1
ASI	005 720	Meat-Packing Plant Oper. ....	2
ASI	005 777	Meat Technology ....	3
Dy. Sc.	025 401	Fund. of Milk Proc. & Sant. ....	3
Dy. Sc.	025 501	Pnn. of Dy. Foods Proc. ....	3
Dy. Sc.	025 505	Prin. of Dy. Foods Proc. Lab. ....	1-3
Poul. Sc.	026 700	Poultry Prod. Tech. ....	3
Hort.	040 792	Harvesting, Handling, and Processing of Fruits and Vegetables ....	3
Gr. Sc.	045 120	Intr. Bakery Tech. ....	2
Gr. Sc.	045 635	Baking Science I ....	2
Gr. Sc.	045 636	Baking Science I Lab. ....	2
Gr. Sc.	045 715	Fund. Processing Grain for Food ....	3

## and a minimum of 9 hours of the following:

Ag. Ec.	010 514	Econ. of Food Marketing ....	3
Dy. Sc.	025 550	Dairy Bacteriology ....	4
Dy. Sc.	025 715	Chem. of Foods ....	3
Gr. Sc.	045 300	Cereal and Feed Analysis ....	3
Gr. Sc.	045 602	Cereal Science ....	3
Gr. Sc.	045 661	Qualities of Food & Feed Ingredients ....	3
Gr. Sc.	045 700	Adv. Cereal Chemistry ....	3
Gr. Sc.	045 711	Prin. of Food Analysis ....	3
BIOL.	215 201	Organismic Biology ....	5
BIOL.	215 525	Human Physiology ....	4
Stat.	285 340	Biometrics I ....	3
C.Sci.	286 200	Fund. of Computer Prog. ....	2
C.Sci.	286 20-	Language Lab ....	1
Ag. E.	506 555	Dairy Mechanics ....	3
F.&N.	640 301	Trends in Food Products ....	3
F.&N.	640 710	Nutr. Needs Throughout Life Cycle ....	3
F.&N.	640 760	Fund. of Food Flavor Analysis ....	3
F.&N.	640 790	Food Res. Techniques ....	3
Anat. & Ph.	740 530	Anat. & Physiology ....	4

## Unrestricted Electives, 9-15 Hours

Other			
Concepts in Phys. Ed.			1
Total for Graduation			127



## Departments & Course Offerings

### CLOTHING, TEXTILES, AND INTERIOR DESIGN

*Theresa Perenich,\* Head of Department*

Associate Professor Perenich;\* Assistant Professors Newby, Peterson, Reagan, Stolper, and Villasi;\* Instructors Barnhart, Cross, Graff, Helvenston, Kruckeberg, Munson, Nelsen, Ordonez, Schmidt, and Varney. Emeritus: Professors Barfoot\* and Brockman;\* Associate Professors Cormany,\* Hill,\* Howe,\* and Llenkaemper;\* Assistant Professor Craigie.\*

The Department of Clothing, Textiles and Interior Design offers opportunities for study in socio-economics of clothing, textile science, clothing construction, fashion merchandising, history of costume, and design of interiors. Four options leading to a Bachelor of Science degree are: (1) fashion marketing, (2) fashion design, (3) textile science, and (4) interior design. Major sequences leading to the Master of Science degree in the field of clothing, textiles and interior design may be selected according to the individual's choice.

Facilities include an extensive University library, well-equipped studios, laboratories, and equipment for interior design, clothing construction and textile analysis. The department has two student chapters of professional organizations, the ASID and AATCC.

#### Graduate Study

The Department offers advanced work leading to a Master of Science degree. Programs of study are individually planned for the students and are aimed at developing skills and concepts which will promote professional and personal advancement.

The Department of Clothing, Textiles and Interior Design participates in the graduate program for the Ph.D. in home economics.

### Courses in Clothing and Textiles

#### Undergraduate Credit

**610 131. Clothing and Society.** (3) I, II, alt. S. Cultural, social, psychological, and economic aspects of clothing needs and practices of individuals and groups. Two hours lec. and one hour discussion. Pr.: Open only to freshmen and sophomores. 610-131-0-1303

**610 150. 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. 610-150-1-1303

**610 220. Fundamentals of Costume Design.** (3) I, II. Application of function, form, and color to costume design. Pr.: Art 100. 610-220-1-1303

**610 230. Fashion Marketing.** (3) I, II. Overview of the fashion profession: career opportunities and influences on the marketing of fashion goods. 610-230-0-1303

**610 260. Textiles.** (3) I, II, alt. S. Fundamentals of textiles as related to the problems of the consumer. Two hours rec. and two hours lab. a week. Pr.: Sophomore standing. 610-260-1-1303

**610 300. Advanced Clothing Construction.** (3) I, 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.: C&T 150 and C&T 260 or concurrently. 610-300-1-1303

**610 315. Costume Illustration.** (3) II. The changing fashion figure and fashion renderings; fundamental fashion layout. Pr.: Art 225, C&T 220, or consent of instructor. 610-315-1-1303

**610 360. Textile Testing.** (3) Alt. I, II. Basic principles and methods used in analyzing end-use performance of textiles. One hour lecture and four hours lab per week. Pr.: C&T 260. Not open to seniors in 611 option. 610-360-1-1303

**610 395. Visual Merchandising.** (3) I, II. Basic principles and techniques of merchandising display; experience through cooperation with retail stores. Pr.: Art 100. 610-395-1-1303

**610 400. Tailoring.** (3) I, II, alt. S. Beginning tailoring techniques applied in the construction of a coat or suit based on a commercial pattern. Pr.: C&T 300. Six hours lab. a week. 610-400-1-1303

**610 440. Socio-Psychological Aspects of Clothing.** (3) I, II. An interdisciplinary approach to the concepts and theories applied to the study of clothing and its expression and use in relation to self, society and culture. Pr.: Soc. 211 and Psych. 110. Not open to freshmen, sophomores or students who have taken C&T 131. 610-440-0-1303

**610 450. Fashion Marketing Field Experience.** (5) I. Observation and supervised experience in merchandising procedures in a retail establishment. Pr.: C&T 230 and B.A. 260. Junior or senior in 610 option, 2.2 cum. GPA, and 2.5 GPA in professional courses. 610-450-2-1303

#### Undergraduate And Graduate Credit In Minor Field

**610 500. Intermediate Costume Design.** (3) I. Design by illustration, with emphasis on functional and original design solutions; and on fashion sources. Pr.: C&T 315 and Art 220. 610-500-1-1303

**610 565. Design by Weaving.** (2) I, II. Color, texture, and design are integrated within the experience of fabric and rug construction. Pr.: I. Des. 240 or consent of instructor. 610-565-1-1303

#### Undergraduate And Graduate Credit

**610 610. Theory of Pattern Design.** (3) I, II, S. Introduction to basic principles and techniques used in the development, alteration, and styling of patterns through the use of pattern drafting and flat pattern design. Pr.: C&T 150. 610-610-1-1303

**610 636. Fashion Merchandising.** (4) I. The processes involved in managing fashion departments. Pr.: C&T 230, and junior or senior standing. 610-636-0-1303

**610 645. Textile and Apparel Industry.** (3) I. The textile industry from fiber production to the ultimate consumer. Pr.: Econ. 110; C&T 260. 610-645-0-1303

**610 650. Textile Fibers.** (3) I, alt. S. In-depth study of fibers. Two hours rec. and three hours lab per week. Pr.: C&T 260 and Chem. 191 or 351. 610-650-0-1303

**610 670. Textiles for Merchandising.** (3) I, II. Application of principles of textiles to end-uses; characteristics of fibers used in household textiles, apparel, and accessories; emphasis on serviceability and comparison shopping. Pr.: C&T 260, Chem. 191, and junior or senior in 610 or 613 option. 610-670-0-1303

**610 710. Advanced Tailoring.** (3) II, alt. S. Construction of a garment, using different fabrics and utilizing custom tailoring techniques. Pr.: C&T 400 and 610 or 720. 610-710-1-1303



**610 715. Advanced Flat Pattern Design.** (3) I. Application of flat pattern design with emphasis on the development of patterns for original designs. Pr.: C&T 610. 610-715-1-1303

**610 720. Designing by Draping.** (3) II, alt. S. Social significance of fashion; application of design principles in dress. Designs draped in muslin and then completed in suitable fabrics. Six hours lab. a week. Pr.: Six hours clothing construction, C&T 610 recommended. Fashion Design majors must take concurrently with Advanced Costume Design. 610-720-1-1303

**610 725. Pattern Drafting Techniques.** (3) II. Study of advanced pattern drafting techniques with emphasis on the bodice and pants for different figure types. Pr.: C&T 610. 610-725-1-1303

**610 730. History of Costume: Western Dress to 1815.** (3) I, II, alt. S. Interrelationships of costume and social, cultural, political, economic environments from antiquity to 1815; evolution of garments. Pr.: Hist. 501. 610-730-0-1303

**610 731. History of Costume: Western Dress from 1815 to Present.** (3) II, alt. S. Interrelationships of costume and social, cultural, political, economic environments from 1815 to present with emphasis on fashion cycles, development of ready-to-wear and haute couture designing. Pr.: C&T 730. 610-731-0-1303

**610 735. Fashion Promotion.** (3) II alt. years. Promotion of fashion merchandise including advertising, fashion show production, special events, selling techniques, and other promotional activities in industry and retailing. Pr.: C&T 230 and B.A. 420. 610-735-0-1303

**610 740. Advanced Costume Design.** (3) Alt. years. Design orientation for market size range. Pr.: C&T 500. 610-740-1-1303

**610 750. Experimental Textiles.** (Var.) Offered on sufficient demand. Individual investigation into textile research. Pr.: C&T 650. 610-750-1-1303

**610 756. 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.: C&T 650. 610-756-1-1303

**610 760. Clothing and Textiles Seminar.** (Var.) II, alt. S. 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. 610-760-0-1303

**610 765. 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.: C&T 650 or 670, Chem. 191 or 351. 610-765-1-1303

**610 780. Problems In Clothing and Textiles.** (Var.) I, II, S. Work is offered in garment designing, textiles, history of costume, clothing economics. Pr.: Senior or graduate standing; consent of instructor. 610-780-3-1303

**610 785. Problems In Costume Design.** (Var.) I, II, S. Problems planned with the student to meet particular needs. Pr.: C&T 500 or consent of instructor. 610-785-3-1303

### Graduate Credit

**610 831. Experimental Clothing Construction.** (2-3) I, alt. S. Recent developments in clothing construction, utilizing experimental projects and innovative methods. Six hours lab. a week. Pr.: Six hours of clothing and textiles. 610-831-1-1303

**610 835. Fashion Industries In the Economy.** (3) I, alt. S. Issues in the production and distribution in textiles, clothing, and home furnishings. Pr.: Econ. 110; six hours in C&T. 610-835-0-1303

**610 845. Clothing and Human Behavior.** (3) II In alt. years. Influences of the psychological, cultural, and social aspects of clothing upon human behavior. Pr.: Anthro. 200 and C&T 131 or C&T 440. 610-845-0-1303

**610 851. Textile and Clothing Literature.** (2) I, alt. S. Review of current literature with implications for future research. Pr.: Eight hours of clothing and textiles and eight hours of physical science. 610-851-3-1303

**610 860. Contemporary Topics in Clothing and Textiles.** (2-3) I, alt. 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. 610-860-0-1303

**610 870. Case Studies in Fashion Marketing.** (3) On sufficient demand. Independent and creative solutions to typical problems in the fashion industry by means of case study method. Pr.: B.A. 541, C&T 645 or consent of instructor. 610-870-0-1303

**610 898. 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. 610-898-4-1303

**610 899. Research In Clothing and Textiles.** (Var.) I, II, S. Research in clothing or textiles which may form the basis for the master's thesis. Pr.: Consent of instructor. 610-899-4-1303

**610 999. Research In Clothing, Textiles, and Interior Design.** (Var.) I, II, S. Pr.: Consent of major professor. 610-999-4-1303

## Courses in Interior Design

### Undergraduate Credit

**611 101. Design for Contemporary Living.** (3) I, II. Development of critical awareness of the application of principles of design in contemporary living. 611-101-0-1399

**611 215. Fundamentals of Interior Design.** (2) I, II. Aesthetic, social, and functional aspects of the home and its furnishings. One hour rec. and two hours lab. a week. Pr.: Art 100. 611-215-1-1399

**611 240. Interior Design I.** (3) I, II. Design concepts related to color, space planning, materials, and furnishings within living environments. Six hours lab. a week. Pr.: Art 100, 190 and Pre-Des. Prof. 211 (or concurrent enrollment). 611-240-1-1399

**611 435. 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 esthetic, functional, and behavioral interior planning; relationship among the systems, properties, methods, techniques and materials in interior design. Pr.: I. Des. 240 or concurrent enrollment. 611-435-0-1399

### Undergraduate And Graduate Credit in Minor Field

**611 540. Interior Design II.** (3) I, II. The analysis and design of interior space. Emphasis on design and awareness of human ecological requirements. Pr.: I. Des. 240. 611-540-1-1399

**611 545. Interior Design Practicum.** (3) I, II. Professional ethics and business practices; sources, materials and construction methods used in designed interiors. Pr.: I. Des. 540 or concurrent. Required of seniors in interior design option prior to I. Des. 730. 611-545-2-1399

### Undergraduate And Graduate Credit

**611 600. 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. 611-600-2-1399



**611 650. Contemporary Home.** (3) I. Living environments explored in three-dimensional studies. Two hours lec.; two hours lab. Pr.: I. Des. 240. 611-650-0-1399

**611 730. Interior Design III.** (3) I, II. Creative design of furnishings; introduction to markets and selling; designer-client relationships; qualifications of the professional designer. Pr.: I. Des. 540. 611-730-1-1399

**611 740. 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 and C.&T. 260. 611-740-0-1399

**611 745. Historic Furniture Design.** (3) II. Design expressed in furniture in each of the great art periods. Pr.: I. Des. 240 or consent of instructor. 611-745-0-1399

**611 751. Designing for Exceptional Needs.** (3) II. Problems encountered in designing for children, handicapped, aged, and the confined. Pr.: I. Des. 540. 611-751-0-1399

**611 780. Interior Design Seminar.** (2-3) I, II, alt. 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. 611-780-0-1399

**611 782. Problems in Interior Design.** (Var.) I, II, S. Problems planned with the student to meet particular needs. Pr.: I. Des. 730 or consent of instructor. 611-782-3-1399

### Graduate Credit

**611 820. Readings in Interior Design.** (2) I, II, S. Directed study in current problems of interior design. Pr.: I. Des. 540 or consent of instructor. 611-820-3-1399

**611 899. Research in Interior Design.** (Var.) I, II. Research which may form the basis for the master's thesis. Pr.: Graduate standing. 611-899-4-1399

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## FAMILY AND CHILD DEVELOPMENT

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*Marjorie Stith,\* Head of Department*

Professors Bollman,\* Kennedy,\* and Stith,\* Associate Professors Bergen,\* Jurich\* and Davis;, Assistant Professors Imig, Larson, Poresky,\* Russell, and Scheidt\*; Instructors McNeil, Price, Warren, and Woods. Emeritus: Professors Keli,\* McCord\* and Williams;\* Assistant Professor Raffington.

Family and child development offers unique opportunities for study of children, youth, and their families, with enriching experiences in the child development laboratory, the infant and child care center, the Manhattan community, and through the Wichita semester. Courses are planned to create an awareness of the dynamics of family relationships, interaction and development through the study of individuals, couples, and other family units throughout the life cycle.

Two options are available in the Department: **early childhood education** and **family life and human development**. Requirements for each are outlined on pages 262 and 263.

**Out-of-Classroom Experiences:** This department places great emphasis on the importance of laboratory and field experiences along with academic preparation. Laboratories are an integral part of many course offerings. The child development laboratory and the infant and child care center provide on-campus opportunities for students to observe and participate in child care programs. Both

facilities have morning and afternoon sessions and are located near Justin Hall, the main home economics building. Off-campus observation and participation with children of various ages are arranged in connection with a number of courses. A research room with one-way vision glass and an inter-communication system provide further opportunities for students to observe individuals or groups in an experimental setting.

Field experiences off campus involving direct contact with families, youth and children are available through the friendship tutoring program, the family resources center, and additional programs in Manhattan, Topeka, Kansas City, and other Kansas communities. There are two special professional semesters which provide responsible, supervised, professional involvement for students.

**Student Teaching:** Each student in the **early childhood education option** has a full semester of student teaching with pre-kindergarten aged children. There are a limited number of places in Manhattan for this experience, along with many excellent centers in Topeka, Kansas City, Salina, Clay Center, and other nearby communities. Some students elect to live in the community where they are teaching, if it is outside Manhattan; others choose to commute. One day each week is scheduled for course work in Manhattan during this semester.

**Wichita Semester:** Students majoring in **family life and human development** with a concentration in the community services area have a requirement of one semester of work in Wichita. Students have found this experience to be exciting and beneficial. During this period the student is involved in various private and public agencies concerned with families, youth, and children such as: Mid-American All Indian Center, Neighborhood Youth Corps; Elks Training Center, Store Front Counseling Center, Sedgwick County Mental Health Center, Community Action Program, and the American Red Cross.

Concurrently, the student is enrolled in at least two courses, taught in Wichita by family and child development staff. During this time of professional involvement and study, students meet together for planning, direction, and evaluation. They have guidance from agency personnel and from family and child development faculty. Each participant, with assistance from family and child development staff, makes arrangements for housing during this semester.

**Early Childhood Certification:** Completion of the **early childhood education option** meets the academic requirements for a degree three-year early childhood education certificate as established by the State Board of Education. In addition to the option requirements, the following criteria must be met: (1) an overall grade point average of 2.2 on all work taken at Kansas State University which must be attained before enrolling in student teaching; and (2) recommendation for certification by the director of the child development laboratory and by the head of the Department of Family and Child Development to the certifying officer of Kansas State University.

There is current emphasis on special preparation for work with exceptional children. The student may plan to add this component to the program. This is a



cooperative emphasis involving the departments of Curriculum & Instruction, Health, Recreation and Physical Education, and Speech.

**Dual Degree—Family and Child Development and Social Work:** Students in the **family life and human development option** may choose a dual degree in **social work**, planning with an adviser in family and child development and an adviser in social work. Those electing this course of action will work closely with the family and child development advising staff to include preliminary requirements and to make proper arrangements for entry into the dual program at the junior level. Such a program will give the student an opportunity for understanding human development and the varied concerns of families along with beginning social work skills. The social work major, housed in the Department of Sociology, Anthropology, and Social Work is accredited by the Council on Social Work Education.

**Dual Degree-Family and Child Development and Elementary Education:** Students in the **early childhood education option** may choose a dual degree in **elementary education**, planning with an advisor in family and child development and an advisor in elementary education. This choice will require careful use of all electives and regular summer school attendance to complete the requirements in four calendar years. Students electing this choice will have two professional teaching semesters, one at the below five-year level and one at the kindergarten through third-grade level.

### Graduate Study

The Department offers work toward the Master of Science degree for students interested in professional opportunities such as child development programs, child guidance clinics, family life education through community agencies and public schools, college teaching, student personnel work, or research in child development, marriage, and family life. Current emphasis on day care programs and on disadvantaged families and children provides varied professional opportunities to the home economist with a graduate degree in child development and family relations.

The Department of Family and Child Development participates in the graduate program for the Ph.D. in home economics.

## Courses in Family and Child Development

### Undergraduate Credit

**620 212. Observation of the Preschool Child.** (1) I, II, S. Observation and recording of behavior of children from birth to five years of age. Pr. or conc.: F.C. Dev. 310. 620-212-1-1305

**620 230. Introduction to Human Development.** (3) I, II, S. A study of human development through an individual's awareness and understanding of his own physical, social and psychological growth and relationships with his family, peers, and others. One hour lec. and two hours rec. a week. 620-230-0-1305

**620 235. Infancy.** (3) I, II. Prenatal and infant development from conception through age two. Study of the influences on the development and growth of the infant. 620-235-0-1305

**620 250. You and Your Sexuality.** (3) I, II. Study of the role and meaning of human sexuality in relation to oneself as well as in inter-relationships with others. Limited to freshmen and sophomores. 620-250-0-1305

**620 272. The Helping Relationship.** (2-3) I, II, S. 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 F.C. Dev. 230. 620-272-0-1305

**620 300. Problem in Family and Child Development.** (Var.) I, II, S. Independent or small group study. Pr.: Consent of instructor. 620-300-3-1305

**620 310. The Preschool Child.** (3) I, II, S. 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. 620-310-0-1305

**620 311. Preschool Child Lab.** (1) I, II, S. 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 F.C. Dev. and Home Ec. Ed. majors only. Conc. with F.C. Dev. 310. 620-311-1-1305

**620 315. Community Resources for Children.** (3) I. Study of legislation, community agencies and programs pertaining to children. Field trips arranged. Pr.: F.C. Dev. 310 and Soc. 211. 620-315-0-1305

**620 335. Expressive Media and Resources for Teachers of Young Children.** (2-3) I, II. Skills and resources in preparing instructional materials and implementing expressive activities in the early childhood center. 620-335-0-1305

**620 350. Family Relationships and Sex Roles.** (3) I, II, S. Effects of family interaction upon individual development and sex roles; consideration of pre-marital, marital, and parent-child relationships. Pr.: Sophomore standing. 620-350-0-1305

**620 352. Concepts of Family Health.** (3) I, II. Current health issues in various developmental stages of the family. Factors conducive to maintaining health for family members from the prenatal period through old age. Pr.: Sophomore standing. 620-352-0-1305

**620 370. Parenting.** (3) II. Principles and philosophies relevant to the act of parenting. How to establish a nurturing relationship between parents and their children. Pr.: F.C. Dev. 230. 620-370-0-1305

**620 400. Field Study in Family and Child Development.** (1-8) I, II, S. Directed study of processes of human development and participation in a field setting. Pr.: Consent of department head. 620-400-2-1305

**620 420. Interaction Techniques with Young Children.** (3) I, II. 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. Pr.: F.C. Dev. 310 or consent of instructor. Two hours lec. and one hour lab. 620-420-0-1305

**620 430. Middle Childhood.** (2) I, II, alt. S. Developmental characteristics of middle childhood as a basis for guidance with emphasis on understanding of family and peer group relationships. To be taken concurrently with F.C. Dev. 431. Pr.: Psych. 110 and one of the following: F.C. Dev. 210, Educ. 215, or Psych. 280. 620-430-0-1305

**620 431. Middle Childhood Lab.** (1) I, II, alt. S. Observation, recording and evaluating out-of-school behavior of children 6 to 12 years of age with a focus on the helping relationship in light of developmental aspects. To be taken concurrently with F.C. Dev. 330. 620-431-1-1305

**620 499. Human Service Data.** (2-3) I, II, S. Preparation and interpretation of interviews, social histories, observations, surveys, and agency records. Techniques in planning, implementing, and evaluating human services. Pr.: F.C. Dev. 310 and 230. 620-499-0-1305

### Undergraduate And Graduate Credit In Minor Field

**620 520. The Adolescent.** (2) I, II, alt. S. Focus on interpersonal processes; principles and characteristics of the helping relation in light of developmental aspects of adolescence. Take F.C. Dev. 521 concurrently. Pr.: Five hours of F.C. Dev. or five hours of a combination of Psych. and Educ. Psych. and junior standing. 620-520-0-1305



**620 521. The Adolescent Lab.** (1) I, II, alt. S. Observation, recording and evaluating of out-of-school behavior of adolescents with focus on developing a helping relationship with an adolescent. Take F.C. Dev. 520 concurrently. 620-521-1-1305

**620 530. Advanced Study of Children.** (3) I, II. History and methods of child study; analysis of developmental theory; laboratory experience for graduate students. Pr.: Psych. 420 or equiv. and F.C. Dev. 310 or Psych. 415 or consent of instructor. 620-530-0-1305

**620 580. Directed Field Experience.** (6-8). A block field placement in agencies outside of Manhattan. Faculty-supervised experience in direct service to clients: individuals, groups, and communities. Weekly seminar during placement emphasizes theory underlying the practice. Pr.: F.C. Dev. 260 and consent of instructor. 620-580-2-1305

### Undergraduate And Graduate Credit

**620 610. Developmental Program Planning for Young Children.** (2) I, II. Principles and techniques of curriculum building to meet the needs of preschool children in the areas of social, emotional, cognitive, motor, and language development. Take F.C. Dev. 611 concurrently. Pr.: F.C. Dev. 310, F.C. Dev. major, and consent of instructor. 620-610-0-1305

**620 611. Developmental Program Planning for Young Children Lab.** (1) I, II. Application of principles and techniques covered in F.C. Dev. 610 in a preschool program. To be taken concurrently with F.C. Dev. 610. 620-611-1-1305

**620 625. Directed Experiences in Early Childhood Education** (with children 2-5). (8) I, II. Participation in a preschool program; planning, instruction, evaluation. Pre-arrangement and consent of instructor required. Pr.: F.C. Dev. 610 and 611. 620-625-2-1305

**620 626. Child Development Center Programming.** (2 or 3) I, II, alt. S. Rationale for and techniques of administering programs for preschool children, including health, education, social services, parent involvement. Pr.: Nine hours Family and Child Development or consent of instructor. 620-626-0-1305

**620 640. Characteristics and Developmental Processes of College Students.** (3) I, II. Study of characteristics of college students; relate patterns of maturity to academic experiences, to formulation of life styles and to development of a sense of vocation. Pr.: F.C. Dev. 230 plus nine additional hours in F.C. Dev., Psych., Soc., or Educ. and consent of instructor. 620-640-0-1305

**620 650. The Family.** (2-3) I, II, S. Consideration of the family throughout the family life cycle; developmental tasks at each stage. Present-day resources available for strengthening American families. Pr.: F.C. Dev. 350 or consent of instructor. 620-650-0-1305

**620 652. Black Family.** (2-3) I, II. 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. 620-652-0-1305

**620 654. Death and the Family.** (2-3) I, II, S. Exploration of contemporary attitudes toward death and dying; related influences on individual development and family life. Pr.: F.C. Dev. 650 or Soc. 640. 620-654-0-1305

**620 670. Parent Education.** (2 or 3). I, II, alt. S. Principles in child development and family relationships applied to professional group and individual work with parents. Pr.: F.C. Dev. 210, 650, six hours psychology, or consent of instructor. 620-670-0-1305

**620 700. Problems In Family and Child Development.** (Var.) I, II, S. Independent study on aspects of Family and Child Development. Students writing a master's report enroll in this course. Pr.: Consent of department head. 620-700-3-1305

**620 704. Seminar In Family and Child Development.** (Var.) I, II, S. Interpretation and evaluation of information on varied topics relating to family members. May be taken more than one semester with consent of department head. Pr.: F.C. Dev. 650 or consent of instructor. 620-704-0-1305

**620 708. Topics in Family and Child Development.** (2-3) I, II, S. Review of recent research and theory related to family and child development, individual growth, family and interpersonal processes. Pr.: Consent of instructor. May be taken more than one semester. 620-708-0-1305

**620 710. Child Care: Components and Issues.** (2-3) Alt. II, S. 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.: 15 hours of either social science and/or F.C. Dev. or combination. 620-710-0-1305

**620 750. Low-Income Families.** (2-3) I, II, alt. S. Factors affecting family life in disadvantaged families; life styles of sub-cultures; proposed programs; implications for persons working with low-income children and families. Pr.: F.C. Dev. 650 or consent of instructor. 620-750-0-1305

**620 765. Human Sexuality.** (3) II, alt. S. Focus on implications of personal and familial aspects of human sexuality throughout the life cycle. Pr.: F.C. Dev. 350 or consent of instructor. 620-765-0-1305

### Graduate Credit

**620 810. Child Development.** (3) I, II, alt. S. Behavioral characteristics and developmental processes in childhood and adolescence. Analysis of developmental trends and issues in terms of research evidence and theoretical expectations. Pr.: F.C. Dev. 310 and three additional hours in F.C. Dev. or Child Psychology. 620-810-0-1305

**620 815. Infant Behavior and Development.** (3) I, II alt. 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.: F.C. Dev. 310, 810, and Biol. 198. 620-815-0-1305

**620 820. Theories of Child Development.** (3) I, alt. S. Theories of development relating to physical, social and psychological patterns of children's growth and interaction with the family and the community. Pr.: F.C. Dev. 530 and 810. 620-820-0-1305

**620 822. Transition to Adulthood.** (3) I or II alt. years. Advanced study of theory and research of the transition period from adolescence through youth to adulthood. Pr.: F.C. Dev. 520 and 810. 620-822-0-1305

**620 824. Parent-Child Interaction: Theory and Research.** (2-3) I, II, S. 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.: F.C. Dev. 820. 620-824-0-1305

**620 830. Advanced Program Development.** (2-3) I, II, S. Analysis of the process and application of child development theory to early childhood program planning. Pr.: F.C. Dev. 820. 620-830-0-1305

**620 840. Social Processes In Human Development.** (3) I, alt. S. 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 or consent of instructor. 620-840-0-1305

**620 842. Physiological Processes In Human Development.** (3) Alt. 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 or consent of instructor. 620-842-0-1305

**620 843. Self-Processes In Human Development.** (3) II, alt. S. 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 or consent of instructor. 620-843-0-1305



**620 850. Family Components and Issues.** (3) I, 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.: F.C. Dev. 650. 620-850-0-1305

**620 862. Marital Interaction.** (3) I, alt. S. A study of the dynamics of marital interaction with emphasis upon the interpersonal relationships and processes of adjustment. Pr.: F.C. Dev. 350, and 650, consent of instructor. 620-862-0-0135

**620 870. Principles of Marriage and Family Counseling.** (3) I, alt S. 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.: Educ. 823; F.C. Dev. 840, 842, or 843 or consent of instructor. 620-870-0-1305

**620 875. Delivery of Human Services.** (3) I, II, alt. S. Cognitive and experiential understanding of professional responsibilities to work effectively with families in an educational outreach or consultative setting. Pr.: F.C. Dev. 272, 610, 650. 620-875-0-1305

**620 879. 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.: F.C. Dev. 272 or 420 and 650. 620-879-0-1305

**Practicums In Family and Child Development.** (Var.) I, II, S. Supervised experience in providing help and/or instruction in the several areas of family and child development presented in terms of the special interests of the students. Consent of practicum supervisor is required for each.

**620 880. Practicum in Counseling.** (Same as Psych. 860 and Educ. 863.) Pr.: F.C. Dev. 810, 850, 870, 875, Educ. 823. 620-880-2-1305

**620 881. Practicum in Family and Community Services.** Pr.: F.C. Dev. 810, 850, 875, 879 (or concurrent). 620-881-2-1305

**620 882. Practicum in Study of Student Development.** Pr.: F.C. Dev. 850 or 860. 620-882-2-1305

**620 883. Practicum in Early Childhood Education.** Pr.: F.C. Dev. 610, 810, 850, 875, 879 (or concurrent). 620-883-2-1305

**620 884. Practicum in Parent Education.** Pr.: F.C. Dev. 810, 850, 875, 879 (or concurrent). 620-884-2-1305

**620 890. Research Methods in Family and Child Development.** (2-3) II. Study and application of family and child development methodology for research in graduate programs and professional careers. Pr.: Six hours in Family and Child Development at 600 level or higher or consent of instructor. 620-890-0-1305

**620 892. Practicum in Human Development Research.** (Var.) I, II, S. Observation, modification, and reporting of behavior. Pr.: F.C. Dev. 840, 842, or 843; course in methods of research; six other graduate hours in Family and Child Development; consent of department head. 620-892-4-1305

**620 894. Readings in Family and Child Development.** (3) I, II, S. Implications of research findings in preparation for professional work in counseling, teaching, and research in Family and Child Development. Pr.: F.C. Dev. 210 or equiv. and F.C. Dev. 650 or equiv. and six hours in Social Science or consent of department head. May be taken more than once. 620-894-3-1305

**620 899. Research in Family and Child Development.** (Var.) I, II, S. Individual research problems which may form the basis for the master's thesis. Pr.: Consent of department head. 620-899-4-1305

**620 950. Family Processes.** (3) Alt. years. Examination of theoretical approaches to the study of the family unit from the perspective of interpersonal relationships; participant observation of families and/or analysis of case materials. Pr.: F.C. Dev. 650. 620-950-0-1305

**620 988. Conjoint and Group Techniques in Family Counseling.** (3) II, S. Advanced theory in marriage and family counseling with emphasis on group techniques. Pr.: F.C. Dev. 880 and consent of instructor. 620-988-0-1305

**620 999. Research in Family and Child Development.** (Var.) I, II, S. Pr.: Consent of major professor. 620-999-4-1305

## FAMILY ECONOMICS

*Richard L.D. Morse,\* Head of Department*

Professor Morse;\* Assistant Professors Annis,\* Flashman, and Rasmussen. Emeritus: Associate Professor Agan.\*

This department prepares students for professional work in the areas of housing, household equipment, home management, consumer education, consumer finance, financial counseling and family economics. Modern laboratory facilities and equipment are provided.

Emphasis in the department is twofold: to study the effect of social and economic forces on the family, and to study management of resources in relation to family goals. Undergraduate options are: (1) consumer interest, and (2) housing and equipment.

Work leading to the Master of Science degree is offered by this department. Work leading to the doctorate is through the Ph.D. in home economics. Graduate students prepare for positions in consumer economics, home management, household equipment, financial counseling, and consumer education as specialists in extension, faculty of colleges and universities, or on government and business staffs. Field study and research are conducted in community programs, consumer affairs, aging, public policy on health, housing, credit, savings, and family resource management. Research opportunities also are available in household equipment and inside environment air contaminant control. Several research and teaching assistantships are available each year.

Prerequisite to graduate work in these fields is a B.S. or B.A. degree, with a major in home economics or a related field.

## Courses in Family Economics

### Undergraduate Credit

**630 110. Consumer Action.** (2) I. 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. 630-110-0-1304

**630 400. Family Economics.** (3) I, II. Economic forces affecting families, and management by families of their economic resources. Pr.: Econ. 110 or equiv. 630-400-0-1304

**630 405. Family Finance.** (3) I, II. Financial problems involved in the effective management of the family's resources. 630-405-1-1304

**630 410. 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. 630-410-2-1304

**630 415. Consumer Law.** (3) II. A study of law and agency regulations related to consumer protection. Pr.: F. Ec. 400, 405 or 605. 630-415-0-1304



**630 420. The House.** (3) I, II. A consideration of dwellings, their environment, plans, and space requirements, which promote effective utilization of family resources. Two hours lec., two hours lab. a week. Pr.: Sophomore standing. 630-420-1-1304

**630 440. Household Equipment.** (3) I, II. Principles of operation, care and design of equipment used in the home; methods of evaluating equipment performance and demonstrating application of principles. Two hours lec. and three hours lab. a week. 630-440-1-1302

**630 460. Family Resource Management Theory and Application.** (2) I, II. The process of using individual and family resources for maximizing goals. Pr.: Junior standing. 630-460-0-1304

**630 465. Home Management Laboratory.** (2) I, II. Residence or equivalent laboratory experiences in home management including analysis and evaluation of management at different family life-cycle stages and socio-economic levels. Arrange enrollment before registration. Pr.: F. Ec. 460. 630-465-1-1304

### Undergraduate And Graduate Credit

**630 600. Economic Status of Women.** (3) I, II. Discrimination, rights, and responsibilities affecting the economic roles of women. Income, wealth, gainful and non-gainful employment, taxation, laws and attitudes. Pr.: Senior or graduate standing plus nine credit hours in social science. 630-600-0-1304

**630 605. Consumers and the Market.** (2 or 3) I, II, S. 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. 630-605-0-1304

**630 615. The Elderly Consumer.** (2-3) II, S. An analysis of consumer problems of the elderly, emphasizing the relationship to national, state, and local public policy. Pr.: F. Ec. 400. 630-615-0-1304

**630 620. Social Effects of the Housing Environment.** (2-3) I, S. 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.: F. Ec. 420 or consent of instructor. 630-620-0-1304

**630 630. Household Equipment Theory.** (2 or 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 F. Ec. 440. Six hours rec. and lab. a week. Pr.: Four hours lab. science course. 630-630-1-1302

**630 650. 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. 630-650-0-1304

**630 670. Field Study In Family Economics.** (Var.) I, II, S. Supervised experiences with community action programs, homemakers' service, and consumer services in industry. May be taken more than one semester. Pr.: F. Ec. 400, 460, or consent of department head. 630-670-2-1304

**630 680. Seminar In Family Economics.** (1 to 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. 630-680-0-1304

**630 700. Families In the American Economy.** (3) I, II. 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. or conc.: Econ. 110 or consent of instructor. 630-700-0-1304

**630 705. Financial Problems of Families.** (2) 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.: F. Ec. 405 or consent of instructor. 630-705-0-1304

**630 710. Consumer Marketing Programs and Policies.** (2 or 3) II, S. Review of consumer marketing programs and policies of education, business and government as they bear upon consumer decision-making in the market. Pr.: F. Ec. 605 or equiv. 630-710-0-1304

**630 712. Family Financial Counseling.** (2) II. Analyses of specific problems of financially troubled families seeking counsel from cooperating agencies. Pr.: F. Ec. 705 or conc. enrollment. 630-712-0-1304

**630 713. Financial Counseling Practicum.** (1-4) I, II, S. Financial counseling with a cooperating agency or business. Pr.: F. Ec. 712 or concurrent enrollment. Placement contingent on staff approval. 630-713-2-1304

**630 720. Housing Requirements of Families.** (1-4) II, S. Housing needs and requirements of families as influenced by social norms, societal values, family activities and preferences, and economic and political constraints. Field trips to gather data for course projects required. Pr.: F. Ec. 420, 620, or consent of instructor. 630-720-0-1304

**630 740. Advanced Household Equipment.** (2 or 3) II, S. 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.: F. Ec. 440, Phys. 115; senior or graduate standing. 630-740-1-1304

**630 760. Management of Family Resources.** (3) II, S. Identifying and analyzing problems of management in the home which affect the needs of individuals and create a satisfying environment for the family. Pr.: F. Ec. 460 and consent of instructor. 630-760-0-1304

**630 780. 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. 630-780-3-1304

### Graduate Credit

**630 810. Resources for Consumer Education.** (2 or 3) S. Survey and evaluation of the subject matter content of consumer education books, pamphlets, and audio-visuals. Pr.: C&I 450, A&O 752, or degree in social science. 630-810-0-1304

**630 811. Consumer Education.** (2 or 3) S. Evaluate syllabi and approaches to teaching consumer economics and consumer affairs. Pr.: C&I 450 or A&O 752 and F. Ec. 400 or consent of instructor. (See A&O 811.) 630-811-0-1304

**630 815. Advances In Consumer Economics.** (1 or 3) S. Fundamental principles of consumer economics emphasizing money management, decision-making in consumer purchases, institutional factors bearing on consumer decisions. Pr.: F. Ec. 605 and 700. 630-815-0-1304

**630 820. Seminar on Aging.** (2 or 3) S. Selected aspects of problems and current developments concerning the economic, housing, equipment, and managerial needs of the aging. Pr.: F. Ec. 460, 700, Econ. 110, Soc. 211, or consent of instructor. May be taken more than once with consent of department head. 630-820-0-1304

**630 840. Experimental Methods In Household Equipment.** (2) I. Philosophy of household equipment evaluation and experimentation; emphasis upon instrumentation, selection of variables, and data analysis. Pr.: A course in statistics, F. Ec. 740 or consent of instructor. 630-840-1-1302



**630 860. Advanced Home Management.** (Var.) II, S. Review of current research in management, administration, decision-making, goal evaluation, and problems of families handicapped by low income, physical disability, or age. Pr.: F. Ec. 465 or consent of department head. 630-860-0-1304

**630 899. 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. 630-899-4-1304

**630 999. Research in Family Economics.** (Var.) I, II, S. Pr.: Consent of major professor. 630-999-4-1304

## FOODS AND NUTRITION

*Jane Raymond Bowers,\* Head of Department*

Professors Bowers,\* Caul,\* Finkelstein,\* Fryer,\* and Harrison;\* Assistant Professors Briggs, Phillips, Newell,\* Setser,\* and Skelton. Emeritus: Professor Tinklin;\* Associate Professors Browning\* and McMillan;\* Assistant Professor Mullen.\*

The Department of Foods and Nutrition provides, through its two options and interdepartmental program, specialized instruction for students who wish to become nutritionists, research workers in food and nutrition, dietitians, extension specialists, food editors, food scientists, or work with food in business and test kitchens.

Two options in foods and nutrition lead to a bachelor's degree: (1) foods and nutrition in business and (2) foods and nutrition science. Students prepare for business, extension work, and communications under option one. Students interested in food sciences and community nutrition select option two. Basic courses in foods and nutrition are offered for all home economics students and for those outside the field of home economics.

The Departments of Dietetics, Restaurant and Institutional Management and Foods and Nutrition offer the four-year undergraduate coordinated program in dietetics leading to a B.S. degree and membership in The American Dietetic Association.

Students wishing to fulfill requirements of Institute Food Technologists may choose the science option of the curriculum in food science and industry (with a B.S. in food science and industry). This is an interdepartmental program involving the Departments of Foods and Nutrition, Animal Science and Industry, Dairy and Poultry Science, Grain Science and Industry, and Horticulture and Forestry.

M.S. and Ph.D. programs are offered by the department. Research and teaching laboratories provide students with excellent equipment. Research assistantships are available to qualified students.

The Department of Foods and Nutrition is a participating member of the graduate programs in food science and in physiology leading to M.S. and Ph.D. degrees.

## Courses in Foods and Nutrition

### Undergraduate Credit

**640 132. Basic Nutrition.** (3) I, II, S. Nutritional requirements of man with emphasis on developing judgment in the selection of foods. Not open to students in Foods and Nutrition, Dietetics and Institutional Management, and Home Economics Education. 640-132-0-1306

**640 133. Food for Man.** (3) I. Food production, distribution, significance and consumption. Nutritional status of world population and local, national and international programs for improvement. 640-133-0-1306

**640 300. Meal Management.** (3) I, II. Fundamentals of food purchasing and preparation, and meal service with emphasis on nutritional adequacy, aesthetics, and management of money, facilities and human resources. One hour rec. and six hours lab. a week. 640-300-1-1306

**640 301. Trends in Food Products.** (3) I, II. Current trends in utilization, consumption, preservation, and market forms of various foods. Food laws, regulation, additives, labeling, and packaging. 640-301-0-1306

**640 400. Food Preparation.** (3) I, II. Effect of preparation, conditions, and ingredients on physical characteristics of standard food products. One hour rec. and four hours lab. a week. Pr.: Biochem. 120 or Chem. 190 and 191. 640-400-1-1306

### Undergraduate And Graduate Credit In Minor Field

**640 500. Practicum in Foods and Nutrition.** (5) I, S. Supervised professional field experience in foods and nutrition. Two credits recitation and three credits of supervised experience. Pr.: F&N 300, 616, and/or consent of instructor. 640-500-2-1306

**640 535. Nutrition and Physical Activity.** (3) S. The study of nutrition concepts, physical activity and their interrelationships. Emphasis will be on weight control, fads and fallacies of diet; physical fitness and athletics. Pr.: Biol. 198 and consent of instructor. (Cross-listed with College of Arts and Sciences, see HPER 535.) 640-535-0-1306

### Undergraduate And Graduate Credit

**640 601. Food Science.** (4) I, II. Preparation of foods as related to their chemical, physical, and organoleptic properties. Two hours rec. and five hours lab. a week. Pr.: Chem. 190 and 191 or 350 and 351, or Biochem. 120. 640-601-1-1306

**640 602. Principles of Nutrition.** (3) I, II. Functions and interrelationships of various nutrients in the body. Two hours rec. and two hours lab. a week. Pr.: Chem. 190 and 191, or 350 and 351 or Biochem. 120; and Biol. 198. 640-602-1-1306

**640 603. Maternal and Child Nutrition.** (2-3) II, S. A study of the principles of prenatal, infant, and child nutrition emphasizing the practical application to life situations. Pr.: F&N 132, Biol. 198 or consent of instructor. 640-603-0-1306

**640 612. Principles of Food Product Development and Control.** (3) I, S. Food product concept, feasibility and evaluation. Pr.: F&N 601 or consent of instructor. 640-612-0-1306

**640 613. Applied Normal Nutrition.** (3) I, II. Theory, observation and supervised application. Emphasis on communication and nutrition with child, aged and psychiatric patients. Two credits recitation, one credit of supervised experience. Pr.: Biochem. 201 or 521, Biol. 525, consent of instructor. 640-613-2-1306

**640 614. Nutrition in Medical Science.** (6) I, II. Therapeutic nutritional principles related to anomalies in disease. Supervised experience. Three credits recitation and three credits of supervised experience. Pr.: Biochem. 201 or 521, Biol. 525, consent of instructor. 640-614-2-1306

**640 615. Nutritional Care of Patients.** (6) I, II. Routine observation and supervised experience in nutritional care of patients. One credit recitation and five credits of supervised experience. Pr.: Biochem. 201 or 521, Biol. 525, consent of instructor. 640-615-2-1306

**640 616. 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.: F&N 132 or 601 and 602. 640-616-1-1306



**640 620. Sensory Evaluation of Foods.** (3) I. 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.: F&N 601. 640-602-1-1306

**640 680. Seminar in Foods and Nutrition.** (2) I. Individual reports and discussion of current topics in foods and nutrition. Pr.: F&N 601 and 602. 640-680-0-1306

**640 700. Community Nutrition.** (3) I, II. Organizations and personnel involved in action programs for nutrition; methods for determining and implementing nutrition education programs. Pr.: F&N 132 or 602. 640-700-0-1306

**640 710. Nutrition Needs Throughout the Life Cycle.** (3) I, II. Food patterns, dietary intakes and nutritional requirements of infants, children, adolescents, and adults. Pr.: Biochem. 201 or 521, Biol. 525, F&N 602. 640-710-0-1306

**640 712. Diet Therapy.** (3) II. Dietary modifications for pathological conditions. Pr.: F&N 602, Biochem. 201 or 521, Biol. 525. 640-712-0-1306

**640 750. Nutritional Aspects of Food Processing and Preparation.** (3) II alternate years. Stability of nutrients during processing, storage, and preparation of foods from raw food to products for human consumption. Pr.: F&N 601 and 602, Biochem. 200 or 521. 640-750-0-1306

**640 760. Fundamentals of Food Flavor Analysis.** (3) I. 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 organoleptic measurement. One hour lec. and six hours lab. a week. Pr.: Chem. 190, 350, or 550; F&N 601. 640-760-1-1306

**640 780. 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.: F&N 601 or 602. 640-780-3-1306

**640 790. Food Research Techniques.** (3) II. Fundamental principles of food quality evaluation and development of an independent research problem. Pr.: F&N 601. 640-790-1-1306

#### Graduate Credit

**640 809. Research Methods in Foods and Nutrition.** (3) I or II, on demand. Chemical, biological, and histological methods applicable to research in foods and nutrition. Pr.: F&N 710 and 601, or consent of instructor. 640-809-1-1306

**640 811. Advances in Foods.** (1-3) S. Recent developments and concerns related to foods. Pr.: F&N 601 and consent of instructor. 640-811-0-1306

**640 813. Advances in Nutrition.** (1-3) S. Recent developments and concerns related to nutrition. Pr.: F&N 602 and consent of instructor. 640-813-0-1306

**640 814. World Nutrition.** (1-3) I, II, S alt. years. Analysis of factors that contribute to malnutrition, effects of under-nutrition and of malnutrition, methods for assessing nutritional status and measures for improvement. Pr.: F&N 602. 640-814-0-1306

**640 815. Practicum in Community Nutrition.** (3) I, II, S. Supervised experience in community nutrition agencies. Pr.: F&N 700. 640-815-2-1306

**640 816. Application of Food Flavor Analysis.** (2) II on demand. Application of flavor panel analysis to food research problems. One hour lec. and two hours lab. a week. Pr.: F&N 760. 640-816-1-1306

**640 817. Nutrition and Aging.** (2-3) II, S. Nature of aging process, nutritional requirements, food habits, and effect of nutrition on the rate of biological aging. Pr.: Nine hours of nutrition, Biol. 525 and Biochem. 521. 640-817-0-1306

**640 818. Fundamentals of Meat Processing and Preparation.** (1-2) S on demand. Inspection, grading, processing, and preparation in relation to chemical and physical characteristics, costs, safety, quality, and palatability of red meat. Pr.: F&N 601 and conc. enrollment in ASI 818. 640-818-1-1306

**640 880. Graduate Seminar in Foods and Nutrition.** (1) II. Discussion of investigations in foods and nutrition. May be taken four semesters for credit. Pr.: F&N 790 and 710. 640-880-0-1306

**640 890. Readings in Foods and Nutrition.** (Var.) I, II, S. Reports and discussions on current research and literature in foods and nutrition and allied areas. Pr.: Consent of instructor. 640-890-3-1306

**640 898. Master's Report.** (2) I, II, S. Survey in depth of the literature. 640-898-4-1306

**640 899. Master's Thesis.** (6-8) I, II, S. Research in area of specialization. 640-899-4-1306

**640 900. Bionutrition.** (3) I, S. Evaluation of nutrient needs of the whole man by integration of knowledge of biochemistry, physiology, and nutrition. Pr.: Biochem. 521, Biol. 525 and F&N 602. 640-900-0-1306

**640 901. Advanced Nutrition.** (3) II, S. Current knowledge of metabolic functions of food in the human organism. Pr.: Biochem. 201 or 521, Biol. 525, F&N 602. 640-901-0-1306

**640 902. Food Systems.** (3) I. Basic scientific principles associated with colloidal systems as applied to food gels and emulsions and to protein food systems. Pr.: Biochem. 521, F&N 601, or consent of instructor. 640-902-1-1306

**640 903. Advanced Foods.** (3) II, S. Properties and functions of fats, oils, and starches in food; the structure of batters and doughs; and principles and techniques in food preservation. Two hours rec. and three hours lab. a week. Pr.: Biochem. 201 or 521, and F&N 601. 640-903-1-1306

**640 904. Methods of Nutrition Consultation.** (3) I or II. Consultation techniques stressing technical and socio-psychological factors in meeting nutritional problems of individuals and agency personnel. Pr.: F&N 712. 640-904-0-1306

**640 905. Lipids in Food Systems.** (2) S on demand. Physical and chemical characteristics of lipids with emphasis on their behavior and function in food systems. Pr.: Biochem. 521 and F&N 903. 640-905-0-1306

**640 906. Proteins in Food Systems.** (3) I or II alt. years. Behavior and function of proteins in food systems. Pr.: Biochem. 521 and F&N 902. 640-906-0-1306

**640 981. 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. Pr.: Consent of instructor. 640-981-0-1306

**640 999. Research in Foods and Nutrition.** (Var.) I, II, S. Three hours a week for each hour of credit. Pr.: Consent of instructor. 640-999-4-1306

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## DIETETICS, RESTAURANT AND INSTITUTIONAL MANAGEMENT

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*Marian Spears,\* Head of Department*

Professor Spears;\* Associate Professor Riggs; Assistant Professors Roach\* and Vaden;\* Instructors Gilroy, Ingalsbe, Owens, and Strelt. Emeritus: Professors Shugart\* and West;\* Associate Professor Zeigler.\*

The programs in the Department of Dietetics, Restaurant and Institutional Management are designed to prepare students for professional careers as dietitians or food service managers in health care facilities, community projects, colleges and universities, schools, commercial and industrial operations. Instruction is offered in three distinct programs each of which leads to a B.S. in home economics: 1) coordinated undergraduate program in dietetics, 2) traditional dietetics, 3) college and school food service. The Department of Dietetics,



Restaurant and Institutional Management administers the curriculum in restaurant management which leads to the degree B.S. in restaurant management.

**Coordinated Undergraduate Program in Dietetics.** Upon completion of the basic requirements, students may at the beginning of the junior year enter the coordinated undergraduate program in dietetics, which integrates classroom with clinical experiences, culminating in a B.S. in home economics and eligibility for active membership in The American Dietetic Association (ADA) and for registration as a dietitian (R.D.) upon passing a national qualifying examination. Junior and senior students obtain coordinated experience in the residence halls and K-State Union food services on campus. In addition, senior students in the program acquire experience for a minimum of one semester in either the Wichita KSU Dietetic Center or the University of Kansas Medical Center in Kansas City (as an enrolled student in the University of Kansas). Because of its professional connotation, the following criteria have been established for admission to and continuation in the program:

1. Transfer students must satisfy KSU admission requirements.
2. G.P.A. of 2.2 on a 4.0 scale for the first two years.
3. Provide health report and personal references with application which must be filed at the end of the sophomore year.
4. Approval of the dietetics executive committee.
5. G.P.A. of 2.5 in professional courses at the end of the junior year for continuation in the program.

**Traditional Dietetics.** Completion of this program, after the basic requirements, results in a B.S. in home economics and associate membership in ADA. Active membership may be obtained by one of three methods, each individually approved by ADA: 1) internship, 2) traineeship, or 3) three years of experience in dietetics. Active membership qualifies for ADA registration.

**College and School Food Service.** Although this program is not specifically designed to lead toward ADA membership, individual student programs can be arranged to accomplish this end.

### Graduate Study

Graduate study toward the M.S. in institutional management degree is offered after the completion of a four-year curriculum substantially equivalent to that required of undergraduate students majoring in dietetics, restaurant or institutional management at this university. Holders of a M.S. degree may be eligible for ADA membership following a one-year assistantship or six months of approved experience. The Department of Dietetics, Restaurant and Institutional Management participates in the graduate program for the Ph.D. in home economics.

## Courses in Dietetics, Restaurant and Institutional Management

### Undergraduate Credit

**660 400. School Lunch Management I.** (2) S. Basic principles of nutrition, menu planning and quantity food

production as related to school food services. 660-400-0-1307

**660 410. School Lunch Management II.** (2) S. Problems of the school food service manager, including employee training and scheduling, supervision, and financial control. Pr.: DRIM. 400. 660-410-0-1307

**660 430. 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. 660-430-0-1307

**660 440. Fundamentals of Quantity Food Production.** (4) 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. Two hours rec. and six hours lab. Pr.: F&N 300. 660-440-1-1307

**660 445. School Food Service Management.** (2-3) II, S. Managerial functions in the school food service system. Pr.: DRIM. 440 or equiv. 660-445-0-1307

**660 450. Field Experience in Dietetics and Institutional Management.** (1-5) I, II, S. Supervised professional experience in dietetics and institutional food service. May be taken more than once. 660-450-2-1307

**660 460. Instructional Competencies for Dietetic Practice.** (3) I, II. Professional dietetics practice applied to group and individual work with clients and personnel. Includes training, development of instructional materials, consultation, interviewing skills. Pr.: DRIM. 440. 660-460-0-1307

### Undergraduate And Graduate Credit

**660 635. Food Service Equipment and Layout.** (2) I, II. Factors affecting the selection and arrangement of equipment in food service systems. Field trip required. Pr.: DRIM. 440. 660-635-0-1307

**660 640. Organization and Management of Food Services.** (2 or 3) II, S. Principles of management as applied to food services; study of food service policies, budgets, supervision and personnel. Three hours rec. a week. Field trip required. Pr.: DRIM. 650 or consent of instructor. 660-640-0-1307

**660 650. Food Service Systems.** (6) I, II. Institutional food service as a system; menu planning, forecasting; procurement, production and service; employee training; supervisory experience in campus and community food services. Field trip required. Two credits rec., four credits practicum. Pr.: DRIM. 440 and consent of instructor. 660-650-2-1307

**660 660. Management in Dietetics.** (9) I, II. Functions of management in food service; financial control policy making, interdepartmental relationships, food service planning; independent study and management experience in campus and other food services. Three credits rec., six credits lab. Pr.: DRIM. 650 and consent of instructor. 660-660-2-1307

**660 665. Computer-assisted Food Service Management.** (1-2) I, II. Application of computer assistance in the food service system utilizing a dietetic educational model. Pr.: DRIM. 650. 660-665-0-1307

**660 670. Seminar in Dietetics.** (1-2) I, II. Investigation of trends and current research in dietetics. Pr.: DRIM. 650 and consent of instructor. May be taken more than once. 660-670-0-1307

**660 710. Readings in Institutional Management.** (1-3) I, II, S. Directed study of current literature in Institutional Management and related areas. 660-710-3-1307

**660 755. Food Service in Community Institutions.** (Var.) I, S. Management of the food service in small hospitals, nursing homes, and schools. Pr.: DRIM. 440 or consent of instructor. 660-755-0-1307



**660 780. Problems in Institutional Management.** (Var.) I, II, S. Individual investigation of problems in institutional management. Conferences and reports at appointed hours. Pr. or conc.: DRIM. 640, consent of instructor. 660-780-3-1307

**660 785. Practicum in Food Service Systems Management.** (1-6) I, II, S. Professional experiences in approved food service organization as a member of the management team under faculty supervision. Pr. or conc.: DRIM. 640. 660-785-2-1307

### Graduate Credit

**660 805. Food Production Management.** (3) II. Production planning and controls in food service systems. Decision optimization and application of computer-assisted management and systems analysis in food service organizations. Pr.: DRIM. 650 or consent of instructor. 660-805-1-1307

**660 810. Institutional Management Research Techniques.** (3) I. Survey and application of research methodology in institutional management. Pr.: DRIM. 440. 660-810-0-1307

**660 880. Resource Procurement and Food Service System Planning.** (3) II. Principles and methods of planning, selection, and purchasing resources for the food service system. Consideration of automation and convenience food systems. Pr.: DRIM. 650 and 635 or consent of instructor. 660-880-0-1307

**660 885. Seminar in Institutional Management.** (Var.) I, S. Developments in research related to food service management. May be taken more than one semester with consent of student's advisory committee. Pr.: DRIM. 640 and consent of department head. 660-885-0-1307

**660 890. Food Service Administration.** (2 or 3) II, S. Advanced study of management as applied to food service systems; organizational structure, financial and personnel policies, responsibilities and problems of management. Pr.: DRIM. 640. 660-890-0-1307

**660 899. Research in Institutional Management.** (Var.) I, II, S. Pr.: Consent of instructor. 660-899-4-1307

**660 999. Research in Institutional Management.** (Var.) I, II, S. Pr.: Consent of major professor. 660-999-4-1307

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## GENERAL HOME ECONOMICS

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*Ruth Hoeflin,\* Head of Department*

Professor Hoeflin;\* Associate Professor Senecal; Assistant Professor Reehling; Instructor Sego. Emeritus: Professor Kramer;\* Assistant Professor Barnes.\*

## Courses in General Home Economics

### Undergraduate Credit

**650 120. Dimensions of Home Economics.** (1-2) I. Historical development, philosophy, scope, and career choices. Includes use of computer based system for home economics educational plan. 650-120-0-1301

**650 208. Home Economics Colloquium.** (Var.) I, II, S. Special topics for home economics majors. 650-208-2-1301

**650 385. Problem in General Home Economics.** (Var.) I, II, S. Independent study. Pr.: Consent of instructor. 650-385-3-1301

**650 399. Honors Seminar in Home Economics.** (1) I, II. Selected topics in home economics. May be taken more than once for credit. For students in Honors Program only. 650-399-0-1301

**650 400. Home Economics Seminar.** (1) I, II. Current issues, professionalism and place of research in home economics. Pr.: Senior standing or consent of instructor. 650-400-0-1301

### Undergraduate And Graduate Credit

**650 780. Problem in General Home Economics.** (Var.) I, II, S. Individual investigation into work in area of general home economics. Pr.: Consent of instructor. 650-780-3-1301

### Graduate Credit

**650 800. Methods of Research in Home Economics.** (2) I, S. Fundamental procedures for research; meaning and organization of research from conception through publication. 650-800-0-1301

**650 850. Home Economists in Rehabilitation.** (1-6) I, II, S. Current status, literature, and research on rehabilitation programs for the handicapped. Pr.: 15 credit hours in 400-700 level home economics courses. 650-850-0-1301

**650 851. Field Study in Rehabilitation.** (6-12) I, II, S. Supervised professional experience in a rehabilitation agency or community program as a member of the rehabilitation team. Pr.: General H.E. 850. 650-851-2-1301

**650 860. Contemporary Topics in Home Economics.** (1-4) I, II, S. Selected topics in home economics. May be taken more than once with consent of graduate committee. Pr.: Eight hours graduate level home economics courses. 650-860-2-1301

**650 865. Field Study in Home Economics.** (1-6) II. Supervised professional home economics experiences. May be taken more than one semester. Pr.: General H.E. 860 or consent of instructor. 650-865-2-1301

**650 880. Seminar in Home Economics.** (1-3) I, II, S. Current research and trends in home economics. May be taken more than once for credit. Pr.: Consent of instructor. 650-880-0-1301

**650 899. Research in General Home Economics.** (Var.) I, II, S. Individual research problems. Pr.: Consent of instructor. 650-899-4-1301

**650 980. Interdisciplinary Home Economics Seminar.** (3) I, II, S. Current research, topics and issues relevant to the home economics profession. Pr.: Enrollment in the Ph.D. program in Home Economics. 650-980-0-1301

### Graduate Programs in General Home Economics

Graduate study leading to the degree Master of Science is offered in general home economics in combination with two or three related areas. Either the thesis, report, or course-work only plan may be selected for a program of study. The area of general home economics participates in the graduate program for the Ph.D. in home economics. Prerequisites for graduate work include a background in home economics or related areas and admission to Graduate School. The Dean of the College of Home Economics serves as an adviser.

**Home Economics Education.** The College of Home Economics and the College of Education have a cooperative arrangement so that a student who wishes a minor or major in home economics education may plan a graduate program of study to include one or more areas in home economics with emphasis in one area. A student may choose one of three options for a Master's degree: (1) thesis, (2) report, or (3) non-thesis or report plan based on course work. Prerequisites for graduate work include admission to Graduate School and a background in home economics and education courses as required for undergraduate students majoring in home economics education. Home economics education courses are listed on page 267. Graduate faculty members in home economics education serve as major advisers.







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# College of Veterinary Medicine

*Donald M. Trotter,\* Dean*  
*John L. Noordsy,\* Assistant Dean*

## **Requirements For Admission To The College Of Veterinary Medicine**

Enrollment in the College of Veterinary Medicine is limited to 100 well-qualified students after a minimum of two years of college work which includes the required 64 hours of pre-veterinary medical courses (see pre-veterinary medical requirements). The 100 students are selected from 1,000 plus applicants, with preference to Kansans. A student must have at least a B (3.0) average over the pre-professional requirements and the last 45 hours of undergraduate college work in order to be interviewed for selection. Non-residents from contract states need to meet the same scholastic requirements to receive an application for the professional curriculum and consideration for selection. Personal interviews are required of all students under consideration. Selection is based upon academic achievement and professional potential as determined by the interview with the admissions committee. In recent years the majority of the successful candidates have had over four years of pre-veterinary training.

Selection for admission to the professional program in veterinary medicine will be on individual merit from qualified applicants as listed above, who are graduates of Kansas high schools and who, with their parents, have maintained residence in Kansas,

or: who together with their parents are residents of Kansas and have been residents for at least three years immediately prior to first semester enrollment of the year for which they are applying, or: who have been wholly independent residents of Kansas for five years immediately prior to first semester enrollment of the year for which they are applying. After Kansans are selected, non-residents from states with which K-State has a contract for reimbursement (Arizona, Arkansas, Hawaii, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Oregon, Puerto Rico, South Dakota, Utah and Wyoming) will be selected. The three- and five-year requirements mentioned previously may be fulfilled concurrently with the pre-veterinary years.

Non-residents from states having colleges of veterinary medicine will not be considered. These students should seek admission in their home states.

On October 1 applications for admission to the professional curriculum may be obtained from the Assistant Dean of the College of Veterinary Medicine for consideration in the next class.

No applications are accepted after January 15 from off-campus students or after February 1 from Kansas State University students.

## **Pre-Veterinary Medical Requirements**

The pre-veterinary medical work may be pursued at Kansas State University in the College of Arts and Sciences or the College of Agriculture or in any approved junior college or university.



Course	Semester Hours
English Composition I	3
English Composition II	3
Chemistry I	4
Chemistry II	4
Chemical Analysis	4
General Organic Chemistry	5
Principles of Animal Science	3
Animal Science & Industry	1
Oral Communications	2
Physics I and II	8
Trigonometry	3
General Zoology or Principles of Biology	4
Genetics	3
Dairy Science	1
Poultry Science	1
Social Science and/or Humanities Electives	12
Electives*	1-3
Total Semester Hours	64

\*Number depending on selection of other courses.

A Kansas State University student who completes the pre-veterinary curriculum in the College of Arts and Sciences or the College of Agriculture\*\* may be awarded a Bachelor of Science degree after successful completion of the second year in the professional veterinary medical curriculum.

## Veterinary Medical Library

The College of Veterinary Medicine has a well-equipped library consisting of approximately 7,000 volumes which deal with all phases of veterinary medical literature and many allied fields. Numerous additional textbooks and journals are available at the main library on campus.

## Fees For Veterinary Medical Students

Assessments	Kansas Residents or Staff Members	Non-residents
Per semester (if enrolled in more than six hours)		
1. Incidental	\$305.00	\$825.00
2. Student Health	37.00	37.00
3. Student Union Annex I	2.25	2.25
4. Student Union Annex II	10.25	10.25
5. Student Activities (incl. Union operations)	24.25	24.25
6. Stadium Bonds	4.25	4.25
7. Student Recreation Building	12.00	12.00
Total for Veterinary Medical Students	\$395.00	\$915.00

## Doctor Of Veterinary Medicine Curriculum

The curriculum in veterinary medicine at Kansas State University was established to give young men and women of this state an opportunity to pursue these studies in an environment where the facilities offered by other branches of the University would be at their command. To fit the veterinarian to deal with the livestock problems that must be met, one is required to take work in livestock feeding, breeding, judging, poultry, milk and dairy inspection, chemistry, bacteriology, parasitology, and zoology, in addition to purely professional work.

Work must be taken as prescribed, except that certain courses may be selected from extracurricular electives if the student has the prerequisites.

While not required, third year students are encouraged to accept summer internships with practicing veterinarians, federal and state regulatory forces.

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-veterinary medical requirements."

The carefully planned two or two and one-half year pre-veterinary program plus the four year (total of at least six years) professional curriculum may lead to the two degrees, Bachelor of Science and Doctor of Veterinary Medicine. (Hours required for graduation: pre-veterinary—64; professional—152; total—216.)

### FIRST PROFESSIONAL YEAR

Fall Semester	Course	Semester Hours
Anatomy & Physi	Gross Anatomy I	7
Anatomy & Physi	Micro. Anatomy I	5
Anatomy & Physi.	Veterinary Physiology I	6
Anatomy & Physi	Veterinary Orientation	1
		19

Spring Semester	Course	Semester Hours
Anatomy & Physi.	Gross Anatomy II	5
Anatomy & Physi.	Micro. Anatomy II	3
Anatomy & Physi.	Veterinary Physiology II	8
Anatomy & Physi.	Methods of Physi. Exam.	1
Surgery & Med	Propaedeutic Medicine	2
		19

### SECOND PROFESSIONAL YEAR

Fall Semester	Course	Semester Hours
Infectious Diseases	Vet. Microbiology I	5
Infectious Diseases	Vet. Parasitology	5
Pathology	General Pathology	5
Anatomy & Physi.	Pharmacology	4
		19

Spring Semester	Course	Semester Hours
Infectious Diseases	Vet. Microbiology II	5
Infectious Diseases	Clinical Pathology	3
Pathology	Systemic Pathology	5
Surgery & Med	Surgery I	3
Surgery & Med.	Theriogenology	3
		19

### THIRD PROFESSIONAL YEAR

Fall Semester	Course	Semester Hours
Infectious Diseases	Clinic I	2
Pathology	Clinic I	
Surgery & Med.	Clinic I	
Anatomy & Physi.	Anatomy III	2
Anatomy & Physi.	Comparative Nutrition	5
Surgery & Med	Comparative Nutrition	
Surgery & Med	Small Animal Surgery	3
Surgery & Med.	Companion Animal Med	4
Surgery & Med	Food Animal Med	4
		20

Spring Semester	Course	Semester Hours
Infectious Diseases	Epidemiology & Zoonoses	3
Infectious Diseases	Clinic II	2
Pathology	Clinic II	
Surgery & Med.	Clinic II	
Pathology	Avian Medicine	3
Surgery & Med	Large Animal Surgery	4
Surgery & Med.	Medicine I	5
Surgery & Med.	Radiology	3
		20

### FOURTH PROFESSIONAL YEAR

Fall Semester	Course	Semester Hours
Infectious Diseases	Food Quality Control	4
Infectious Diseases	Clinical Medicine I	6
Pathology	Clinical Medicine I	
Surgery & Med.	Clinical Medicine I	
Surgery & Med.	Medicine II	4
Surgery & Med.	Toxicology	4
		18

\*\*Those receiving the B.S. degree in Agriculture must use Ag Orientation one hour for one hour of their electives.



Spring Semester		Course	Semester Hours
Infectious Diseases	720 824	Clinical Medicine II	6
Pathology	730 824	Clinical Medicine II	
Surgery & Med	750 824	Clinical Medicine II	
Pathology	730 859	Lab Animal Science	3
Anatomy & Physi	740 775	Clinical Pharmacology	2
Surgery & Med	750 870	Medicine III	4
Surgery & Med	750 883	Practice Management	3
			18

## Departments & Course Offerings

### INFECTIOUS DISEASES

*E.H. Coles, Jr.,\* Head of Department*

Professors Coles,\* Kelley,\* Leland,\* and Lindquist;\* Associate Professors Bailie, Burroughs,\* Minocha,\* and Moore.\* Instructor Quinn. Emeritus: Professors Leasure and Kitselman; Instructor Kimball.

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 degrees Master of Science and work toward 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.

### Courses in Infectious Diseases

#### Undergraduate And Graduate Credit

**720 645. Veterinary Mycology.** (3) I in odd 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, Path. 710. 720-645-1-1218

**720 650. Fundamentals of Veterinary Public Health.** (3) II. Organization and function of food inspection services; zoonoses as related to foods of animal origin. Three hours rec. a week. Pr.: Biol. 198 and consent of staff. 720-650-0-1218

**720 710. Veterinary Microbiology I.** (5) I. A study of host-parasite interaction and principles of immunology. Three hours rec. and four hours lab. a week. Pr.: Physi. Sci. 730 or consent of instructor. 720-710-1-1218

**720 715. Experimental Parasitology.** (3) I in even years. Planning, execution, analysis and reporting of experiments in parasitology. Techniques concerning interaction between host and parasite, in vitro cultivation, tracers, anthelmintic evaluation. Pr.: Consent of instructor and two semesters of parasitology. 720-715-2-1218

**720 720. Veterinary Microbiology II.** (5) II. Morphology, biology, classification of pathogenic microorganisms and their study in relation to the cause of disease. Three hours rec. and four hours lab. a week. Pr.: Inf. Dis. 710 or consent of instructor. 720-720-1-1218

**720 752. Epidemiology and Zoonoses.** (3) II. The epidemiologic principles of infectious and noninfectious diseases; consideration of the bacterial, viral, parasitic and mycotic diseases shared by man and animals. Three hours lec. a week. Pr.: Third year standing in College of Veterinary Medicine. 720-752-0-1218

**720 754. Food Quality Control.** (4) I. The role of the veterinarian in processing, handling, storage, and evaluation of foods of animal origin, including regulatory requirements, animal testing procedures, shipment and quarantine of food animals. Four hours lec. a week. Pr.: Fourth year standing in the College of Veterinary Medicine.

**720 775. 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. 720-775-1-1218

**720 790. Veterinary Hematology.** (3) II in odd years. A detailed study of the blood of domestic animals. Emphasis is placed on the species variabilities. Two hours lec. and three hours lab. a week. Pr.: Inf. Dis. 775 or consent of instructor. 720-790-1-1218

**720 793. 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. 720-793-1-1218

#### Graduate Credit

**720 800, 720 803. Clinic I (2) and II. (2)** I and II respectively. Instruction in laboratory procedures as related to examination and treatment of patients (jointly with 750 800 and 750 803). Pr.: Third year standing in College of Veterinary Medicine. 720-800-1-1218, 720-803-1-1218

**720 810. Problems in Infectious Diseases.** (1-6) I, II, S. Work is offered in infectious diseases including parasitology, clinical pathology, virology, bacteriology, food hygiene. Pr.: Consent of instructor. 720-810-3-1218

**720 820. Advanced Clinical Pathology.** (3) II in even years. Further studies and application of the more detailed laboratory procedures and tests in hematologic, serologic, bacteriologic, chemic and pathologic diagnosis. Pr.: Path. 849 and consent of staff. 720-820-1-1218

**720 823, 720 824. Clinical Medicine I (6) and II. (6)** I and II respectively. Instruction in laboratory procedures and interpretation of results; laboratory and field experience in epidemiology and public health (jointly with 750 823 and 750 825). Pr.: Fourth year standing in College of Veterinary Medicine. 720-823-1-1218, 720-824-1-1218

**720 825. Pathology of Body Fluids.** (3) I. A detailed study of the alterations of the components of body fluids occurring in disease processes, and interpretations of these changes. Pr.: Inf. Dis. 820 or consent of staff. 720-825-1-1218

**720 830. Infectious Disease Seminar.** (1) I, II, S. Designed primarily for graduate and veterinary students interested in infectious diseases. Each student is required to give reports on subjects related to infectious diseases. 720-830-0-1218

**720 835. 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.: Inf. Dis. 753, Med. 870. 720-835-0-1218

**720 850. 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 two semesters of parasitology. 720-850-2-1218



**720 860. Advanced Veterinary Bacteriology.** (3) I in alt. years. The detailed study of the classification, morphology, biochemic and differential characteristics permitting identification of the bacteria of veterinary medical significance. One hour rec. and six hours lab. a week. Pr.: Inf. Dis. 720, Biol. 610 or equiv. 720-860-1-1218

**720 865. Diagnostic Veterinary Virology.** (3) I in alt. 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.: Inf. Dis. 720, Biol. 730 or equiv. 720-865-1-1218

**720 875. Advanced Food Hygiene.** (3) I, II, S. Further studies of the more recent detailed procedures used in the preservation and sanitary control of manufactured products prepared from seafood, poultry, animal meat, and dairy products. Two hours lec. and three hours lab. a week. Pr.: Inf. Dis. 753. 720-875-1-1218

**720 880. Principles and Techniques of Research in Medical Investigations.** (4) I, S. A study of the procedures in planning and evaluating medical experiments and the use of special research instruments in medical research. Three hours rec. and three hours lab. a week. Pr.: Path. 703, Physi. Sci. 745. 720-880-1-1218

**720 899. Research in Infectious Diseases.** (1-6) I, II, S. Individual research in infectious diseases. Pr.: Consent of instructor. This work may form the basis for the Master's thesis and the Ph.D. dissertation. 720-899-4-1218

## **PATHOLOGY**

*J.E. Cook,\* Head of Department*

Professors Dennis,\* Cook,\* and Leipold;\* Associate Professors Smith,\* Strafuss,\* and Kruckenberg.\*

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 degree Master of Science and Doctor of Philosophy is offered.

Work at the graduate level includes advanced courses in general, systemic, cellular, molecular, laboratory and wildlife pathology.

## **Courses in Pathology**

### **Undergraduate And Graduate Credit**

**730 500. Topics in Comparative Pathology.** (1-3) I, II, S. Selected topics in diseases of laboratory animals, wildlife, and fish for nonveterinary students. Pr.: Biol. 198 or equiv. 730-500-1-1218

**730 501. Diseases of Wildlife.** (3) I. Infectious and noninfectious diseases of birds, fur-bearing animals, zoological animals, and fish with reference to methods of prevention and control. Three hours lec. a week. Pr.: Biol. 198 or equiv. 730-501-0-1218

**730 703. 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. 730-703-1-1218

**730 710. 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.: Path. 703. 730-710-1-1218

### **Graduate Credit**

**730 800, 730 803. Clinic I (2) and II. (2) I and II respectively.** Instruction in necropsy procedures. (Jointly with 750 800 and 750 803.) Pr.: Third year standing in College of Veterinary Medicine. 730-800-1-1218, 730-803-1-1218

**730 823, 730 825. Clinical Medicine I (6) and II. (6) I and II respectively.** Experience in the necropsy laboratory. (Jointly with 750 823 and 750 825.) Pr.: Fourth year standing in College of Veterinary Medicine. 730-823-1-1218, 730-825-1-1218

**730 845. Advanced Diagnostic Pathology.** (3) I, S. Study of pathologic alterations of disease with emphasis on diagnostic characteristics. Pr.: Path. 710 and consent of instructor. 730-845-1-1218

**730 847. Avian Medicine.** (3) II. The prevention, diagnosis and treatment of avian diseases. Three hours lec. a week. Pr.: Third year standing in College of Veterinary Medicine. 730-847-0-1218

**730 848. Avian Pathology.** (2) II. Study of etiology, pathogenesis, gross and microscopic characteristics of avian diseases. Pr.: Path. 847 or consent of instructor. 730-848-1-1218

**730 849. Pathological Technique and Diagnosis.** (3) I, II, S. Practical experience in mammalian necropsy, avian necropsy, clinical pathology, histologic techniques, and diagnostic laboratory procedures. Pr.: Path. 710 and consent of staff. 730-849-1-1218

**730 850. Perinatal Pathology.** (2) S. Study of placental and fetal lesions of congenital infections in domestic animals. Pr.: Path. 845. 730-850-1-1218

**730 851. Advanced Principles of Pathology.** (3) II in even years. Advanced study of disease and its effects with emphasis on etiology and pathogenesis; morphologic change will be correlated with changes in chemical composition and function. Pr.: Path. 710 and consent of instructor. 730-851-1-1218

**730 852. Surgical Pathology.** (1-2) I, II, S. Practical experience in examining and processing surgical biopsy specimens and writing histopathological reports. Pr.: Path. 845. 730-852-1-1218

**730 855. Oncology.** (3) II in odd years. Etiology, behavior, gross, microscopic characteristics, identification and prognosis of tumors. Pr.: Path. 845 and consent of staff. 730-855-1-1218

**730 857. Developmental Pathology.** (2) I in even years. A bridging course between embryology and pathology with emphasis on congenital defects in domestic animals. Pr.: Path. 710 and consent of instructor. 730-857-1-1218

**730 858. Medical Genetics.** (3) I in even years. Study of genetic diseases of domestic animals with emphasis on chromosomal observations, biochemical factors and hereditary patterns in transmission. Pr.: 730 845 or equiv. 730-858-1-6-1218

**730 859. Laboratory Animal Science.** (3) II. Consideration of the management and health of common species of laboratory animals. Three hours lec. a week. Pr.: Fourth year standing in College of Veterinary Medicine. 730-859-0-1218

**730 860. Pathology of Diseases of Laboratory Animals, Fish and Wildlife.** (3) I in even years. Pathology of diseases affecting laboratory animals, fish and wildlife. Pr.: Path. 845 and consent of instructor. 730-860-1-1218

**730 862. Histopathological and Photographic Techniques.** (2) II in odd years. Principles of routine histopathological techniques with emphasis on special stains, together with principles of light microscopy with emphasis on obtaining optimal black and white and color photomicrographs. Pr.: Path. 845 or consent of staff. 730-862-1-1218



**730 865. Advanced Topics In Comparative Pathology.** (1-3) I, II, S. Selected topics to assist pathology majors in their areas of specialization. Pr.: Path. 845. 730-865-1-1218

**730 870. Pathology Seminar.** (1) I, II, S. Pr.: Consult department head. 730-870-0-1218

**730 880. 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.: Path. 710 and consent of instructor. 730-880-2-1218

**730 885. 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 (M.S.) and ten credit hours (Ph.D.). Pr.: Path. 845 or consent of staff. 730-885-3-1218

**730 899. Research In Pathology.** (1-6) I, II, S. Individual research in the pathology of animal disease. Pr.: Path. 710, 849. This work may form the basis for the Master's thesis and the Ph.D. dissertation. 730-899-4-1218

**730 947. 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.: Path. 845. 730-947-1-1218

**730 950. 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, musculoskeletal, genital and nervous systems, and special senses. Pr.: Path. 947. 730-950-1-1218

**730 965. Cellular and Molecular Pathology.** (4) I. 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. 730-965-0-1218

**730 966. Cellular and Molecular Pathology Lab.** (1) I, II, S. Basic techniques used in the study of cellular and molecular pathology. Pr.: Path. 965 or concurrent enrollment and consent of instructor. 730-966-1-1218

**730 970. Pathology Seminar.** (1) I, II, S. Pr.: Consult department head. 730-970-0-1218

**730 980. 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.: Path. 710 and consent of instructor. 730-980-2-1218

**730 985. 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 (M.S.) and ten credit hours (Ph.D.). Pr.: Path. 845 or consent of staff. 730-985-3-1218

**730 999. Research In Pathology.** (1-6) I, II, S. Individual research in the pathology of animal disease. Pr.: Path. 710, 849. This work may form the basis for the Master's thesis and the Ph.D. dissertation. 730-999-4-1218

## ANATOMY AND PHYSIOLOGY

*R.A. Frey, Head of Department*

Professors Clarenburg\*, Fedde\*, Frey\*, Oehme\*, Trotter\*, Upson\* and Westfall\*; Associate Professors Chapman\*, Klemm\*, Quadri and Weinman\*, Assistant Professor Gatz, Hartke and Klorpes; Instructors Johnson, and Shaw. Emeritus: Professor Underbjerg.

The Department of Anatomy and Physiology presents courses in the areas of physiology, pharmacology, physiological chemistry, gross anatomy, and microscopic anatomy at both the undergraduate and graduate levels.

Biophysical electronic instrumentation, two electron microscopes, environmental chambers, scintillation counter, 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 is offered for undergraduate and graduate students outside the field of veterinary medicine.

## Courses in Anatomy and Physiology

### Undergraduate And Graduate Credit In Minor Field

**740 530. Anatomy and Physiology.** (4) II. General anatomy and physiology of the domestic animals. Three hours rec. and three hours lab. a week. 740-530-1-1218

**740 531. Introduction to Pharmacology of Farm Animals.** (2) Interim Semester. The study of the basic principles of pharmacology as related to the proper and safe use of drugs and chemicals by the livestock industry. Pr.: Physi. Sci. 530 or equivalent. 740-531-0-1218

### Undergraduate And Graduate Credit

**740 700. Gross Anatomy I.** (7) I. Dissection of the body cavities, limbs, head, neck and genital organs of the dog. Three hours rec. and twelve hours lab. a week. Pr.: First year standing in College of Veterinary Medicine. 740-700-1-1218

**740 705. Gross Anatomy II.** (5) II. Dissection of the body cavities, limbs, head, and neck of the horse and the ruminant. Parallel comparative studies on the laboratory animals, pig, chicken, and cat. Two hours rec. and nine hours lab. a week. Pr.: Physi. Sci. 700. 740-705-1-1218

**740 710. 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. 740-710-1-1218

**740 715. Microscopic Anatomy II.** (3) II. Origin, development and microscopic structure and appearance of the cells and tissues of the animal body. One hour lec. and six hours lab. a week. Pr.: Physi. Sci. 710. 740-715-1-1218

**740 720. Anatomy III.** (2) I. Dissections and demonstrations of regions of diagnostic and surgical importance. One hour lec. and two hours lab. a week. Pr.: Third year standing in College of Veterinary Medicine. 740-720-1-1218

**740 737. Veterinary Physiology I.** (6) I. Physiological functions at the molecular and various structural levels in domestic animals are integrated. Physiological control mechanisms, criteria for evaluating animal health, and conditions leading to loss of control are emphasized. Four hours rec. and six hours lab. a week. Pr.: First year standing in College of Veterinary Medicine. 740-737-1-1218

**740 740. Veterinary Orientation.** (1) I. Lectures on introduction to veterinary medicine. One hour lec. a week. Pr.: First year standing in College of Veterinary Medicine. 740-740-0-1218

**740 747. Veterinary Physiology II.** (8) II. Function and control of nervous, muscular, respiratory, cardiovascular, endocrine, reproductive, digestive and renal systems of domestic animals. Six hours lec. and six hours lab. a week. Pr.: Physi. Sci. 737 and Physi. Sci. 700 or consent of instructor. 740-747-0-1218

**740 748. Methods of Physiological Examination.** (1) II. Techniques for determination of the functional status of body systems of domestic animals. Two hours lab. per week. Pr.: Second semester, first year standing in College of Veterinary Medicine. 740-748-1-1218



**740 770. Pharmacology.** (4) I. The history, source, physical and chemical properties, compounding, biochemical and physiological effects, mechanism of action, absorption, distribution, biotransformation and excretion, therapeutic and other uses, and toxicity of drugs. Three hours rec. and three hours lab. a week. Pr.: Physi. Sci. 737 and 747 or equiv. 740-770-1-1218

**740 775. Clinical Pharmacology.** (2) II. The application of the basic principles of pharmacology to the proper use of a single drug or multiple drug regimens to veterinary medical and surgical patients. Two hours lec. a week. Pr.: Fourth year standing in College of Veterinary Medicine. 740-775-0-1218

### Graduate Credit

**740 803. 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 evaluate data. One hour a week. Pr.: Consent of staff. 740-803-0-1218

**740 812. Canine Anatomy.** (2 to 4) I, II, S. Pr.: Consent of staff. 740-812-3-1218

**740 825. Special Anatomy.** (Var.) I, II, S. The study of any part of the horse (as the digestive or reproductive system), ox, sheep, pig, dog, cat, or chicken. Pr.: Physi. Sci. 700, 705 or equiv. 740-825-3-1218

**740 850. Anatomical Techniques.** (1 to 2) I in odd years, S. Pr.: Consent of staff. 740-850-3-1218

**740 855. Comparative Physiology.** (3) II. Comparisons of physiological functions in the animal kingdom, including respiration, circulation, digestion, excretion, locomotion and control. Pr.: Biol. 201, Physi. Sci. 530 or equiv. 740-855-0-1218

**740 860. 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. 740-860-0-1218

**740 865. 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.: Physi. Sci. 747 and consent of staff. 740-865-1-1218

**740 885. 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. 740-885-0-1218

**740 886. 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. Pr.: Third year standing in College of Veterinary Medicine or A.S.I. 700. 740-886-0-1218

**740 890. Problems In Pharmacology.** (Var.) I, II, S. Individual investigation into the interactions of chemical compounds and living systems. Pr.: Consent of instructor. 740-890-4-1218

**740 898. Master's Report.** (2) I, II, S. Pr.: Consent of staff. 740-898-4-1218

**740 899. Research.** (1 to 4) I, II, S. For graduate students in the field of anatomy working toward the M.S. degree. Pr.: Consent of staff. 740-899-4-1218

**740 900. 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.: Physi. Sci. 747 and consent of staff. 740-900-0-1218

**740 915. 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. 740-915-0-1218

**740 925. Advanced Physiology.** (3 to 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.: Physi. Sci. 747 and consent of staff. 740-925-1-1218

**740 995. 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. 740-995-4-1218

**740 999. Research In Physiology.** (1 to 6) I, II, S. For graduate students working toward the M.S. or Ph.D. degree. Pr.: Consent of staff. 740-999-4-1218

## SURGERY AND MEDICINE

*J.E. Mosier,\* Head of Department*

Professors Anderson,\* Butler,\* Guffy,\* Mosier,\* Noordsy,\* Oehme,\* and Railsback; Associate Professors Camahan, Harris,\* and Schneider; Assistant Professors Blauck,\* Brandt, Dom, Gabbert, Jernigan, Olson, Samuelson, Schoneweis,\* and Taussig; Instructors Bostwick, Edwards, Hultine, Hauptman, Kittleson, Mount, Spire and Vonderfecht. Emeritus: Professors Frank and Frick.

The Dykstra Veterinary Hospital is 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 32 large animal patients and 100 small animal patients. Members of clinical staff, accompanied by students, conduct a field service for the purposes 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.

Third- and 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 within the clinical and pathology staffs. In addition to daily assignments, third- and fourth-year students are required to serve a two-week internship in the veterinary hospital, during which time they are responsible for the various management phases of the hospital.

The department presents courses in medicine, surgery, toxicology, obstetrics and gynecology 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.

Excellent library facilities, adequate physical equipment, and an abundance of cases offer excellent resources for research in surgery and medicine.

## Courses in Surgery

### Graduate Credit

**750 802. Research in Surgery.** (1 to 6) I, II, S. The objectives of the course are to attempt to solve problems confronting the veterinary surgeon. Pr.: Anat. 700, 705, 720; Surg. 805, 815. Offered especially for graduates in veterinary medicine. 750-802-4-1219

**750 805. Surgery I.** (3) II. Principles of surgery and consideration of instrumentation, the surgical suite, and preparation and monitoring of the patient. Three hours lec. a week. Pr.: Second year standing in College of Veterinary Medicine. 750-805-0-1218

**750 811. 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. 750-811-0-1218

**750 814. Small Animal Surgery.** (3) I. 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. 750-814-0-1218

**750 832. Surgical Techniques.** (1 to 6) I, S. The study and application of developments in surgical techniques. Pr.: D.V.M. degree or consent of staff. 750-832-3-1219

**750 867. The Physiologic Effects of Surgery.** (3) II in even years. A study of the effects of surgery on the different body systems. Pr.: D.V.M. degree or consent of staff. 750-867-3-1219

**750 872. Organ Transplantation.** (3) II in odd years. The study of transplantation of tissues and associated problems. Pr.: D.V.M. degree or consent of staff. 750-872-3-1219

**750 877. 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 instructor. 750-877-3-1219

**750 887. Problem in Medicine or Surgery.** (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. 750-887-3-1219

## Courses in Medicine

### Graduate Credit

**750 800, 750 803. Clinic I.** (2) and **II.** (2) I and II respectively. Instruction in operation of the outpatient clinic; participation in the receipt, restraint, examination and treatment of the patient and in ancillary services of the animal hospital. Six hours lab. a week. Pr.: Third year standing in College of Veterinary Medicine. 750-800-1-1218, 750-803-1-1218

**750 810. Propaedeutic Medicine.** (2) II. Introduction to the principles of animal hospitalization, physical examination, diagnostic procedures and techniques, care of the hospitalized patient and an introduction to the psychology of veterinary medical practice. Two hours lec. a week. Pr.: First year standing in College of Veterinary Medicine. 750-810-0-1218

**750 812. Research in Medicine.** (1 to 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. 750-812-4-1219

**750 820. Theriogenology.** (3) II. 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.: Second year standing in College of Veterinary Medicine. 750-820-0-1218

**750 821. Companion Animal Medicine.** (4) I. A study of the etiology, clinical signs, diagnosis, treatment and control of infectious or contagious disease conditions which affect horses, dogs and cats. Four hours lec. a week. Pr.: Third year standing in College of Veterinary Medicine. 750-820-0-1218

**750 822. Breeding Diseases.** (1 to 5) I, II, S. Advanced studies of the breeding diseases of domestic animals. Pr.: D.V.M. degree or consent of staff. 750-822-3-1219

**750 823, 750 825. Clinical Medicine I** (6) and **II.** (6) I and II respectively. Study of the veterinary medical and surgical patient; participation in field studies of animal disease, veterinary public health, seminars, and clinicopathologic conference. Twenty-two hours lab. a week. Pr.: Fourth year standing in College of Veterinary Medicine. 750-823-1-1218, 750-825-1-1218

**750 824. 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. 750-824-0-1218

**750 826. Systemic Medicine I.** (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 staff. 750-826-3-1219

**750 827. Systemic Medicine II.** (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 staff. 750-827-3-1219

**750 830. Medicine I.** (5) II. Consideration of medical and pathological aspects of diseases affecting the musculoskeletal, respiratory, cardiovascular, hemic and lymphatic, special senses, integumentary, and nervous systems. Five hours lec. a week. Pr.: Third year standing in College of Veterinary Medicine. 750-830-0-1218

**750 837. Interpretation of Radiologic Studies of Body Systems.** (4) 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 instructor prior to registration. 750-837-0-1219

**750 840. 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. Two hours lec. and two hours lab. a week. Pr.: Third year standing in College of Veterinary Medicine. 750-840-1-1218

**750 842. Comparative Gastroenterology.** (3) II in even 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 man are discussed. Pr.: D.V.M. degree. 750-842-3-1219

**750 850. Medicine II.** (4) II. Consideration of the medical and pathological aspects of diseases affecting the endocrine, urinary, and digestive systems. Four hours lec. a week. Pr.: Fourth year standing in College of Veterinary Medicine. 750-850-0-1218



**750 882. Clinical Science Seminar.** (1) I, II, S. A participating seminar for graduate students in the clinical sciences. Case studies will form the basis of the seminars. One-hour conference weekly. May re-enroll for total maximum of two credits. Pr.: Consent of staff. 750-882-0-1218

**750 883. Veterinary Practice Management.** (3) II. 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. Pr.: Fourth year standing in College of Veterinary Medicine. 750-883-0-1218

**750 886. 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. Pr.: Third year standing in College of Veterinary Medicine or A.S.I. 700. 750-886-0-1218

**750 887. Problem in Medicine or Surgery.** (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. 750-887-3-1219

**750 871. Medicine III.** (4) II. Consideration of programs of disease prevention for domesticated animals. Four hours lec. a week. Pr.: Fourth year standing in College of Veterinary Medicine. 750-871-0-1218

**750 892. Toxins in the Biological System.** (2) I in odd numbered 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. 750-892-3-1219

**750 895. Toxicology.** (4) I. Effects of harmful substances on the animal body. Emphasis placed on toxicologic principles, and management of the poisoned patient. Four hours lec. a week. Pr.: Fourth year standing in College of Veterinary Medicine, Biochem. 520 and Physi. Sci. 747 or equiv. 750-895-0-1218

**750 897. 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 and/or controversy to mammalian health. Specific topics will change from semester to semester. Students in PhD programs may repeat the course. Pr.: 211-521, 740-747.

## Veterinary Diagnostic Laboratory

*H.D. Anthony, Director*

Professors Anthony,\* and West;\* Associate Professors Gray,\* Milleret,\* and Phillips; Instructor Baugh and Howard.

The Diagnostic Laboratory serves the livestock industry in the state in solving animal disease problems. The laboratory not only is a service unit for animal diseases but also is a responsible service unit for human health problems relative to animal disease. The laboratory is the official rabies diagnostic service to the state.

Special laboratories with appropriate personnel and equipment can perform a variety of diagnostic tests not available or accessible to practitioners in the state.

The Diagnostic Laboratory is nationally recognized as a fully accredited laboratory with capabilities in all areas of diagnostic service.

The staff of the laboratory also contributes to the teaching, service and research programs of the college.



# The Land Grant Tradition

## Agriculture at Kansas State University

*Roger L. Mitchell, Vice President for Agriculture*

Historically the foundation of K-State's educational program has been service to the citizens of a state which was basically agricultural. In modern times with the threat of starvation enveloping the globe, K-State's particular specialty is even more relevant.

Agriculture at Kansas State University includes instruction, research, extension, and international agriculture. County agents, branch experimental stations, and experimental fields throughout the state are part of agriculture. Under the vice president for agriculture are four administrators: the dean of the College of Agriculture, the director of the Kansas Agricultural Experiment Station, the director of the Cooperative Extension Service and the director of International Agriculture Programs.

## International Agricultural Programs

*Vernon C. Larson, Director*

People from other countries and people 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 and geared to increasing food production and improving the country's economy.

The KSU community and the state of Kansas are conducive to international cooperation, and the KSU staff and faculty have found cooperative environments abroad that, for the most part, have resulted in excellent development programs.

K-State has been involved in international activities since 1956 when its College of Agriculture

was 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). Deep 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 in India, 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 K-State.

K-State has been helping Nigeria develop Colleges of Agriculture and Veterinary Medicine at Ahmadu Bello University since 1962. The major thrust of that effort will be completed in a few years. More than 90 KSU faculty members have served in Nigeria and 70 Nigerian faculty members have taken graduate training in the U.S., primarily at K-State.

In the Philippines an Integrated Agricultural Production and Marketing Program involves both short term (1-3 months) and long term (2 years) faculty appointments. Filipino faculty members or government officials are also sent to KSU for graduate training at either the M.S. or Ph.D. level.

Additional programs, all focusing on the world food situation and stressing that the U.S. role is to help the developing world help themselves, include activities in Paraguay, Sierra Leone, Libya, Morocco, India and Taiwan.

# Division of Continuing Education

*E. Norman Harold, Director*

*J. Lance Kramer, Associate Director*

*Betty A. Ayres, Assistant Director*

*Robert W. Stamey, Assistant Director*

Associate Professors Brock, Cashin, and Kramer; Assistant Professors Harold, Hazlett, Lockhart, McCallum, Miller, Noble, Rothermill, Steffen, and Williamson; Instructors Ayres, Blies, Crees, Dieckhoff, Draves, W. Dunn, M. Dunn, Flaherty, Hebert, Ireland, Killacky, Maes, Martin, Mathewson, Michael, Rippetoe, Slawson, and Stamey.

The function of the Division of Continuing Education is to make the resources of Kansas State University available to the people of Kansas. The Division offers a variety of educational services on

almost every level of interest or desire. Each year from 8,000 to 9,000 persons participate in credit courses, and from 15,000 to 20,000 participate in non-credit educational activities.

## Credit Classes Off-Campus

The Division of Continuing Education strives to determine the educational needs of the people throughout the state and respond to those needs with credit programs from the various Colleges and academic units.

An ever-expanding program of courses is offered at a growing number of locations in Kansas. Kan-



sans in Dodge City, Salina, Topeka, Kansas City or other locations can work toward an advanced degree from Kansas State University by attending classes taught by University faculty in their home community. Programs of sequenced courses can take the student toward degrees in such academic areas as education, history, computer science, and industrial engineering. In some cases, a student can earn an advanced degree entirely through courses attended at off-campus locations; in other cases, the student must come to Kansas State University for courses requiring the special facilities and resources available only on the campus.

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 of these groups.

### **Regents' Continuing Education Network**

Many courses and other educational programs normally offered on the K-State campus are available to the people of Kansas by means of the Regents' Continuing Education Network. The Network is a system of 26 educational centers located throughout Kansas and linked together via telephone lines. The locations include Chanute, Colby, Concordia, Dodge City, El Dorado, Emporia, Garden City, Goodland, Great Bend, Hays, Hutchinson, Independence, Johnson County-Linwood, Lawrence, Liberal, Manhattan, Norton, Paola, Pittsburg, Pratt, Sabetha, Salina, Stockton, Topeka, Wellington, and Wichita.

Each center is equipped with amplifying telephone equipment allowing easy "two-way" communication between all 26 locations. In addition to the amplified telephone system, each of the 26 centers is equipped with general types of audio-visual support equipment. A monitor is present at each location to operate the equipment, distribute hand-out materials, and provide general educational support.

Each year several thousand people participate in credit and non-credit courses on the Network. Instruction usually originates from KSU or one of the other regents' institutions. However, the flexibility of the system allows resource people from throughout America to be hooked electronically into the system. Thus, people across the state can have access to national educational resources.

Meetings and conferences also are held on the Network. The telephone hookup allows nationally recognized people to participate in local activities at a minimum cost and maximum effectiveness.

### **Non-Traditional Study**

The Non-Traditional Study Program (NTS) is designed for undergraduate students who need a personalized approach to study. NTS is oriented toward those students who have encountered ob-

stacles to traditional college attendance, helping them surmount barriers created by distance, by physical handicap, or by job.

NTS advisers assist students in planning individual programs of study and serve as guides to faculty and media resources. The advisers help students select options such as late afternoon, evening, or off-campus classes, correspondence study, credit by examination, or work-study programs.

In addition to class requirements, the advisers direct students toward the completion of independent study projects, and toward the development of documentation of prior non-sponsored learning. Given appropriate documentation, credits may be granted for learning achieved without formal, sponsored instruction.

A KSU degree, the Bachelor of General Studies, is available through NTS. A "competency-based" degree, it is meant to serve students whose educational aims cannot be satisfied by a conventional major, and/or whose main area of study intersects two or more colleges within the University.

### **Intersession**

Kansas State University conducts its Intersession Program during major breaks in the standard academic calendar. There are two Intersessions offered each year; one in early January, the other in late May and early June. During this time, 80-100 courses of a unique and unusual nature are offered. These courses generally run for two or three weeks and are attended by current KSU students, as well as persons unable to attend the University during the regularly-scheduled semesters.

Intersession offers the opportunity to explore areas of study which otherwise would not be possible during regular school terms. For example, an extended two- or three-week trip to another part of the state or country is possible during this time. Students also have the opportunity to explore topics in their major field with more depth and perception than might otherwise be possible. Many students use Intersession as an opportunity to examine academic areas not scheduled in their current curriculum. The KSU faculty uses Intersession as an opportunity to experiment with new ideas and formats for teaching. Many courses are offered on an experimental basis to test the possibility of becoming regular offerings by a department.

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 adviser to determine if a particular Intersession course will meet necessary degree requirements.

### **Center for Faculty Evaluation and Development in Higher Education**

The Center for Faculty Evaluation and Development in Higher Education aids the efforts of faculty members at colleges and universities throughout the United States and Europe as they pursue their teaching activities and other professional responsibilities.



The Center is partially supported by the W.K. Kellogg Foundation and works with approximately 100 colleges and universities, providing faculty and administrative evaluation and development services. These services include the use of the IDEA System (Instructional Development and Effectiveness Assessment) which has been developed on the Kansas State University campus over the course of the past eight years. The Center also provides the services of a team of educational development specialists and consultants to institutions using the IDEA system. The Center staff, with the assistance of outside consultants, conducts semi-annual training workshops for those individuals who coordinate the use of the IDEA system on their campuses and also conducts an annual series of faculty-administrative development seminars at major cities throughout the United States.

### **Conference Center**

The Division of Continuing Education's Conference Center makes the University's facilities and resources available to individuals and organizations through the design and management of conferences, short courses, workshops, special interest programs, and non-credit programs. All programs which are sponsored on the KSU campus in which fees are collected from the participants and/or university facilities are utilized are coordinated through this office, which is empowered to collect all fees and pay all bills associated with such activities.

Services available through the Conference Center include program development and design, program budgeting, brochure design and printing, publicity, facility, food and accommodation arrangements, speaker and resource arrangements, preparation of materials, registration and follow-up activities.

The involvement of the Conference Center in a conference, workshop, short course or similar activity will be either: (1) a full service involvement in which the Division of Continuing Education is responsible for the total activity; (2) a partial service involvement in which the Division shares specific responsibilities for the activity with the client group; or (3) a minimal service involvement in which the Division staff conducts registration, collects fees, and pays the expenses. In all three cases, the specific responsibilities and budgets are negotiated with the client group prior to the scheduling of the activity.

For detailed information and assistance, contact the Conference Center, Division of Continuing Education, Hollis House, KSU (Phone 913/532-5575).

### **Fort Riley Course Offerings**

Kansas State University offers a series of courses at nearby Fort Riley, Kansas. KSU works in cooperation with the Army Education Center (Old Trooper University) to provide persons in the Fort Riley community the opportunity to take University courses. Courses are scheduled to be convenient for army personnel who are required to maintain a full-time job while attending Kansas State University. The courses are taught by regular KSU faculty members, and fulfill degree requirements where ap-

plicable. Courses are scheduled to allow the completion 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. Courses are offered during the daytime, as well as during the evening hours to accommodate persons unable to attend on-campus classes because of work requirements or other scheduling conflicts. KSU courses offered at Fort Riley are open to military, as well as non-military students.

Kansas State University maintains an office at Fort Riley staffed by KSU personnel familiar with degree requirements and KSU requirements on acceptance of transfer work. Students are encouraged to meet with these advisors to pursue their academic goals and objectives.

### **Kansas Women's Outreach Program**

The Kansas Women's Outreach Program transports information and resources of Kansas State University to all parts of the state. The Kansas Women's Resource Directory, a compilation of activities, agencies, and speakers available for individuals and organizations, is published by the Women's Outreach Program, and is distributed throughout Kansas.

Credit courses are scheduled through this program at locations and times that are accessible to the busy schedule of today's woman. Non-credit conferences, courses, or workshops focus upon topics of personal interest, midlife career changes, occupational upgrading, and individual knowledge to provide a well-rounded program of educational experiences for the women of Kansas.

### **Kansas Rural-Urban Art Program**

KRUAP is a program centered around the appreciation for and the involvement in art. It offers credit and non-credit courses and sponsors regional art shows and critiques and a state-wide amateur art exhibition.

### **Servicemen's Opportunity College**

The Servicemen's Opportunity College (SOC) is affiliated with Kansas State University. The program maintains a commitment to servicemen and women interested in pursuing a college education. Through the Division of Continuing Education, KSU offers courses at Fort Riley and Fort Leavenworth. These courses are scheduled to avoid conflicts with military duties and to provide the opportunity for an education.

### **University For Man**

University for Man is a community education organization which develops and conducts a wide variety of informal educational opportunities which do not involve prerequisites, grades, credits, or tuition. Offering classes, symposia, forums, and unstructured learning experiences covering a wide range of human interests, activities, and concerns, University for Man is committed to the development and expansion of informal learning opportunities available to the people of Kansas.



# Kansas Agricultural Experiment Station

*Floyd W. Smith, Director*  
*Stanley E. Leland, Jr., Associate Director*  
*Lowell Brandner, Editor*  
*Grace Muilenberg, Associate Editor*  
*Warren C. Pray, Research Assistant*

The Kansas Agricultural Experiment Station is supported by both federal and state funds. Acts of Congress authorizing grants (always subject to state legislative assent) have included the Hatch Act of 1887, the Adams Act of 1906, Purnell Act of 1925, Bankhead-Jones Act of 1935, an amendment to the Bankhead-Jones Act, Agricultural Marketing Act of 1946, the 1955 act to consolidate previous acts pertaining to state agricultural experiment stations, the McIntire-Stennis Act of 1962, and the Rural Development Act of 1972.

Each session of the Kansas legislature and each session of the 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 unique responsibility of the Agricultural Experiment Station is to conduct original research in the broad field of agriculture and to publish and disseminate the results of agricultural research. Attention is devoted largely to the solution of problems related to agriculture, including farm homes.

Departments of the Agricultural Experiment Station are as follows: Agricultural Engineering, Agricultural Economics, Agronomy, Animal Science and Industry, Biochemistry, Biology, Business Administration, Chemical Engineering, Chemistry, Computer Science, Economics, Entomology, Dairy and Poultry Science, Grain Science and Industry, Geology, Home Economics, Horticulture and Forestry, International Agriculture, Nuclear Engineering, Physics, Plant Pathology, Political Science, Statistics, Sociology and Anthropology and Veterinary Medicine, and the five branch stations—Colby, Fort Hays, Garden City, Southeast Kansas and Tribune.

Research of the various departments includes agricultural economics, soil and water investigations, plant science, animal and animal feeds investigations, plant diseases and insects, animal diseases and pests, agricultural engineering, food science, human nutrition, home economics, social science, and other fundamental and applied studies.

An annual budget of about \$14.3 million and many positions for graduate research assistants make the Kansas Agricultural Experiment Station a strong ally of the Graduate School. The Experiment Station has research projects in six colleges of the University. Interested graduate students are encouraged to seek graduate research assistantships to supplement their graduate study programs.

Research by scientists in the experiment station is organized into more than 600 projects which cover nearly all phases of agriculture in its broadest context. More than 11,000 acres is involved in agricultural research. Among the projects are physiology and nutrition of plants and animals;

diseases of plants and animals; chemical composition of soils, plants and animal products; plant and animal breeding; crop rotations and fertilizers; acclimatization of new plants and trees; grasses and forage plants; feeds for livestock; production, processing, marketing, distribution, and use of agricultural products and machinery and equipment; farm management and other economic problems; sociological problems; community development; human nutrition and family living.

Farms, branch stations, well-equipped laboratories and scientific equipment are available for use by Experiment Station researchers.

Results of research are published in scientific journals, station bulletins, circulars, pamphlets, leaflets, reports of progress, research papers, popular journals, news releases to the press and to radio and television stations and reports at field days and other special events. All bulletins and other publications of the Agricultural Experiment Station are sent without charge to citizens of the state. Any person in the state may be placed on the permanent mailing list of the station to receive announcements of station publications.

Letters of inquiry and general correspondence should be addressed to the Kansas Agricultural Experiment Station, Kansas State University, Manhattan, Kansas 66506.

## Branch Agricultural Experiment Stations

### Fort Hays Branch Station

*W.M. Phillips, Acting Head*

Professors Brethour, Hackerott, Harvey, Launchbaugh, and Livers; Associate Professors Phillips and Stegmeier; Assistant Professors Baxter, Martin, and Thompson.

Land occupied by this station is 3,700 acres of the former Fort Hays military reservation. A bill was approved by Congress March 28, 1900, setting aside this reservation for experimental and educational purposes. It was accepted by the state legislature February 7, 1901. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating funds for preliminary work.

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, legumes, and grasses; soil management; weed control; and insects as related to crops and livestock.

### Garden City Branch Station

*G.L. Greene, Head*

Professor Greene; Associate Professors Davis and Herron; Assistant Professors Condray, DePew, Norwood, Penas, and Witt; Instructor Ohmes.

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. An 80-acre irrigated tract was made available by The Garden City Company in 1948.



Current investigations involve extensive irrigation research, livestock feeding, dairying, dryland soil management, crop improvement, weed control, horticultural and specialty crops, insect control, and soils and fertilizer relationships. One of the two state soils laboratories is located at the Garden City Branch Station.

### **Colby Branch Station**

*E.E. Banbury, Head*

Associate Professors Banbury and Lawless; Assistant Professors Petersen, Schwulst, Sunderman.

The Kansas legislature of 1913 provided for a branch experiment station near Colby. It is on a tract of 715 acres. The original tract of land was purchased by Thomas County and deeded to the state. In 1941 the state purchased an additional 320 acres. In 1963 additional land was acquired through an exchange of 39 acres of the original tract for an adjoining quarter section. Operations at the Colby station were begun in March, 1914. Investigations include crop improvement, soil and crop management, irrigation, sheep production and adaptation studies with fruit and shade trees, shrubs and flowers.

### **Tribune Branch Station**

*R.E. Gwin, Jr., Head and Assistant Professor, Instructor Suh*

The Tribune Branch Station was established in 1911 by an act of the Kansas legislature.

At the Tribune station experimental work is conducted for the benefit of the surrounding western territory. Special attention is paid to the problems of producing field and specialty crops under conditions of limited rainfall and under irrigation.

### **Southeast Kansas Branch Station**

*K.W. Kelley, Acting Head*

Instructors Fransen, Ibbetson and Kelley.

After World War II, a 242-acre tract of land near Mound Valley, used as an auxiliary landing field, was declared surplus property. Ownership was transferred to Kansas State University in 1948. In 1949 the Kansas legislature authorized the establishment of the Mound Valley Branch Experiment Station and appropriated funds for its development and operations.

The 1966 Kansas legislature transferred 485 acres of land formerly operated by the Parsons State Hospital and Training Center to Kansas State University and authorized consolidation of the Mound Valley, Parsons, and Columbus Experiment Field land into a single unit, the Southeast Kansas Branch Experiment Station, with headquarters at Mound Valley.

Soil studies in relation to yield and quality of crops, field crop investigations, dairy cattle production, 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 12 experimental fields of from 20 to more than 320 acres each. Six are operated by the Department of Agronomy. They are on different soil types and under different climatic conditions. Field crops and soil investigations are specially pertinent to

local conditions. Three fields are supervised jointly by the Departments of Agricultural Engineering and Agronomy and include irrigation studies. Fields (most leased) are: Cornbelt (Powhattan), North Central Kansas (Belleville), Irrigation (Scandia), Southwest Kansas (Minneola), Sandyland Irrigation and Dryland (St. John), South Central Kansas (Hutchinson), Newton, East Central (Ottawa), Kansas River Valley Irrigation (Topeka: Rossville and Silver Lake).

Three fields for horticultural and forest crops operated by the Department of Horticulture and Forestry are Northeast Kansas (Wathena), Wichita and Southeast Kansas (Chetopa).

## **The Kansas Water Resources Research Institute**

*William L. Powers, Director*

Cooperating with the Water Resources Institute, University of Kansas

The Kansas Water Resources Research Institute was established by the Board of Regents October 31, 1964, at Kansas State University after Congress passed the Water Resources Research Act of 1964. By Regents' stipulation, Kansas State University and the University of Kansas participate in the Institute so maximum benefit will accrue to the citizens of Kansas. Consequently, the Institute can support water resources research in any department at either university. The policy committee governing the Institute is composed of representatives from both Kansas State University and the University of Kansas.

The purpose of the Institute is to conduct basic and applied research and to train scientists in areas related to water resources. Research and educational interests include the hydrologic cycle; supply and demand for water; conservation and best use of available supplies of water; methods of increasing such supplies; and economic, legal, social, engineering, recreational, biological, geographical, ecological and other aspects of water problems.

### **Evapotranspiration Laboratory**

*Hyde S. Jacobs, Director*

Established by the 1968 Kansas legislature, this laboratory is concerned with conserving Kansas' limited water resources by reducing both evaporation from soil and plant surfaces and transpiration from plant leaves.

## **The Food And Feed Grain Institute**

*C.W. Deyoe, Acting Director*

Leonard W. Schruben, Associate Director

The Institute is based on the faculty in the Grain Science and Industry Department and utilizes some faculty in other departments. Its goals are to develop methods of milling and processing grains; to evaluate and improve their quality and nutritional properties; to find new uses for them; and to improve the handling, transporting, storing, and domestic and international marketing of grains and foods.

### **The Statistical Laboratory**

*A.D. Dayton, Director*

This laboratory was established in 1946 to provide



consulting and computational services to the faculty and students of Kansas State University, especially those associated with the Kansas Agricultural Experiment Station. It is under the administration of

the Department of Statistics whose faculty is available by appointment for statistical and computational assistance on a twelve-months basis to assist in the designing of experiments.

# Division of Cooperative Extension

*John O. Dunbar, Director*

The basic mission of Extension is to deliver informal, out-of-school, non-credit 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.

Extension provides an important learning bridge between the University and the people of the State. It takes scientific knowledge, principles, and practices to all corners of the State that bear directly on the grass roots problems of people. 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 county-wide educational programs.

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 program areas—agriculture, home economics, 4-H youth and community resource development.

Changing conditions continually enlarge and modify the emphasis on subjects relating to the major program areas. 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 now includes urban and suburban people, as well as the farm families for whom the original programs were designed. Extension specialists now 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 persons with the work of the University by organizing and conducting groups to visit the University and its branch experiment stations and fields. Many statewide organizations in agriculture, home economics and 4-H club work are given assistance with their annual conferences at the University. Included in this type of educational work are the various breed, seed and feed associations; the Kansas Home Economics Advisory Council; and the 4-H Round-up.

## 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 are also specialists training individuals who in turn train others, either individually or in groups. Thus, these public-spirited lay leaders 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 appraise the county Extension agents of new developments in research.

The basic role of the Extension specialist is to interpret research developed by the state agricultural experiment station and USDA, help county agents to 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 Local People to State and National 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, Acting State Leader, and Director, Division of University Communications*

The state leader of the Department of Extension Communications also is the director of the Division of University Communications. This department head coordinates and directs information activities of the Division of Cooperative Extension with all other informational activities of Kansas State University. The Department of Extension Communications is divided into two sections: Office of Extension Radio-Television-Film and the Office of Extension Information.

### Office of Extension Radio-Television-Film, and Office of Extension Information

*Jack M. Burke, Head, Office of Extension Radio-TV-Film and Manager, Radio Station KSAC*

*Gary L. Vacin, Extension Editor and Head, Office of Extension Information*

Professor Burke; Associate Professors Graham, Titus, Unruh and Vacin; Assistant Professors Daly, DeWeese, Kuehn, Medlin, Naegel, Nelson, Peck, Stockard, Sullins, and Tennant; Instructors Ballou, Blevins, Crawford, Dierking, Harmes, and Nagel; Emeritus: Professor Warner; Associate Professors Dexter and Shankland.

It is the objective of these offices to acquaint the people of Kansas with the research findings of this land-grant University, its branch experiment stations and the United States Department of Agriculture, through the mass communications media. This includes the responsibility of reporting to all people of Kansas new developments and recommendations in agriculture, quality of living, youth work, public affairs, and community and rural development. All means of communication are utilized in the dissemination of information for the benefit of all Kansas residents.

Scientific information, as written or produced in popular version by the departmental staff, is channeled through all appropriate means of communication, including newspapers, publications, circulars and posters, printed annual reports, exhibits, motion pictures, slides, radio and television.

The State's weekly and daily newspapers and various Kansas farm, trade and consumer publications are provided periodically with news stories and pictures about research work of the Kansas Agricultural Experiment Station and program activities of the Kansas Cooperative Extension Service.

County Extension agents are provided a weekly press service and are given special training throughout the year in utilizing to the maximum a balanced information program. The department

cooperates with all agents in the 105 organized County Extension Services and the specialized staff in five area offices, as well as central office staff workers, in planning and executing information programs.

Radio is divided into two phases: broadcasting programs over KSAC, an institution-owned, non-commercial, educational station; and broadcasting recorded services and live programs over more than 80 cooperating commercial radio stations in Kansas and adjacent states.

Station KSAC, the University radio station, is used exclusively for the dissemination of informative and cultural programs. Five hours a day is devoted to the broadcast of programs originating from within all colleges of the University and the Division of Cooperative Extension. Approximately 50 per cent of the broadcast time is devoted to programs originating from within the Extension Service.

Daily scripts are mailed to cooperating commercial radio stations, and county agents are given assistance in planning local radio programs. Numerous live programs are arranged for Extension Service and other University staff members to broadcast over stations when the personnel are in the field.

Television programs showing results of research work and demonstrations are prepared, directed and presented on several cooperating television stations in the state. Special television training is provided for Extension and other University staff members who appear on educational television programs.

Motion pictures for the University and off-campus groups with educational objectives are produced on a fee basis.

A limited library of motion pictures and slides for visual instruction is maintained for use by county agents, field workers, vocational education instructors and personnel of cooperating agencies of government. Providing visual aids materials represents an important phase of work in the department.

Each year nearly four million copies of Extension Service, Experiment Station and USDA publications, and other materials are printed and distributed.

## Extension Agricultural Production Programs

*Wilber E. Ringler, Assistant Director of Extension and 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.

Each department has Extension faculty who plan, conduct and evaluate off-campus programs in their respective subject matter areas. These specialists organize the educational information, prepare support materials, and make presentations in counties, upon request.

In addition, Extension offers interdisciplinary programs in three areas:

**Food, Feed and Forage Production.** Stresses continued application of physical, biological, and economical factors to food, feed, and forage produc-



tion which influence sound crop production practices, good business management, efficient use of labor, and rapid adoption of new technology.

**Animal Production and Utilization.** Provides a more concentrated effort for effective production and utilization of meat, dairy, and poultry products, based on such economic factors as comparative advantage in animal and feed resources, climate, producer competence, market location, and consumer demand.

**Resource Use and Conservation.** Focuses attention on increasing need for pollution-free soil, water, and air in rural and urban settings; zoning; and public affairs education. Also, emphasizes proper management and conservation of fields and forests—as related to commercial production and recreation—to gain clientele and legislative approval and support.

**Management on Commercial Farms.** Helps producers effectively manage their farm, forest, or range enterprises to increase the proper utilization of the marketing system. Farmers need continued information about enterprise organization, total business structure, and procurement of supplies, labor, credit, and equipment.

### Extension Agronomy

*Hyde S. Jacobs, Head of Department*

*Frank G. Bieberly, Section Leader*

Professors Bieberly, Ellis, Jacobs, Jones, Nilson and Peterson; Associate Professors Dicken, Edelblute, Follett, Kilgore, and Whitney; Assistant Professors Nuttelman, Ohlenbusch, and Reinhardt. Emeritus: Professors Cleavinger and Lind; Associate Professor Harper.

The Extension Agronomy department conducts a state-wide educational program in agricultural crop production and 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, promote the adoption of proven practices, and inform the Agricultural Experiment Station of needed research. The agronomy specialists correlate their program with specialists in all other subject matter areas to insure the most effective overall Extension program.

### Extension Animal Science and Industry

*Don L. Good, Head of Department*

*Wendell A. Moyer, Section Leader*

Professors Good, Moyer, and Zoellner; Associate Professors Francis and Westmeyer; Assistant Professors Brazle, Corah, Orwig, Schafer, Schwartz, and Spaeth; Extension Assistant Spiker. Emeritus: Professor McAdams.

Extension specialists in Animal Science and Industry provide leadership for state programs in beef, sheep, swine and meats. Programs are conducted in counties with producers (both adult and youth) and the allied industry with the support of county Extension personnel.

### Extension Dairy and Poultry Science

*Charles L. Norton, Head of Department*

Professor Norton; Associate Professors Bonewitz, Dunham, and Jackson.

**Dairy Science.** Extension dairy specialists provide information which enables Kansas families to maintain efficient dairy operations. A dividend of this educational input is the participation of Kansas dairymen in community, state and national affairs. The leadership and direction of specialists has resulted in constructive and dynamic dairy programs in all areas of the state where dairying is a viable enterprise. An important force to progress is the specialists' supervision of the National Dairy Herd Improvement Program in Kansas.

**Poultry Science.** Extension education in poultry science is the development of practical information from research for the poultry industry. This involves working with all segments of the industry including producers, hatcheries, turkey producers, marketing organizations, feed companies and other interested organizations and groups. Extension programs are involved with developing projects that improve the opportunity for increased income to persons in the poultry industry.

### Extension Entomology

*Richard T. Sauer, Head of Department*

Professors Gates and Sauer; Associate Professor Brooks; Assistant Professor Mock.

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. Extension entomology uses meetings, newsletters, and mass media to keep Kansas producers informed of populations of insects that may create problems. 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

*Ronald W. Campbell, Head of Department*

*Frank D. Morrison, Section Leader*

Professor Morrison; Associate Professor Marr; Assistant Professors Leuthold, and van der Hoeven.

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 or personal use, the use of horticultural plants for therapeutic purposes, or for environmental improvement or family gardens.

Assistance is available to suburban, urban and rural homeowners; and to commercial producers, such as florists, nurseries, greenhouse operators, 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 hor-



ticultural plant materials. Assistance is available in every Kansas county and is conducted 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**

*Harold G. Gallaher, State and Extension Forester*

Professor Gallaher; Associate Professors Biswell, Grey and Strickler; Assistant Professors Aslin, Atchison, Biles, Bratton, Gaylor, Geisler, Gould, Lindsey, Loucks, Moyer, Naughton, Nighswonger, Pinkerton, and Rowland; Instructor Baughman.

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 is operated, providing 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 efficiency and better utilization of the timber crop.

The department also operates a Cooperative Rural Fire Control program. Assistance is given to rural fire districts in organizing, planning, fire prevention, obtaining fire equipment, 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 use areas around reservoirs. The section also 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 northwest of the main campus. The Forestry Building, at 2610 Claflin Road in Manhattan, also houses the tree distribution, tree cold storage, greenhouse, and shop facilities. Paneling of twelve Kansas hardwood species is on display in the building. Area forestry offices are in Chanute, Garden City, Hays, Hutchinson, and Manhattan.

### **Extension Plant Pathology**

*James F. Shepard, Head of Department*

Professors Shepard and Willis; Assistant Professor Claflin. Emeritus: Professor King.

The purpose of the work by Extension specialists in plant pathology is to 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, lawngrasses 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.

### **Extension Veterinary Medicine**

*Homer K. Caley, Section Leader*

Professor Caley; Assistant Professor Breeden. Emeritus: Associate Professor Osburn.

Extension Veterinary Medicine serves the companion animal and livestock industry including veterinarians as a source of scientific material pertaining to the most recent information on disease prevention and control. Current research is evaluated and adapted for use in this area.

Product evaluation, field trials and surveys are implemented into the work program so that our livestock interests can be provided with actual test results as conditions exist on Kansas farms and ranches.

### **Extension Wildlife Damage Control**

*Assistant Professors Boggess and Henderson*

The function of this section 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 attitudes which recognize 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 ranch surveys immediately after loss of livestock from predators, giving control recommendations, 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 and birds 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 Agricultural Engineering**

*William H. Johnson, Head of Department*

*Leo T. Wendling, State Leader*

Professors Holmes, Johnson and Wendling; Associate Professors Jepsen, Powell and Schindler; Assistant Professors Hay, Murphy, Thomas, and Zerr; Extension Assistant Schrock. Emeritus: Professors Ferguson and Stover; Associate Professor Selby.

The function of the Department 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 subject matter fields such as the control of soil erosion; the development, conservation and utilization 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 subject matter areas. 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**

*Paul L. Kelley, Head of Department, Professor*  
*Norman V. Whitehair, Assistant Head, Professor*

#### **Farm Management**

Associate Professors Bogle, Figurski, Langemeier, McReynolds, and Schlender; Assistant Professors Baden, Overlay, Pretzer, and Treat; Instructors Allen, Appleby, Bratcher, Collins, DeLano, Dickson, Everson, Faidley, Frederick, Germann, Green, Greene, Hackler, Herod, Janssen, Mullen, Nelson, D. Parker, L. Parker, Reimer, Smith, Strickler, and Urban. Emeritus: Professors Coolidge and Thomas; Instructors Bartlett, Guy, Hageman, McClelland, and Means.

The Extension educational program in farm management is divided into two sections: Kansas Farm Management Association Programs and Area Farm Management Programs.

In the Kansas Farm Management Association Program, the 24 area extension economists, farm management (fieldmen), conduct an intensive educational program with 3,800 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 120-150 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 record, 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, training, 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 subject matter areas.

The Area Farm Management Program encompasses the public educational program in farm management. This is conducted by state specialists and area extension 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 agri-business 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 agents. 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 feed and supply firms.

### **Public Affairs and Economic Information**

*Associate Professor Flinchbaugh.*

The public affairs Extension educational program is designed to provide the people of Kansas and their leaders with educational information on public issues which are of current interest. The purpose is to provide the people with the facts so they have broader and more accurate knowledge from which to make a decision. 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 which can be used for immediate or long-term business planning.

### **Extension Marketing**

*Associate Professors Frederick and Walker; Assistant Professor Barton.*

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, 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, sell input products and retail products and services. Educational work is conducted in the fields of sales, cooperatives, business management, 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 Grain Science and Industry**

*C.W. Deyoe, Acting Head of Department*

*Robert W. Schoeff, Section Leader*

Professors Schoeff and Wilcox; Assistant Professor Balding.

Kansas State University has the only Formula Feed Extension program in the United States designed for the feed manufacturing industry. This unique 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, building 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 the areas of grain quality, grades and inspection, and transportation and (2) processing and utilization through milling and baking.

### **Extension Community Resource Development**

*Oscar W. Norby, Assistant Director of Extension*

Professor Norby; Associate Professors Halazon and Utermohlen; Assistant Professors Albright, Baker, Bittel, Deutsch, Eberle, Frazier, Hendrix, and Sisk.

Community Resource Development is a process whereby those in a community arrive at group decisions and take actions to enhance the social and economic well-being of the community.

Community Resource Development educational programs include subject matter in such areas as comprehensive planning, land use, community organization, leadership development, recreation, tourism, economic development, community housing, community health and welfare, community

facilities and services, local government, public affairs, taxation, manpower development, and environmental improvement. The Community Resource Development staff develops and implements programs in coordination with five Area Extension Specialists, Community Resource Development; County Extension Agents; local leaders and citizens; and civic and governmental agencies and organizations in helping to strengthen communities, promote employment, and improve agriculture—all of which results in communities that are better places in which to live and work.

## **Quality of Living Programs**

### **Department of Extension Home Economics**

*Gail L. Imig, Assistant Director of Extension, Quality of Living Programs.*

Associate Professors Anderson, Brill, Carlson, Imig, Redeker, Tucker; Assistant Professors Atkinson, Clarke, Goetting, Howe, Jones, Meyer, Slinkman, Spalding, Zimmerman. Emeritus: Professors Allen, Ellithorpe, Koenig, and Smurthwaite; Associate Professors Dickinson, Johnson, and Wiggins; Assistant Professors Briggs, Guthrie, Miller, and Starkey.

Educational programs designed to improve the quality of living are carried on in each Kansas county under the direction of Quality of Living programs.

Program emphases are in the areas of: development of children and youth; marital and parental roles; preparation for retirement years; changing roles of women; management in allocation of family resources; family financial security; money management; consumer performance in the market; nutrition and health; food safety and sanitation; health and safety; hazards in the home and community; community health hazards; home selection, building, buying, and remodeling; housing costs and finance; community factors in housing decisions; furnishing and equipping the home; and developing community economic, social, cultural, human resources including understanding public concerns affecting families, expansion and improvement of cultural opportunities and development of leadership abilities.

Each county designs its Quality of Living 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 through the mass media of press, radio and television.

Quality of Living programs often work jointly with other Extension departments, and other agencies and organizations in carrying out educational programs.

### **Extension Expanded Food And Nutrition Education Program**

*Gail L. Imig, Assistant Director of Extension, Quality of Living Programs*

Associate Professors Clonts and Wells.

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 para-professionals who work under the supervision and administration



of an Extension home economist. The program is being conducted in designated counties.

## 4-H And Other Youth Programs

*Glenn M. Busset, Assistant Director of Extension, 4-H and Youth*

Professors Apel and Busset; Associate Professors Bates, Borst, Eyestone, Hanna, and Lang; Assistant Professors Abell, Adams, Murphy, Robbins, and Rohs; Instructor Whitson.

4-H work is the out-of-school youth educational program of the University, conducted in cooperation with County Extension Councils and the United States Department of Agriculture. In 4-H work young people take part in agricultural, homemaking, community service, health, music, education, safety, conservation, recreation, and other activities. 4-H work is often explained by the slogan "Learning by Doing." Through projects, scientific information recommended by the University is applied to problems of agricultural production, home living and personal development.

Each local 4-H Club elects its own officers who conduct club meetings with guidance of volunteer adult leaders. The club meets at least once monthly in a member's home or in a public building. The meetings have educational features, such as demonstrations, talks and discussions. Adult leaders counsel with the 4-H members and give guidance to their club activities. Each member carries to completion at least one personal project. Any boy or girl 7 to 19 years of age may be a 4-H member. The leaders and members work in cooperation with the county Extension agents.

In addition to approximately 30,000 boys and girls enrolled in 1,050 4-H Clubs, another 46,000 boys and girls have had one or more 4-H educational experience as special 4-H members. The 4-H program nationally has more than 30 million alumni, and has been adopted or adapted into nearly 100 foreign countries.

4-H work began as the University sought to expand research developments to the farmers of Kansas. Children were organized into informal educational groups shortly after 1903. Corn, canning, pig and poultry clubs were among the first educational groups that had affiliation with the University.

It soon became evident that the educational development of boys and girls was of greater importance than the spread of improved farm and home practices. The 4-H program was broadened to include not only projects of a farm and home nature, but many other activities such as health, music, conservation of wildlife and natural resources, recreation, parliamentary practices and art.

The present 4-H program is designed to develop citizenship and leadership among all young people and to provide opportunities for them to participate with their parents and friends in the adoption of better farm, home and personal practices.

A later development, extending 4-H work around the world, is the International 4-H Youth Exchange (IFYE). Kansas 4-H members have lived for periods of up to one year with farm families in foreign countries around the world. Youths from foreign countries have lived in Kansas host family homes. Kansas has sent and received more "IFYE's" than any other state, giving national leadership to the program for international understanding.

## 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. The area Extension specialists 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

Associate Professors Edelblute, Francis, Mann, Neufeld, and Whipples; Assistant Professors Aslin, Boggess, Hendrix and Mock; Instructors Germann, Green, Herod, and Janssen.

### Northwest Area Extension Office, Colby

Philip B. Finley, Area Extension Director

Associate Professor Finley; Assistant Professors Atchison, Overley, Reinhardt, Schroeder, Schwartz, and Sisk; Instructors Faidley, Nelson, Reimer, Urban, and Zerr.

### South Central Area Extension Office, Hutchinson

Lawrence J. Cox, Area Extension Director

Professor Cox; Associate Professor McReynolds; Assistant Professors Albright, Deutsch, Goetting, Lindsey, Nuttelman, Orwig and Wiggins; Instructors Allen, Bratcher, Collins, Frederick and Whitson.

### Northeast Area Extension Office, Manhattan

Richard F. King Jr., Area Extension Director

Associate Professors Borst, Dicken, Figurski, King, and Utermohlen; Assistant Professors Biles, Crist, Geisler and Jones; Instructors Delano, Dickson, Everson, Greene, Hackler, D. Parker, L. Parker, and Smith.

### Southeast Area Extension Office, Chanute

Herman W. Westmeyer, Area Extension Director

Associate Professors Kilgore and Westmeyer; Assistant Professors Appleby, Bittel, Bratton, Robbins, Rowland, Spalding, and Treat; Instructors Appleby, Baughman, Dawson, Mullen, and Strickler.

**County Extension Offices.** County Extension work is designed to take 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 horticultural agent. The professional persons holding these positions are members of the faculty of Kansas State University and hold the academic rank of instructor.

County Extension work is financed by federal, state and local tax funds. A local nine-member executive board aids in directing the programs and activities of the county Extension professional staff.

In addition to the problem-solving responsibility, local Extension professionals assist local persons in organizing group action to help solve community problems.

Probably no greater opportunity exists for a professional person to express himself through working with local people. A tremendous amount of self-satisfaction is gained by Extension professionals when viewing the results of their efforts as they help people—individually and collectively—from all races and income levels—move from where they are to where they want to be.



# Faculty and Administration

Includes only those with rank of instructor or above.

**Reading Key**—Academic ranks are abbreviated as follows. Professor, Prof., Associate Professor, Assoc. Prof., Assistant Professor, Asst. Prof., Instructor, Instr. Academic ranks are current as of January, 1977. The first year listed in parentheses following the title is the date of initial employment at KSU, subsequent yearly dates (if any) are dates of appointment to higher academic ranks or to new positions. (GF) following a person's listing means he or she is a member of the Graduate Faculty; such persons also are designated as Graduate Faculty members in the body of the catalog by placement of asterisks following their names.

## Officers of Administration

**ACKER, DUANE**, President (1975). BS 1952, MS 1953, Iowa St. Univ., PhD 1957, Dkla. St. Univ.  
**ALLOWAY, JAY E.**, Instr., Computing Center (1970). BS 1970, Kan. St. Univ.  
**ARHEART, KRISTOPHER L.**, Instr. and Mgr. of Information Services, Computing Center (1973). BS 1970, MS 1973, Kan. St. Univ.  
**AYRES, JANET SPRANG**, Assoc. Dir. of Alumni Relations (1970, 1973, 1975). BS 1970, Kan. St. Univ.  
**BEATTY, DANIEL D.**, Vice Pres. for Business Affairs, Prof. of Business Administration (1956, 1959, 1972). AB 1947, Hope Col., MBA 1949, Univ. of Mich.  
**BONEBRAKE, CASE A.**, Dir. of Physical Plant (1947, 1967). BS 1947, BS 1955, Kan. St. Univ.  
**BROWN, WILBUR E.**, Asst. Prof., Dir. of Student Publications, (1970). BS 1949, Kan. St. Univ.  
**CHALMERS, JOHN**, Vice Pres. for Academic Affairs, Prof. of Economics (1963, 1969). AB 1938, Middlebury Col., PhD 1943, Cornell Univ. (GF)  
**CONROW, KENNETH**, Assoc. Dir. and Mgr. of User Services, Computing Center (1974, 1976). Assoc. Prof. of Computer Science (1961, 1964). BA 1954, Swarthmore Col., PhD 1957, Univ. of Ill. (GF)  
**COOL, VINCENT J.**, Asst. Vice Pres. for Planning, Asst. Prof. of Architecture (1957, 1967). BS 1951, Kan. St. Univ., Registered Architect, 1952  
**DALLAM, JERALD**, Instr., Assoc. Dir. of Records, Instr. (1968). BS 1959, Northwest Mo. St. Col., MS 1964, Dkla. St. Univ.  
**DEVORE, JOHN J.**, Instr., Mgr. of Programming Services, Computing Center (1973). BS 1970, MS 1973, Kan. St. Univ.  
**DODGE, THEODORE O.**, Asst. Prof., Dir., Budget Office (1946, 1957). BS 1940, Kan. St. Univ.; CPA 1954, Kansas  
**ELKINS, RICHARD NELSON**, Instr., Dir. of Admissions (1966, 1968). BS 1956, MS 1963, Kan. St. Univ.  
**FOSTER, DONALD E.**, Instr., Dir. of Records (1965, 1968). BS 1960, MS 1961, Kan. St. Univ.  
**GALLAGHER, TOM L.**, Dir. of Computing Center, Assoc. Prof. of Computer Science (1970). BA 1953, MS 1954, North Tex. St. Col., DSc 1967, Wash. Univ. (GF)  
**GARVIN, RICK L.**, Instr., Office of Educational Resources (1972). BA 1970, San Jose St. Col.  
**GERRITZ, ELLSWORTH M.**, Prof., Dean of Admissions and Records (1954, 1962). BE 1938, St. Cloud St. Teach. Col., MS 1948, PhD 1951, Univ. of Minn. (GF)  
**GREEN, PATRICIA A.**, Instr., Asst. Dir. of Affirmative Action (1976). BS 1973, Univ. of Kan.  
**HAINES, RICHARD O.**, Asst. Prof., Dir., Office of Univ. Publications (1967). BS 1958, Kan. St. Univ.; MA 1976, Univ. of Minn.  
**HESS, H. DEAN**, Dir. of Alumni Relations (1961). BS 1950, Kan. St. Univ.  
**HEYWOOD, KENNETH M.**, Dir., Endowment and Development (1956). BS 1938, Kan. St. Univ.; MA 1949, Univ. of Wyo.  
**HOYT, DONALD P.**, Prof., Dir., Office of Educational Resources (1968). BS 1948, Univ. of Ill.; MA 1950, PhD 1954, Univ. of Minn. (GF)  
**HURLEY, DOUGLAS E.**, Instr., Asst. Dir. of Records (1976). BA 1970, Miami Univ. of Ohio, MS 1976, Univ. of Vt.  
**IRVIN, H. HUGH**, Instr., Computing Center (1973). BS 1972, Kan. St. Univ.  
**KEPPLE, MELVIN T.**, Instr., Dir., Data Processing Center (1967). BS 1950, Washburn Univ.  
**KRIDER, JOHN A.**, Instr., Editor, Univ. Publications (1975). BA 1967, MS 1976, Kan. St. Univ.  
**KRUH, ROBERT F.**, Dean of the Graduate School, Prof. of Chemistry (1967). AB 1948, PhD 1951, Wash. Univ. (St. Louis). (GF)  
**LAMBERT, JOHN P.**, Asst. Prof., Radiation Safety Officer (1964, 1976). BS 1959, Lebanon Valley Col.; MPH 1963, Univ. of Mich.; PhD 1975, Kan. St. Univ.  
**LARSON, VERNON C.**, Prof., Chairperson, Council on International Activities (1976). BS 1947, MS 1950, PhD 1954, Mich. St. Univ.

**LIPP, MARK E.**, Instr., Asst. Dir., Data Processing Center (1972, 1976). BS 1969, Kan. St. Univ.  
**MCCAIN, JAMES ALLEN**, President Emeritus (1950, 1975). AB 1926, LLD 1951, Wofford Col.; MA 1929, Duke Univ.; EdD 1948, Stanford Univ.; LLD 1964, Univ. of Mont.; DSc 1967, Andhra Pradesh St. Univ. (India); LLD 1965, Colo. St. Univ.  
**MILBOURN, MAX W.**, Asst. to the Pres., Assoc. Prof. of Journalism (1949, 1957). AB 1938, Univ. of Wichita  
**MILLER, MICHAEL H.**, Assoc. Dir. of Computing Center (1964, 1966, 1976), and Asst. Prof. of Computer Science (1960, 1965). BS 1958, MS 1960, Iowa St. Univ.  
**MITCHELL, ROGER L.**, Prof., Vice Pres. for Agriculture (1975). BS 1954, Iowa St. Univ.; MS 1958, Cornell; PhD 1961, Iowa St. Univ.  
**MURRY, JOHN P.**, Asst. Prof., Asst. Dean of Graduate School (1957, 1973). BS 1955, Rockhurst Col.; MS 1960, PhD 1971, Kan. St. Univ.  
**NOONAN, JOHN P.**, Assoc. Dean of Graduate School (1947, 1966), Prof. of English (1968). BS 1947, Rockhurst Col., MS 1950, Kan. St. Univ., PhD 1955, Denver Univ. (GF)  
**OWENS, RICHARD E.**, Prof., Office of Educational Resources (1964, 1969, 1976). AB, BS 1949, Northwest Mo. St. Col.; MS 1953, EdD 1964, Colo. St. Col. (GF)  
**PERRY, RALPH H.**, Asst. Prof., Comptroller (1946, 1953, 1962). BS 1946, Kan. St. Univ.  
**RASCH, CARLA R.**, Instr., Asst. Dir. of Admissions (1974). BSc 1967, Kan. St. Teach. Col.; MS 1971, Kan. St. Univ.  
**RAUSCH, DIANE K.**, Instr., Acting Dir. of Affirmative Action (1976). BA 1965, Simpson College; MLS 1966, Univ. of Wis.; MS 1974, Kan. St. Univ.  
**ROCHAT, CARL ROBERT**, Dir., Office of Univ. News, Assoc. Prof. of Journalism (1953, 1963). BS 1940, Kan. St. Univ.; MS 1948, Univ. of Ill.  
**RUGGLES, BERTRAM L.**, Asst. Prof., Dir., Employee Relations (1972). BS 1942, Iowa St. Univ.; MS 1950, American Univ.  
**SCHWAB, MERLE E.**, Instr., Office of Vice Pres. for Univ. Development (1970). BS 1949, Kan. St. Univ., Registered Professional Engineer, Licensed Surveyor  
**SEATON, RICHARD H.**, University Attorney (1971). AB 1959, Harvard Col., LLB 1963, Harvard Law School.  
**SMITH, JOYCE E.**, Instr., Asst. Dir. of Admissions (1976). BS 1975, MS 1976, Kan. St. Univ.  
**STEHLER, DONALD R.**, Assoc. Dir. of Alumni Relations (1961, 1966). BS 1950, Kan. St. Univ.  
**STONE, R. GLEN**, Instr., Dir., Office of Sports Information (1973). BS 1967, Univ. of Okla.  
**SWITZER, VERYL A.**, Asst. Prof., Assoc. Dean for Univ. Minority Affairs (1969, 1973). BS 1954, MS 1974, Kan. St. Univ.  
**TAOTMAN, EMERSON L.**, Dir., Personnel Services (1964, 1969).  
**TARRANT, DONALD H.**, Instr., Asst. Dir., Office of Educational Resources (1970, 1976). BS 1948, Morningside Col.; MS 1959, Iowa St. Univ.  
**THOMPSON, DOROTHY**, Instr., Dir. of Affirmative Action for Women (1972). BS 1959, Wis. St. Univ.; MA 1965, Univ. of Wyo.  
**WEBER, ARTHUR D.**, Vice Pres. Emeritus (1924, 1963). BS 1922, MS 1926, Kan. St. Univ.; PhD 1940, DSc 1950, Purdue Univ.  
**WEIGEL, LARRY N.**, Instr., Vice Pres. of Endowment and Development—Private Support Programs (1968, 1971, 1973). BS (dual degree) 1967, MS 1968, Kan. St. Univ.  
**WOODWARD, JANET R.**, Instr., Information Asst. to the President (1976). AB 1962, Univ. of No. Colo.; MS 1975, Kan. St. Univ.  
**YOUNG, PAUL M.**, Prof., Vice Pres., Univ. Development, Prof. of Mathematics (1947, 1970). AB 1937, Miami Univ.; MA 1939, PhD 1941, Ohio St. Univ. (GF)

## Library Faculty

**AYERS, JUDITH L.**, Instr., Univ. Library (1977). BA 1971, Fort Hays Kan. St. Col.; ML 1975, Emporia Kan. St. Teach. Col.  
**BATSON, CONNIE HINES**, Instr., Univ. Library (1973). BME 1965, Univ. of Kan.; MLS 1973, Kan. St. Teach. Col.  
**BLANOING, SYLVIA J.**, Instr., Univ. Library (1972). BA 1970, Kan. Wesleyan; MLS 1971, Kan. St. Teach. Col.  
**BROWN, JANET L.**, Instr., Univ. Library (1976). BA 1974, Wichita St. Univ.; MLS 1975, Emporia Kan. St. Col.  
**ERICKSON, VALERA L.**, Instr., Univ. Library (1974). BS 1972, MLS 1974, Univ. of Me.  
**FARMER, DIANA M.**, Instr., Univ. Library (1972). BA 1971, MLS 1972, Kan. St. Teach. Col.  
**FRANCO, CAROLE A.**, Instr., Univ. Library (1971). AB 1968, Baker Univ.; MLS 1969, Kan. St. Teach. Col.



**FRIESNER, VIRGINIA G.**, Instr., Univ. Library (1972). BA 1971, Kan. Wesleyan, MLS 1972, Univ. of Ill.

**HOLTZ, JEROME E.**, Instr., Univ. Library (1974). BA 1972, Penn. St. Univ., MLS 1974, Univ. of Pittsburgh.

**JENKINS, LAVERNE C.**, Instr., Univ. Library (1977). BA 1968, Bennett Col.; ML 1975, Univ. of S. Car.

**JOHNSON, JOHN L.**, Instr., Univ. Library (1969). BA 1967, MA 1973, Kan. St. Univ.

**LEVINSON, MARILYN I.**, Instr., Univ. Library (1972). BA 1971, Indiana Univ., MA 1972, Univ. of Wis.

**LITCHFIELD, MEREDITH C.**, Assoc. Prof., Univ. Library (1967, 1970, 1975). BS 1950, MS 1967, Kan. St. Teach. Col.

**LU, JAMES Y.**, Asst. Prof., Univ. Library (1969, 1975). BA 1960, Tamkang Col., MLS 1965, MS 1970, Kan. St. Teach. Col.

**MCDONALD, DAVID R.**, Instr., Univ. Library (1976). BA 1973, Calif. St. Univ., Long Beach, MA 1974, Wash. St. Univ., MLS 1975, Univ. of Dre.

**MORELAND, RACHEL S.**, Instr., Univ. Library (1971). BS 1955, Univ. of Ariz., MS 1970, Kan. St. Univ.

**PIGNO, ANTONIA**, Instr., University Library (1975). BA 1968, St. Univ. of N. Y., Stony Brook, MA 1971, Kan. St. Univ.

**QUIRING, VIRGINIA M.**, Asst. Prof., Univ. Library (1971, 1975). BA 1943, Ottawa Univ., MLS 1971, Kan. St. Teach. Col.

**RAUSCH, G. JAY**, Prof., Dean, Univ. Libraries (1973). BA 1955, North Central Col., MA 1958, PhD 1960, MLS 1961, Univ. of Ill.

**RICHARDS, ARNE H.**, Assoc. Prof., Univ. Library (1965, 1975). BA 1954, Yankton Col., MSLS 1960, Univ. of Ill.

**ROHRER, RICHARD L.**, Asst. Prof., Univ. Library (1968). BS 1960, MLS 1968, Kan. St. Teach. Col.

**SCOTT, ANN**, Instr., Univ. Library (1973). BA 1964, MA 1970, Kan. St. Univ.

**SODERHOLM, DOROTHY J.**, Asst. Prof., Univ. Library (1966, 1972). BA 1946, Kearney St. Teach. Col., MA 1956, Wheaton Col., MS 1959, Univ. of Ill.

**TAYLOR, ELLYN M.**, Asst. Prof., Univ. Library (1957, 1958). BS 1938, Kan. St. Teach. Col.

**VANDER VELDE, JOHN J.**, Asst. Prof., Univ. Library (1968). BA 1967, ML 1968, Kan. St. Teach. Col.

**VDTH, SALLY J.**, Instr., Univ. Library (1974). BA 1962, Kan. St. Univ., MS 1973, Kan. St. Teach. Col.

**WHITE, NEVA L.**, Assoc. Prof., Univ. Library (1966, 1970). AB 1944, Goshen Col., AB in LS 1946, Univ. of Mich.

**WILDE, LUCY M.**, Asst. Prof., Univ. Library (1967). BA 1965, Avila Col., MLS 1967, Rosary Col.

**WILLIAMS, EVAN W.**, Asst. Prof., Univ. Library (1964, 1971). AB 1955, Wash. Univ., MLS 1956, Univ. of Ill.

## Student Personnel Services Faculty

**AOAMS, TERRY R.**, Instr., Food Service Dir., K-State Union (1975). BS 1971, Southern Dre. St.

**AKIN, JAMES N.**, Assoc. Dir., Career Planning and Placement Center (1966). BS 1960, MS 1964, Kan. St. Univ.

**AUGUSTYN, LOREN L.**, Assoc. Prof., Student Health Center (1976). BS 1950, Neb. St., MD 1954, Creighton Univ.

**BIRNBAUM, ROGER D.**, Admin. Asst., Student Health Center (1976). BA 1970, Southwestern St. Okla.

**BOSCO, PAT J.**, Instr., Asst. Dean of Students, Center for Student Development (1972, 1976). BS 1971, MS 1973, Kan. St. Univ.

**BRAOSHAW, MICHAEL H.**, Instr., Asst. Dir. Health Education, Student Health Center (1971). BS 1968, MH Ed. 1971, Brigham Young Univ.

**BRETTELL, J. ALLAN**, Foreign Student Adviser, Asst. Prof., Center for Student Development (1966). BA 1949, MS 1951, Westminster Col.

**BROWN, ROBERT M.**, Assoc. Prof., Student Health Center (1972). BS 1954, Kan. St. Univ.; BA 1959, MD 1963, Univ. of Kan.

**BUTLER, GLENDA S.**, Asst. Dir., Aids, Awards and Veterans Service (1976). BS Ed 1974, MS 1975, Emporia Kan. St. Col.

**CHABARRIA, GILBERT R.**, Instr., Center for Student Development (1976). BS 1973, MS 1974, Kan. St. Univ.

**OANSKIN, DAVID G.**, Prof. of Psychology and Education, Center for Student Development (1959, 1966, 1968). AB 1950, Univ. of Redlands; MA 1951, PhD 1954, Ohio St. Univ. (GF)

**OWNEY, RONALD G.**, Asst. Prof., Center for Student Development (1975). BA 1966, Univ. of Tex.; MA 1968, PhD 1971, Temple Univ.

**EDWAROS, A. THORNTON**, Dir. Emeritus of Housing (1945, 1949, 1974). BS 1941, MS 1946, Kan. St. Univ.

**FRITH, THOMAS J.**, Asst. Prof., Dir. of Housing (1965, 1974). BA 1960, MA 1963, EdS 1965, Univ. of Iowa.

**HARMS, WILLIAM B.**, Intramurals Coordinator (1974). BA 1968, Kearney St. Col.; MA 1971, Colo. St. Univ.

**HERMES, STEVEN E.**, Asst. Dir., K-State Union (1973). BA 1969, MS 1971, Kan. St. Univ.

**KERR, WENOELL ROBERT**, Asst. Dir., Housing, Asst. Prot. of Education (1947, 1957). BS 1947, MS 1951, Kan. St. Univ.

**KIDD, SANDRA L.**, Instr., Center for Student Development (1976). BS 1972, MS 1974, Kan. St. Univ.

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

**LA FENE, BENJAMIN WILLIAM**, Dir. Emeritus, Student Health Center (1946, 1948, 1962). BS 1923, Mich. St. Univ.; MD 1931, Western Reserve Univ.

**LAUGHLIN, J. BRUCE**, Asst. Prof., Dir., Career Planning and Placement Center (1962, 1966). BS 1950, Univ. of Kan.; MS 1961, Kan. St. Univ.; JD 1967, Washburn Univ.

**LILLY, JERRY A.**, Instr., Administrative Asst., Vice Pres. for Student Affairs (1967). BS Ed, 1964, Concord Col.

**LYNCH, MICHAEL L.**, Asst. Prof., Center for Student Development (1972). BS 1967, MS 1968, EdD 1972, Ind. Univ.

**MARTIN, DANIEL C.**, Assoc. Prof., Student Health Center (1976). BS 1952, Arkadelphia Univ.; MD 1958, Univ. of Kan.

**MCCOY, DONALD E.**, Assoc. Prof., Student Health Center (1970). BS 1937, MD 1945, Univ. of Kan.

**McKNIGHT, DAVID E.**, Radiologist, Student Health Center (1972). DVM 1954, Kan. St. Univ., MD 1962, Univ. of Kan.

**McMANIS, HELEN L.**, Instr., Dietitian, Housing (1966, 1971). BS 1941, MS 1972, Kan. St. Univ.

**MITCHELL, SHARLENE K.**, Instr., Residence Hall Complex Coord., (1969). BS 1968, MS 1971, Kan. St. Univ.

**MDLT, MARY**, Instr., Dietitian, Housing (1973). BS 1971, Kearney St. Col., MS 1973, Univ. of Okla.

**NOLTING, EARL, JR.**, Assoc. Prof., Dir., Center for Student Development, Dean of Students (1974). BS 1959, MS 1961, Ind. Univ., PhD 1967, Univ. of Minn. (GF)

**NORDIN, MARGARET N.**, Assoc. Prof., Assoc. Dir., Center for Student Development, Dean of Women (1957). BS 1941, MA 1953, PhD 1962, Univ. of Minn. (GF)

**NOVAK, MICHAEL A.**, Dir. Aids, Awards and Veterans Service (1969, 1976). BS 1966, MS 1969, Kan. St. Univ.

**DGG, WILLIAM D.**, Instr., Center for Student Development (1964). BS 1956, MS 1964, Kan. St. Univ.

**OLIVERSON, LARRY R.**, Asst. Prof., Student Health Center (1975). BS 1964, Kan. St. Col.; MS 1972, PhD 1975, Univ. of Kan.

**OSER, NANETTE**, Asst. Dir., Career Planning and Placement Center (1976). BS 1967, St. Univ. of N. Y., Fredonia, M. Ed 1968, Springfield Col.

**PEINE, CAROLINE F.**, Instr., Center for Student Development (1961). AB 1947, Carleton Col., MS 1951, Kan. St. Univ.

**PENCE, JOHN T.**, Instr., Dietitian, Housing (1963, 1971). BS 1963, Purdue Univ., MS 1970, Kan. St. Univ.

**PESCI, PATRICK**, Instr., Dietitian, Housing (1975). BS 1973, Indiana Univ. of Pa.

**PETERS, CHESTER E.**, Prof. Vice Pres. for Student Affairs (1947, 1953, 1962, 1967). BS 1947, MS 1950, Kan. St. Univ., PhD 1953, Univ. of Wis.

**PETERSON, JACK T.**, Consulting Pathologist, Student Health Center (1965). AB, MD, 1950, Univ. of Kan.

**PHILLIPS, STEPHEN B.**, Assoc. Prof., Chief, Clinical Medicine, Student Health Center (1967). AB 1942, MD 1945, Univ. of Kan.

**RIGGS, JEAN M.**, Assoc. Dir., Housing and Dir., Food Service Assoc. Prof. of Institutional Management (1960, 1974). BS 1939, MS 1956, Iowa St. Univ.

**ROBEL, RAYDON H.**, Dir., Recreational Services (1970, 1973). BS 1965, MS 1970, Kan. State Univ.

**ROBYAK, JAMES E.**, Instr., Center for Student Development (1975). BA 1966, St. Vincent Col., MS 1973, Univ. of Utah.

**RDDF, DONALD B.**, Instr., Residence Hall Complex Coord. (1964). BS 1964, Kan. St. Univ.

**SCHUETTE, CLIFFORD G.**, Asst. Prof., Center for Student Development (1975). AA 1967, Del Mar Community Col., BBA 1969, Univ. of Tex.-Austin, MS 1973, EdD 1975, East Tex. St. Univ.

**SHERRARD, PETER A. D.**, Asst. Prof., Center for Student Development (1973). AB 1961, Wheaton Col., MDiv 1967, ThM 1971, Princeton Univ., EdD 1973, Univ. of Mass.

**SILLS, JACK L.**, Asst. Dir., K-State Union (1973). AB 1958, Kan. Wesleyan Univ.

**SINCLAIR, ROBERT E.**, Prof., Dir., Student Health Center (1970). BA 1948, MD 1952, Ohio St. Univ.

**SINNETT, E. ROBERT**, Asst. Dir., Mental Health Section, Student Health Center, Prof. of Psychology (1962). AB 1948, Univ. of Iowa, MA 1950, PhD 1953, Univ. of Mich.

**SMITH, WALTER D.**, Dir., K-State Union (1957, 1973). BA 1950, Kan. Wesleyan Univ.

**STRONG, MABEL B.**, Instr., Residence Hall Complex Coord. (1961, 1964). BS 1961, Kan. St. Univ.

**SWITZER, VERYL A.**, Asst. Prof., Assoc. Dean for Univ. Minority Affairs (1969, 1973). BS 1954, MS 1974, Kan. St. Univ.

**TORRENCE, BARBARA**, Instr., Dietitian, Housing (1974). BS 1973, MS 1975, Kan. St. Univ.

**TROTTER, MARILYN B.**, Instr., Asst. Dir., Center for Student Development (1967, 1975). BS 1965, MS 1967, Kan. St. Univ.

**UPHAM, JAMES A.**, Assoc. Dir., Aids, Awards and Veterans Service (1967, 1969). BS 1943, MS 1969, Kan. St. Univ.

**ZELNICK, SAUL**, Assoc. Prof., Student Health Center (1976). BS 1944, New York Univ.; MD 1954, St. Univ. of N. Y., Buffalo.

## Intercollegiate Athletics Faculty

**AKERS, JUDY**, Basketball Coach (1970, 1974). BS 1967, MS 1970, Kan. St. Univ.

**ANDERSON, BARRY**, Track Coach (1974). BS 1974, Kan. St. Univ.

**BATES, JAMES**, Asst. Football Coach (1975). MS 1969, Univ. of Tenn.

**BENNER, EUGENE**, Instr., Trainer (1976). BS 1957, Wilmington Col.; MS 1961, Ind. Univ.

**BOCCHI, DON**, Asst. Football Coach (1976). BA 1969, Duquesne Univ., MS 1970, Univ. of Wis.

**BUDA, SANTO**, Asst. Football Coach (1975). BS 1967, MS 1974, Kan. St. Univ.

**COLBERT, CONRAD**, Asst. Athletic Dir. and Business Manager (1976). BBA 1960, Univ. of Iowa.

**DWIGHT, MARY PHYL**, Volleyball and Softball Coach (1975). BS 1974, SWMSU; MS 1975, Kan. St. Univ.

**DUNKELBERGER, DAVID**, Asst. Football Coach (1975). BA 1961, DePauw Univ.

**EMERSON, J.W.**, Asst. Football Coach (1976). BS 1954, Pittsburg St. Univ.

**FOGLER, RONALD**, Head Golf Coach (1977).

**GILSTRAP, JAMES P.**, Athletic Dormitory Director (1976). BS 1964, Univ. of Western Mich.; MS 1967, So. Ill. Univ.

**GOERING, REBEKAH**, Instr., Trainer (1975). BS 1974, Kan. St. Univ.

**HABIGER, JANE**, Assoc. Dir., Office of Sports Information (1974). BS 1972, Kan. St. Univ.



**HARPER, BILLY G.**, Asst. Athletic Director and Academic Counselor (1977). BS 1968, Washburn Univ.; MA 1970, East Mich. Univ.

**HARTMAN, JOHN HOWARD**, Head Basketball Coach (1970). BS 1950, MS 1954, Okla. St. Univ.

**HOLMES, JEROME V.**, Asst. Basketball Coach (1975). BS 1972, Bethel Col.

**HOWE, JEROME E.**, Asst. Track Coach (1976). BS 1972, MS 1975, Kan. St. Univ.

**JERMIE, JOHN**, Dir. of Athletics (1976). BS 1959, Coe Col.; MS 1965, Univ. of Tex.

**MORGAN, LAURENCE**, Instr., Trainer (1951, 1957). BS 1949, St. Ambrose Col.

**NAY, MERLE O.**, Asst. Athletic Director (1977). BS 1957, Kan. St. Univ.

**RAINSBERGER, ELLIS**, Head Football Coach (1975). BS 1958, Kan. St. Univ.

**REINER, MARK**, Asst. Basketball Coach (1976). BS 1963, N.Y. Univ.; MA 1966, Brooklyn Col.

**ROSS, MICHAEL**, Head Track Coach (1975, 1976). BS 1971, Kan. St. Univ.; MS 1973, Eastern Ky. Univ.

**SCHROEDER, JANE**, Asst. Basketball Coach (1975). BS 1971, Kan. St. Univ.

**SELZER, RICHARD**, Asst. Football Coach (1975). BA 1959, Notre Dame Univ.

**SNODGRASS, STEPHEN E.**, Head Tennis Coach (1976). BS 1970, Kan. St. Univ.

**STONE, RUDYAL G.**, Dir. Office of Sports Information (1973). BA 1967, Univ. of Okla.

**WALSTAD, GEORGE**, Asst. Football Coach (1975). BS 1963, Okla. St. Univ.; MA 1968, Wichita St. Univ.

**WEBER, ROBERT W.**, Asst. Football Coach (1973). BS 1958, MS 1962, Colo. St. Univ.

**WILLIAMS, IVERSON**, Asst. Football Coach (1975). BS 1971, Xavier Univ.

**WILSON, PHILLIP B.**, Baseball Coach (1970). BS 1969, MS 1970, Kan. St. Univ.

## College of Agriculture

**ABLE, BILLY V.**, Assoc. Prof. of Animal Science and Industry (1970, 1973). BS 1962, Okla. St. Univ.; MS 1964, Miss. St. Univ.; PhD 1970, Univ. of Ky. (GF)

**ABMEYER, ERWIN**, Asst. Prof. of Horticulture and Forestry; Research Horticulturist in charge, Northeast Kan. Experiment Field (PD Wathena) Agr. Exp. Sta. (1934, 1935). BS 1933, Kan. St. Univ.

**ADAMS, ALBERT W.**, Prof. of Dairy and Poultry Science, Research Poultry Scientist, Agr. Exp. Sta. (1962, 1968, 1976). BS 1951, MS 1955, Kan. St. Univ.; PhD 1964, S.D. St. Univ. (GF)

**AICHER, LOUIS CORNELIUS**, Prof. of Animal Science and Industry Emeritus (1921, 1957). BS 1910, Kan. St. Univ.

**ALLEE, GARY L.**, Assoc. Prof. of Animal Science and Industry; Research Swine Nutritionist, Agr. Exp. Sta. (1970, 1975). BS 1966, MS 1967, Univ. of Mo.; PhD 1970, Univ. of Ill. (GF)

**ALLEN, DELDRAN M.**, Assoc. Prof. of Animal Science and Industry, Meat Animal Research Scientist, Agr. Exp. Sta. (1966, 1970). BS 1961, Kan. St. Univ.; MS 1963, Univ. of Idaho; PhD 1966, Mich. St. Univ. (GF)

**AMES, DAVID R.**, Assoc. Prof. of Animal Science and Industry, Research Environmental Physiologist and Sheep Research, Agr. Exp. Sta. (1969). BS 1964, MS 1966, Ohio St. Univ.; PhD 1968, Mich. St. Univ. (GF)

**ANDERSON, KLING L.**, Prof. of Agronomy Emeritus (1936, 1967). BS 1936, Univ. of Calif.; MS 1938, Kan. St. Univ.; PhD 1951, Univ. of Neb.

**ARMBRUST, DEAN V.**, Asst. Prof. of Agronomy; Research Soil Scientist, Wind Erosion Laboratory, U.S.D.A., Agricultural Research Service (1968, 1975). BS 1960, MS 1961, PhD 1973, Kan. St. Univ. (Adjunct Appointment)

**ATKINSON, C. HARRY**, Assoc. Prof. of Agronomy, Emeritus (1949, 1976). BS 1931, MS 1933, Pa. St. Univ.

**AUBEL, CLIFF E.**, Prof. of Animal Science and Industry Emeritus (1915, 1961). BS 1951, Pa. St. Univ.; MS 1917, Kan. St. Univ.; PhD 1931, Univ. of Minn.

**AXELTON, MILBURNE C.**, Asst. Prof. of Agronomy Emeritus (1929, 1970). BS 1928, Kan. St. Univ.

**BANBURY, EVANS E.**, Assoc. Prof., Head, Colby Branch Agr. Exp. Sta. (1946, 1955). BS 1940, Kan. St. Univ.

**BARNETT, FRANCIS L.**, Assoc. Prof. of Agronomy; Forage Research Geneticist, Agr. Exp. Sta. (1956, 1959). BS 1952, McGill Univ. (Canada); MS 1954, PhD 1956, Pa. St. Univ. (GF)

**BARTLEY, ERLE E.**, Prof. of Dairy and Poultry Science, Dairy Cattle Research Nutritionist, Agr. Exp. Sta. (1949, 1958). BS 1944, Allahabad Univ. (India); MS 1946, PhD 1949, Iowa St. Univ. (GF)

**BASSETTE, RICHARD**, Assoc. Prof. of Dairy and Poultry Science, Dairy Foods Research Chemist, Agr. Exp. Sta. (1958, 1964). BS 1952, MS 1955, PhD 1958, Univ. of Md. (GF)

**BATES, LYNN S.**, Asst. Prof. of Grain Science and Industry, Research Biochemist, Agr. Exp. Sta. (1972). BS 1962, Heidelberg Col.; MS 1966, Purdue Univ.; PhD 1972, Kan. St. Univ.

**BAXTER, WILLIAM M.**, Asst. Prof. and Asst. to the Head, Fort Hays Branch Agr. Exp. Sta. (1949, 1967). BS 1949, Kan. St. Univ.

**BEAT, LARRY J.**, Instr. of Dairy and Poultry Science; Kansas Artificial Breeding Service Unit, Agr. Exp. Sta. (1970). BS 1967, Kan. St. Univ.

**BECK, GLENN H.**, Prof. of International Agriculture (1936, 1975). BS 1936, Univ. of Idaho; MS 1938, Kan. St. Univ.; PhD 1950, Cornell Univ. (GF)

**BIDWELL, ORVILLE W.**, Prof. of Agronomy; Soil Survey Research Scientist, Agr. Exp. Sta. (1950, 1960). AB 1940, Oberlin Col.; BS 1942, PhD 1949, Ohio St. Univ. (GF)

**BIERE, ARLD WILLIAM**, Assoc. Prof. of Agricultural Economics; Research Agr. Econ. Natural Resources; Regional and Community Dev., Agr. Exp. Sta. (1968, 1973). BS 1963, Univ. of Neb.; MA 1967, PhD 1968, Univ. of Calif. (GF)

**BLOCKER, H. DERRICK**, Prof. of Entomology; Research Entomologist, Taxonomy of Leafhoppers and Grassland Insects, Agr. Exp. Sta. (1965, 1971, 1976). BS 1954, MS 1958, Clemson Univ.; PhD 1965, N.C. St. Univ. (GF)

**BOLSEN, KEITH K.**, Asst. Prof. of Animal Science and Industry; Beef Cattle Research Nutritionist, Agr. Exp. Sta. (1971). BS 1966, MS 1967, Univ. of Ill.; PhD 1971, Univ. of Neb. (GF)

**BRANDNER, LOWELL**, Prof.; Agricultural Editor (1947, 1961). AB 1937, BS 1937, Emporia St. Teach. Col.; MS 1951, Kan. St. Univ.; PhD 1960, Univ. of Wis. (GF)

**BRENT, BENNY E.**, Assoc. Prof. of Animal Science and Industry, Meat Animal Research Nutritionist, Agr. Exp. Sta. (1966, 1969). BS 1959, MS 1960, Kan. St. Univ.; PhD 1966, Mich. St. Univ. (GF)

**BRETHOUR, JOHN R.**, Prof.; Beef Research Scientist, Fort Hays Branch Agr. Exp. Sta. (1957, 1975). BS 1955, Kan. St. Univ.; MS 1956, Okla. St. Univ.

**BROWDER, LEWIS E.**, Assoc. Prof. of Plant Pathology; Research Cereal Rust Plant Pathologist, U.S.D.A. Agricultural Research Service (1958, 1975). AS 1952, Cameron St. Agricultural Col.; BS 1954, MS 1956, Okla. St. Univ.; PhD 1965, Kan. St. Univ. (GF) (Adjunct Appointment)

**BUCHANAN, B. REX**, Instr. of Dairy and Poultry Science; Kansas Artificial Breeding Service Unit, Agr. Exp. Sta. (1976). BS 1976, Kan. St. Univ.

**BULLER, ORLAN H.**, Assoc. Prof. of Agricultural Economics; Research Agr. Econ. Farm Management; Production Economics, Agr. Exp. Sta. (1963, 1969). BS 1958, Kan. St. Univ.; MS 1959, PhD 1965, Mich. St. Univ. (GF)

**BURCHETT, LOWELL A.**, Asst. Prof. of Agronomy; Crop Scientist, Kansas Crop Improvement Association; Agr. Exp. Sta. (1965, 1973). BS 1956, Okla. St. Univ.; MS 1969, Kan. St. Univ.

**CALL, EDWARD P.**, Assoc. Prof. of Dairy and Poultry Science; Dairy Cattle Research Physiologist, Agr. Exp. Sta. (1963, 1968). BS 1951, Ohio St. Univ.; PhD 1967, Kan. St. Univ.

**CAMPBELL, ROBERT J.**, Asst. Prof. of Horticulture and Forestry; Research Horticulturist, Floriculture, Agr. Exp. Sta. (1975). BS 1966, N.D. St. Univ.; MS 1969, PhD 1974, Univ. of Minn. (GF)

**CAMPBELL, RONALD W.**, Prof.; Head, Department of Horticulture and Forestry; Research Horticulturist, Agr. Exp. Sta. (1946, 1966). BS 1943, MS 1946, Kan. St. Univ.; PhD 1955, Mich. St. Univ. (GF)

**CARPENTER, FRANK R.**, Assoc. Prof., Asst. Dean, Col. of Agriculture (1961, 1969). BS 1948, MS 1951, Kan. St. Univ.; PhD 1967, Univ. of Mo. (GF)

**CARRDW, ROBERT N.**, Asst. Prof. of Horticulture and Forestry Research Horticulturist, Turfgrass, Agr. Exp. Sta. (1976). BS 1968, PhD 1972, Mich. St. Univ. (GF)

**CASADY, ALFRED J.**, Prof. of Agronomy; Research Sorghum Geneticist, U.S.D.A. Agricultural Research Service (1949, 1970). BS 1948, MS 1950, PhD 1962, Kan. St. Univ. (GF) (Adjunct Appointment)

**CLAPP, ALFRED L.**, Prof. of Agronomy Emeritus (1915, 1961). BS 1914, MS 1934, Kan. St. Univ.

**CLAYBERG, CARL D.**, Assoc. Prof. of Horticulture and Forestry; Research Horticulturist, Vegetable Crop Geneticist, Agr. Exp. Sta. (1974). BS 1954, Univ. of Wash.; PhD 1958, Univ. of Calif. (GF)

**CLAYDON, THOMAS J.**, Prof. of Dairy and Poultry Science Emeritus (1946, 1975). BSA 1934, Univ. of Saskatchewan (Canada); MS 1936, PhD 1939, Iowa St. Univ.

**CONDRAV, JERRY L.**, Asst. Prof.; Research Agronomist, Weeds, Garden City Branch Agr. Exp. Sta. (1968). BS 1966, MS 1968, Kan. St. Univ.

**COX, RUFUS F.**, Prof. of Animal Science and Industry Emeritus (1930, 1971). BS 1923, Okla. State Univ.; MS 1925, Iowa St. Univ.; PhD 1941, Cornell Univ.

**CRAIG, JAMES V.**, Prof. of Dairy and Poultry Science; Poultry Research Geneticist, Agr. Exp. Sta. (1955, 1960). BS 1948, MS 1949, Univ. of Ill.; PhD 1952, Univ. of Wis. (GF)

**CUNNINGHAM, FRANKLIN E.**, Assoc. Prof. of Dairy and Poultry Science, Poultry Foods Research Scientist, Agr. Exp. Sta. (1969). BS 1957, Kan. St. Univ.; MS 1959, PhD 1963, Univ. of Mo. (GF)

**DAVIS, GEDRGE V., JR.**, Assoc. Prof.; Animal Research Scientist, Garden City Branch Agr. Exp. Sta. (1972). BS 1960, MS 1964, PhD 1972, Univ. of Ark.

**DENEKE, FREDERICK J.**, Asst. Prof. of Horticulture and Forestry; Research Forester, Tree Improvement, Agr. Exp. Sta. (1973). BS 1967, Colo. St. Univ.; MS 1969, PhD 1972, Kan. St. Univ. (GF)

**DOWPEW, LESTER J.**, Asst. Prof. of Entomology; Research Entomologist, Insects of Southwestern Kansas (PO Garden City) Agr. Exp. Sta. (1954, 1959). BS 1949, Colo. A & M; MS 1954, Univ. of Minn.

**DEYOYE, CHARLES W.**, Prof. of Grain Science and Industry; Feed Technology Research Scientist, Agr. Exp. Sta. (1962, 1968). BS 1955, Kan. St. Univ.; MS 1957, PhD 1959, Tex. A & M Col. (GF)

**DICKERSON, JERRY D.**, Instr. of Agronomy; Research Agricultural Engineer, Wind Erosion Laboratory, U.S.D.A., Agricultural Research Service (1970). BS 1957, MS 1964, Kan. St. Univ. (Courtesy Appointment)

**DICKERSON, JERRY D.**, Instr. of Agronomy; Research Agricultural Engineer, Wind Erosion Laboratory, U.S.D.A., Agricultural Research Service (1970). BS 1957, MS 1964, Kan. St. Univ. (Adjunct Appointment)

**DIKEMAN, MICHAEL E.**, Assoc. Prof. of Animal Science and Industry; Meats Research Scientist, Agr. Exp. Sta. (1970, 1975). BS 1966, Kan. St. Univ.; MS 1968, Mich. St. Univ.; PhD 1970, Kan. St. Univ. (GF)

**DODGE, GILBERT R.**, Asst. Prof. and Administrative Asst., Office of Vice President for Agriculture (1958). BS 1950, Kan. St. Univ., CPA 1957, Kansas

**DUITSMAN, W. W.**, Prof. and Head, Fort Hays Branch Agr. Exp. Sta. (1941, 1970). BS 1940, Kan. St. Univ.

**EDMUNDS, LEON K.**, Prof. of Plant Pathology; Research Sorghum Plant Pathologist, U.S.D.A., Agricultural Research Service (1960, 1968, 1975). BS 1953, PhD 1958, Univ. of Wis. (GF) (Adjunct Appointment)

**EHLER, STANLEY W.**, Asst. Prof. of Agronomy; Weed Control Research Scientist, Agr. Exp. Sta. (1972). BS 1962, MS 1964, Univ. of So. Ill.; PhD 1974, Univ. of Mo.

**ELLIS, ROSCOE, JR.**, Prof. of Agronomy; Research Soil Chemist, Agr. Exp. Sta. (1948, 1960). BS 1948, MS 1950, Kan. St. Univ.; PhD 1952, Univ. of Wis. (GF)

**ELZINGA, RICHARD J.**, Prof. of Entomology; Research Entomologist, Medical Insects and Mites, Agr. Exp. Sta. (1961, 1973). BS 1955, MS 1956, PhD 1960, Univ. of Utah. (GF)

**ERICKSON, DONALD B.**, Prof. of Agricultural Economics; Research Agr. Econ., Regional and Community Dev., Agr. Exp. Sta. (1966, 1975). BS 1955, MS 1960, Univ. of Wyo.; PhD 1964, Purdue Univ. (GF)

**ERHART, ANDREW B.**, Prof. Emeritus, Garden City Branch Agr. Exp. Sta. (1931, 1952, 1976). BS 1933, Kan. St. Univ.

**ESHBAUGH, ELBERT L.**, Asst. Prof. of Entomology; Emeritus (1945, 1952, 1977). BS 1936, MS 1951, Kan. St. Univ.

**EUSTACE, WALTER D.**, Assoc. Prof. of Grain Science and Industry; Milling Technology Research Scientist, Agr. Exp. Sta. (1973). BS 1959, MS 1962, PhD 1967, Kan. St. Univ.

**EVERSMAYER, MERLE G.**, Asst. Prof. of Plant Pathology; Research Cereal Rust Plant Pathologist, U.S.D.A., Agricultural Research Service (1965). BS 1966, MS 1969, PhD 1971, Kan. St. Univ. (GF) (Adjunct Appointment)

**FARMER, EARL L.**, Prof. of Dairy and Poultry Science, Dairy Cattle Research Physiologist, Agr. Exp. Sta. (1949, 1968). BS 1948, Univ. of Mo.; MS 1957, Kan. St. Univ.; PhD 1963, Univ. of Wis. (GF)



**FARRELL, EUGENE PATRICK**, Prof. of Grain Science and Industry; Milling Technology Research Scientist, Agr. Exp. Sta. (1949, 1967). BS 1935, MS 1952, Kan. St. Univ. (GF)

**FILINGER, GEORGE A.**, Prof. of Horticulture and Forestry, Emeritus (1931, 1966). BS 1924, MS 1925, Kan. St. Univ., PhD 1931, Ohio St. Univ.

**FINNEY, KARL FREDERICK**, Prof. of Grain Science and Industry; Research Chemist, U.S.D.A. Regional Hard Winter Wheat Laboratory (1938, 1948). AB 1935, Kan. Wesleyan Univ., BS 1936, MS 1937, Kan. St. Univ. (GF) (Adjunct Appointment)

**FRANSEN, STEVEN C.**, Instr.; Forage Crops Research Scientist, Southeast Kan. Branch Agr. Exp. Sta. (1975). BS 1973, MS 1975, Mont. St. Univ.

**GEYER, WAYNE A.**, Assoc. Prof. of Horticulture and Forestry; Research Forester, Ecology, Agr. Exp. Sta. (1966, 1975). BS 1955, Iowa St. Univ.; MS 1962, Purdue Univ., PhD 1971, Univ. of Minn.

**GOOD, OON L.**, Prof., Head of Department of Animal Science and Industry (1947, 1966). BS 1947, Ohio St. Univ.; MS 1950, Kan. St. Univ.; PhD 1956, Univ. of Minn. (GF)

**GREENE, GERALD L.**, Prof. and Head, Garden City Branch Agr. Exp. Sta. (1976). BS 1959, MS 1961, Kan. St. Univ.; PhD 1966, Ore. St. Univ.

**GREIG, JR., JAMES K.**, Prof. of Horticulture and Forestry; Research Horticulturist, Vegetable Crops, Agr. Exp. Sta. (1952, 1969). BS 1949, MS 1950, Univ. of Ark.; PhD 1960, Kan. St. Univ. (GF)

**GWIN, JR., ROY E.**, Asst. Prof. and Head, Tribune Branch Agr. Exp. Sta. (1957, 1966). BS 1943, MS 1963, Kan. St. Univ.

**HACKEROTT, HAROLD LEROY**, Prof., Sorghum Research Geneticist, Fort Hays Branch Agr. Exp. Sta. (1954, 1970). BS 1945, MS 1946, Kan. St. Univ.

**HADLE, FRED BENTON**, Asst. Prof. of Horticulture and Forestry, Research Horticulturist, Farm Supt., Agr. Exp. Sta. (1951). BS 1951, MS 1958, Kan. St. Univ.

**HAGEN, LAWRENCE J.**, Instr. of Agronomy; Research Agricultural Engineer, Wind Erosion Laboratory, U.S.D.A., Agricultural Research Service (1967). BS 1962, MS 1967, M.D. St. Univ. (Adjunct Appointment)

**HANSING, EARL DAHL**, Prof. of Plant Pathology, Cereal Crops Research Pathologist, Agr. Exp. Sta. (1935, 1947). BS 1933, Univ. of Minn.; MS 1937, Kan. St. Univ., PhD 1941, Cornell Univ. (GF)

**HARBERS, LENIEL H.**, Prof. of Animal Science and Industry, Meat Animal Research Nutritionist, Agr. Exp. Sta. (1964, 1976). BS 1957, MS 1958, Tex. A & M Col., PhD 1961, Okla. St. Univ. (GF)

**HARVEY, T. L.**, Prof. of Entomology, Research Entomologist, Insects of North Central and Northwest Kan. (P.O. Hays) Agr. Exp. Sta. (1954, 1970). BS 1950, MS 1951, Kan. St. Univ., PhD 1963, Okla. St. Univ. (GF)

**HATCHETT, JIMMY H.**, Assoc. Prof. of Entomology, Research Entomologist, U.S.D.A., Agricultural Research Service (1976). BS 1959, MS 1961, Okla. St. Univ., PhD 1969, Purdue Univ. (GF) (Adjunct Appointment)

**HEID, WALTER G. JR.**, Asst. Prof. of Agricultural Economics, Research Agr. Econ., U.S.D.A., Economic Research Service (1976). BS 1959, MS 1960, Univ. of Mo., PhD 1965, Univ. of Md. (Adjunct Appointment)

**HERRON, GEORGE M.**, Assoc. Prof., Research Agronomist, Soil Testing, Garden City Branch Agr. Exp. Sta. (1956, 1971). BS 1949, MS 1950, Okla. St. Univ., PhD 1968, Univ. of Neb.

**HESS, CARROLL V.**, Dean, Col. of Agriculture, Assoc. Dir., Agr. Exp. Sta. (1966). BS 1947, Pa. St. Univ.; MS 1948, PhD 1953, Iowa St. Univ. (GF)

**HEYNE, ELMER GEORGE**, Prof. of Agronomy; Small Grains Research Geneticist, Agr. Exp. Sta. (1936, 1947). BS 1935, Univ. of Neb.; MS 1938, Kan. St. Univ.; PhD 1952, Univ. of Minn. (GF)

**HINES, ROBERT H.**, Assoc. Prof. of Animal Science and Industry, Swine Research Scientist, Agr. Exp. Sta. (1966, 1969). BS 1957, Purdue Univ., MS 1961, PhD 1966, Mich. St. Univ. (GF)

**HOBBS, JAMES A.**, Prof. of Agronomy; Soil Management Research Scientist, Agr. Exp. Sta. (1950, 1958). BS 1935, MS 1940, Univ. of Manitoba (Winnipeg); PhD 1948, Purdue Univ. (GF)

**HOOVER, JIMMY O.**, Asst. Prof. of Animal Science and Industry (1966, 1973). BS 1961, MS 1970, Kan. St. Univ.

**HOOVER, WILLIAM J.**, Prof. of Grain Science and Industry; Pres. American Institute of Baking (1966, 1976). BS 1950, MS 1954, PhD 1961, Univ. of Ill. (Adjunct Appointment)

**HOPKINS, T. L.**, Prof. of Entomology, Research Entomologist, Insect Physiology, Toxicology, Radioisotope Tracers and Pesticidal Residues, Agr. Exp. Sta. (1960, 1970). BS 1951, MS 1956, Dre. St. Univ.; PhD 1960, Kan. St. Univ. (GF)

**HORBER, ERNST K.**, Prof. of Entomology, Research Entomologist, Host-plant Resistance to Insects, Agr. Exp. Sta. (1970). BS 1945, DSc 1951, Swiss Federal Institute of Technology, PhD 1954, Kan. St. Univ. (GF)

**HOSENEY, R. CARL**, Prof. of Grain Science and Industry, Research Cereal Chemist, Agr. Exp. Sta. (1971, 1975). BS 1957, MS 1960, PhD 1968, Kan. St. Univ. (GF)

**HOWE, HAROLD**, Dean of Graduate School Emeritus, Prof. of Agricultural Economics Emeritus (1925, 1964). BS 1922, Kan. St. Univ., MS 1923, Univ. of Md.; PhD 1937, Univ. of Wis.; LLD 1950, St. Benedict's Col.

**HUNT, MELVIN C.**, Asst. Prof. of Animal Science & Industry; Meat Research Scientist, Agr. Exp. Sta. (1975). BS 1965, MS 1970, Kan. St. Univ., PhD 1973, Univ. of Mo. (GF)

**IBBETSON, R. WESLEY**, Instr., Research Dairy Scientist, Southeast Kan. Branch Agr. Exp. Sta. (1972). BS 1962, MS 1971, Kan. St. Univ.

**JACKSON, WILLIAM P.**, Instr. of Dairy and Poultry Science; Kan. Artificial Breeding Service Unit, Agr. Exp. Sta. (1965). BS 1965, Colo. St. Univ.

**JACOBS, HYDE S.**, Prof., Head, Department of Agronomy; Dir., Evapotranspiration Lab., Research Soil Scientist, Agr. Exp. Sta. (1957, 1971). BSA 1952, MS 1953, Univ. of Idaho, PhD 1957, Mich. St. Univ. (GF)

**JOHNSEN, LOWELL B.**, Assoc. Prof. of Plant Pathology, Research Plant Disease Physiologist, Agr. Exp. Sta. (1968, 1971). BS 1957, Univ. of Ill.; MS 1962, PhD 1964, Purdue Univ. (GF)

**KADOUM, AHMED M.**, Asst. Prof. of Entomology; Research Entomologist in charge Pesticide Residue Analysis Laboratory, Toxicology, Pesticidal Chemistry, Agr. Exp. Sta. (1966). BS 1958, Alexandria Univ.; MS 1963, PhD 1966, Univ. of Neb. (GF)

**KAHRS, AMDS J.**, Instr. of Dairy and Poultry Science, Poultry Research Farm Supt., Agr. Exp. Sta. (1956, 1958). BS 1953, Kan. St. Univ.

**KANEMASU, EDWARD T.**, Assoc. Prof. of Agronomy, Research Micrometeorologist, Agr. Exp. Sta. (1969, 1974). BS 1962, MS 1964, Mont. St. Univ.; PhD 1969, Univ. of Wis. (GF)

**KASTNER, CURTIS L.**, Asst. Prof. of Animal Science & Industry, Meat Research Scientist, Agr. Expt. Sta. (1975). BS 1967, MS 1969, PhD 1972, Okla. St. Univ. (GF)

**KEEN, RAY A.**, Prof. of Horticulture and Forestry, Research Horticulturist, Turfgrass, Agr. Exp. Sta. (1947, 1956). BS 1942, Kan. St. Univ.; MS 1947, PhD 1956, Ohio St. Univ. (GF)

**KELLEY, KENNETH W.**, Instr., Crops and Soils Research Scientist, Southeast Kan. Br. Agr. Expt. Sta. (1975). BS 1967, MS 1973, Kan. St. Univ.

**KELLEY, PAUL LEO**, Prof., Head, Department of Agricultural Economics, Research Economist, Agr. Exp. Sta. (1943, 1968). BS 1943, MS 1946, Kan. St. Univ.; PhD 1956, Iowa St. Univ. (GF)

**KIRACOFE, GUY H.**, Assoc. Prof. of Animal Science and Industry, Animal Research Physiologist, Agr. Exp. Sta. (1966, 1969). BS 1958, MS 1960, Va. Polytechnic Inst.; PhD 1965, Kan. St. Univ. (GF)

**KNIGHT, CHARLES W.**, Instr. of Agronomy, Research Agronomist in charge, East Central Experimental Field (P.O. Ottawa), Agr. Exp. Sta. (1973). BS 1970, MS 1971, Kan. St. Univ.

**KNIGHT, DALE A.**, Assoc. Prof. of Agricultural Economics, Research Agr. Econ., Regional and Community Dev., Agr. Exp. Sta. (1948, 1957). BS 1945, Kan. St. Univ.; MS 1946, Cornell Univ.; AM 1948, PhD 1952, Univ. of Chicago. (GF)

**KNUTSON, HERBERT**, Prof. of Entomology, Research Entomologist, Agr. Exp. Sta. (1953, 1976). AB 1936, Iowa Wesleyan Col.; MS 1937, Southern Methodist Univ.; PhD 1941, Univ. of Minn. (GF)

**KOCH, BERL A.**, Prof. of Animal Science and Industry, Swine Research Nutritionist, Agr. Exp. Sta. (1956, 1963). BS 1949, Iowa St. Univ.; MS 1951, Cornell Univ.; PhD 1956, Univ. of Calif. (GF)

**KOUDELE, JOSEPH WENDELL**, Assoc. Prof. of Agricultural Economics, Research Agr. Econ., Consumption Economics and Marketing, Agr. Exp. Sta. (1947, 1958). BS 1943, Univ. of Neb.; MS 1947, Univ. of Minn.; PhD 1956, Mich. St. Univ. (GF)

**KROPF, DONALD HARRIS**, Prof. of Animal Science and Industry, Meats Research Scientist, Agr. Exp. Sta. (1962, 1972). BS 1952, Univ. of Wis.; MS 1953, Univ. of Fla.; PhD 1956, Univ. of Wis. (GF)

**KYLE, JACK H.**, Asst. Prof., Research Horticulturist, Garden City Branch Agr. Exp. Sta. (1968). BS 1953, Kan. St. Univ.; MS 1955, Univ. of Idaho; PhD 1959, Wash. St. Univ.

**LARSON, VERNON C.**, Prof., Office of Vice President for Agriculture, Dir. International Agricultural Programs (1962, 1970). BS 1947, MS 1950, PhD 1954, Mich. State Univ.

**LAUNCHBAUGH, JOHN L. JR.**, Prof., Range Research Ecologist, Fort Hays Branch Agr. Exp. Sta. (1955, 1967). AB 1947, MS 1948, Fort Hays Kan. St. Col.; PhD 1952, Tex. A & M Col.

**LAWLESS, JOHN R.**, Assoc. Prof., Crops Research Scientist, Colby Branch Agr. Exp. Sta. (1960, 1975). BS 1958, Univ. of Neb.; MS 1960, Wash. St. Univ.

**LELAND, STANLEY E. JR.**, Assoc. Dir., Agr. Expt. Sta. Adjunct Prof., Infectious Diseases (1967, 1975). BS 1949, MS 1950, Univ. of Ill.; PhD 1953, Mich. St. Univ. (GF)

**LIANG, GEORGE H. L.**, Assoc. Prof. of Agronomy, Research Cytogeneticist, Agr. Exp. Sta. (1964, 1969). BS 1956, Taiwan Provincial Col.; MS 1961, Univ. of Wyo.; PhD 1964, Univ. of Wis. (GF)

**LIVERS, RONALD W.**, Prof., Wheat Research Geneticist, Fort Hays Br. Agr. Exp. Sta. (1962, 1966). BS 1948, MS 1949, Kan. St. Univ.; PhD 1957, Univ. of Minn.

**LONG, CHARLES E.**, Asst. Prof. of Horticulture and Forestry, Research Horticulturist, Herbicides, Agr. Exp. Sta. (1965, 1972). BS 1964, MS 1965, Okla. St. Univ.; PhD 1972, Kan. St. Univ. (GF)

**LUNOQUIST, MARVIN C.**, Asst. Prof. of Agronomy, Research Agronomist, Southwest Kan. Experimental Field (P.O. Minneola), Agr. Exp. Sta. (1951, 1975). BS 1950, MS 1952, Kan. St. Univ.

**LYLES, LEON**, Assoc. Prof. of Agronomy, Research Agricultural Engineer, Wind Erosion Laboratory, U.S.D.A., Agricultural Research Service (1968). BS 1955, Okla. St. Univ.; MS 1959, Kan. St. Univ. (Adjunct Appointment)

**MACKINTOSH, DAVID L.**, Prof. of Animal Science and Industry Emeritus (1921, 1965). BS 1920, Univ. of Minn.; MS 1925, Kan. St. Univ.

**MACMASTERS, MAJEL M.**, Prof. of Grain Science and Industry Emeritus. (1960, 1970). BS 1926, MS 1928, PhD 1934, Univ. of Mass.

**MAODUX, LARRY D.**, Asst. Prof. of Agronomy, Research Agronomist in charge, Kan. River Valley Experimental Field (P.O. Topeka), Agr. Exp. Sta. (1975). BS 1965, MS 1967, Okla. St. Univ.; PhD 1973, Univ. of Neb.

**MADER, ERNEST LEE**, Prof. of Agronomy, Crops Research Scientist, Agr. Exp. Sta. (1948, 1968). BS 1936, MS 1944, Okla. St. Univ.; PhD 1948, Univ. of Neb. (GF)

**MAHAFFEY, BEN O.**, Assoc. Prof. of Horticulture and Forestry (1972, 1976). BS 1963, Colo. St. Univ.; MS 1969, PhD 1972, Tex. A & M Univ. (GF)

**MANUEL, MILTON LLOYD**, Prof. of Agricultural Economics, Research Agr. Econ., Marketing and Agribusiness Management, Agr. Exp. Sta. (1945, 1959). BS 1941, MS 1948, Kan. St. Univ.; PhD 1952, Univ. of Minn. (GF)

**MARTIN, TERRY J.**, Res. Assoc., Research Plant Pathologist, Host-Parasite Geneticist, Fort Hays Br. Agr. Exp. Sta. (1974). BS 1970, Kan. St. Col. of Pittsburg, MS 1971, Kan. St. Univ.; PhD 1974, Mich. St. Univ.

**MARTIN, WILLARD HUNGATE**, Prof. of Dairy Science Emeritus (1925, 1964). BS 1918, Purdue Univ.; MS 1922, Pa. St. Univ.

**MATTSON, RICHARD H.**, Assoc. Prof. of Horticulture and Forestry, Research Horticulturist, Floriculture, Agr. Exp. Sta. (1969, 1975). BS 1964, Univ. of Neb.; PhD 1969, Univ. of Minn. (GF)

**MCCORMICK, DEWEY Z.**, Asst. Prof. of Animal Science and Industry Emeritus, International Agricultural Programs (1960, 1968). BS 1921, Kan. St. Univ.

**MCCOY, JOHN HENRY**, Prof. of Agricultural Economics; Research Agr. Econ., Livestock Marketing, Agr. Exp. Sta. (1940, 1960). BS 1940, MS 1942, Kan. St. Univ.; PhD 1955, Univ. of Wis. (GF)

**MCGAUGHEY, WILLIAM H.**, Asst. Prof. of Entomology; Research Entomologist, U.S.D.A., Agriculture Research Service (1973). BS 1963, Tex. Tech. Col.; MS 1965, PhD 1967, Iowa St. Univ. (GF) (Adjunct Appointment)

**McKEE, R. MILES**, Prof. of Animal Science and Industry, Beef Cattle Research Scientist, Agr. Exp. Sta. (1959, 1975). BS 1951, MS 1963, Kan. St. Univ.; PhD 1967, Univ. of Ky.

**MICHAELS, CHARLES L.**, Asst. Prof. of Dairy and Poultry Science; in charge Kan. Artificial Breeding Service Unit, Agr. Exp. Sta. (1965, 1970). BS 1959, Kan. St. Univ.

**MILES, NEIL W.**, Assoc. Prof. of Horticulture and Forestry; Research Horticulturist, Fruit and Nut Crops, Agr. Exp. Sta. (1966, 1973). BS 1959, MS 1964, PhD 1965, Univ. of Minn. (GF)

**MILLER, GERLAD DALE**, Asst. Prof. of Grain Science and Industry Emeritus (1946, 1973). BS 1924, Univ. of Neb.; MS 1953, Kan. St. Univ.



- MILLS, ROBERT B.**, Prof. of Entomology, Research Entomologist, Stored Product Insects, Agr. Exp. Sta. (1963, 1970, 1976). BS 1949, Kan. St. Univ.; MEd 1953, Univ. of Colo.; PhD 1964, Kan. St. Univ. (GF)
- MONGOLO, RONALD O.**, Instr. of Dairy and Poultry Science, Kan. Artificial Breeding Service Unit, Agr. Exp. Sta. (1971). BS 1966, Kan. St. Univ.
- MONTGOMERY, GEORGE**, Prof. of Agricultural Economics Emeritus (1926, 1972). BS 1925, MS 1927, Kan. St. Univ.; PhD 1954, Univ. of Minn.
- MOORE, WALTER ASHTON**, Asst. Prof. of Agronomy; Research Agronomist in charge South Central Experimental Field (P.O. Hutchinson), Agr. Exp. Sta. (1943, 1951). BS 1944, Kan. St. Univ.
- MORRILL, JR., JAMES L.**, Assoc. Prof. of Dairy and Poultry Science; Dairy Cattle Research Nutritionist, Agr. Exp. Sta. (1962, 1969). BS 1958, Murray St. Col.; MS 1959, Univ. of Ky.; PhD 1963, Iowa St. Univ. (GF)
- MUGLER, DAVID J.**, Assoc. Prof., Asst. Dean, Col. of Agriculture (1965). BS 1959, Kan. St. Univ.; MS 1962, Univ. of Wis.; PhD 1969, Kan. St. Univ. (GF)
- MUILENBURG, GRACE E.**, Assoc. Prof.; Assoc. Agricultural Editor (1969, 1974). BS 1947, Univ. of Kan.; MA 1969, Univ. of Mo.; Columbia
- MURPHY, LARRY S.**, Prof. of Agronomy; Soil Fertility Research Scientist, Agr. Exp. Sta. (1965, 1973). BS 1959, MS 1960, PhD 1965, Univ. of Mo. (GF)
- NIBLETT, CHARLES L.**, Assoc. Prof. of Plant Pathology; Research Plant Virologist, Agr. Exp. Sta. (1969, 1974). BS 1965, Univ. of N. H.; PhD 1969, Univ. of Calif. (GF)
- NICKELL, CECIL D.**, Assoc. Prof. of Agronomy, Research Soybean Geneticist, Agr. Exp. Sta. (1967, 1974). BS 1963, Purdue Univ.; MS 1965, PhD 1967, Mich. St. Univ. (GF)
- NIERNBERGER, FLOYD F.**, Asst. Prof. of Agricultural Economics; Research Agr. Econ., U.S.D.A. Economic Research Service (1972). BS 1965, MS 1966, PhD 1969, Kan. St. Univ. (Adjunct Appointment)
- NORMAN, DAVID W.**, Assoc. Prof. of Agricultural Economics (1968, 1971). BS 1961, Wye Col.; MS 1963, PhD 1965, Ore. St. Univ. (GF)
- NORTON, CHARLES L.**, Prof., Head of Department of Dairy and Poultry Science; Research Dairy and Poultry Scientist, Agr. Exp. Sta. (1958, 1964). BS 1940, Univ. of Ill.; PhD 1944, Cornell Univ. (GF)
- NORWOOD, CHARLES A.**, Asst. Prof., Research Agronomist, Dryland Soils, Garden City Branch Agr. Exp. Sta. (1972). BS 1961, Tex. A & I; MS 1969, PhD 1971, Okla. St. Univ.
- ODOM, RICHARD E.**, Assoc. Prof. of Horticulture and Forestry; Research Horticulturist, Floriculture, Agr. Exp. Sta. (1965, 1969). BS 1951, Tex. A & M Col.; MS 1953, Colo. St. Univ.; PhD 1965, Kan. St. Univ. (GF)
- OHMES, FRANCIS E.**, Instr.; Research Engineer, Irrigation, Garden City Branch Agr. Exp. Sta. (1971). BS 1969, MS 1971, Kan. St. Univ.
- OLSON, RAYMOND V.**, Prof. of Agronomy (1947, 1974). AB 1939, N.D. School of Forestry; BS 1941, N.D. St. Col.; MS 1942, PhD 1947, Univ. of Wis. (GF)
- ORAZEM, FRANK**, Prof. of Agricultural Economics; Research Agr. Econ., Production Economics; Regional and Community Dev., Agr. Exp. Sta. (1956, 1966). Cand. Rer. Pol., Dr. Rer. Pol., 1947, Karl Franzens Univ. (Graz, Austria), MS 1953, Kan. St. Univ.; PhD 1956, Iowa St. Univ. (GF)
- OTTO, MERTON L.**, Assoc. Prof. of Agricultural Economics Emeritus (1939, 1967). BS 1921, MS 1942, Kan. St. Univ.
- OVERLEY, CARL BENJAMIN**, Assoc. Prof. of Agronomy; Research Crop Scientist, Foundation Seed Production, Agr. Exp. Sta. (1946, 1971). BS 1946, Kan. St. Univ.; MS 1967, Univ. of Neb.
- OWENSBY, CLENTON E.**, Assoc. Prof. of Agronomy; Range Management Research Agronomist, Agr. Exp. Sta. (1964, 1974). BS 1964, N.M. St. Univ.; PhD 1969, Kan. St. Univ. (GF)
- PAIR, JOHN C.**, Assoc. Prof. of Horticulture and Forestry, Research Horticulturist in charge, Sedgwick Co. Experimental Field (P.O. Wichita), Agr. Exp. Sta. (1971, 1975). BS 1959, N.M. St. Univ.; MS 1961, PhD 1971, Kan. St. Univ.
- PAULSEN, GARY M.**, Prof. of Agronomy; Crops Research Physiologist, Agr. Exp. Sta. (1965, 1975). BS 1961, MS 1963, PhD 1965, Univ. of Wis. (GF)
- PEERSEN, JOHN R.**, Instr. of Grain Science and Industry; Stored Grain Research Entomologist, Agr. Exp. Sta. (1968). BS 1954, MS 1959, Kan. St. Univ.
- PENAS, PAUL E.**, Asst. Prof., Research Agronomist, Irrigation, Garden City Branch Agr. Exp. Sta. (1967). BS 1959, MS 1967, Univ. of Neb.
- PETERSON, DAVID G.**, Asst. Prof.; Irrigation Research Scientist, Colby Branch Agr. Exp. Sta. (1976). BS 1974, MS 1976, Okla. St. Univ.
- PFOST, HARRY B.**, Prof. of Grain Science and Industry; Feed Technology Research Engineer, Agr. Exp. Sta. (1959). BS 1940, Univ. of Mo.; MS 1948, Ala. Polytechnic Inst.; PhD 1959, Mich. St. Univ. (GF)
- PHILLIPS, RICHARD**, Prof. of Agricultural Economics; Research Agr. Econ. International Agr. Dev., Agr. Exp. Sta. (1970). BS 1948, MS 1949, PhD 1952, Iowa St. Univ. (GF)
- PHILLIPS, WILLIAM M.**, Assoc. Prof.; Acting Head, Fort Hays Branch Agr. Exp. Sta.; Research Agronomist, Weed Control (1952, 1973, 1976). BS 1947, MS 1949, Kan. St. Univ.
- PICKETT, WILLIAM F.**, Prof. of Horticulture and Forestry Emeritus (1918, 1965). BS 1917, MS 1923, Kan. St. Univ.; PhD 1935, Mich. St. Univ.
- PINE, WILFRED HARDLD**, Prof. of Agricultural Economics; Research Agr. Econ. Natural Resources, Agr. Exp. Sta. (1934, 1949). BS 1934, MS 1938, Kan. St. Univ.; PhD 1948, Univ. of Minn. (GF)
- PITTS, CHARLES W.**, Prof. of Entomology; Research Entomologist, Livestock Insects; In charge, Scanning Electron Microscope Laboratory, Agr. Exp. Sta. (1962, 1975). BS 1960, Miss. St. Col.; MS 1962, PhD 1965, Kan. St. Univ. (GF)
- POMERANZ, YESHAJAHU**, Prof. of Agronomy, Administrator, U.S.D.A. Grain Marketing Research Center (1973). BSc 1944, Ingenieur 1945, Israeli Inst. of Tech.; PhD 1962, Kan. St. Univ. (Adjunct Appointment) (GF)
- PONTE, JOSEPH G.**, Prof. of Grain Science and Industry, Baking Technology Research Scientist, Agr. Exp. Sta. (1975). AB 1956, Northwestern Univ.; MS 1958, Univ. of Minn. (GF)
- POSLER, GERRY L.**, Assoc. Prof. of Agronomy; Forage Crops Research, Agr. Exp. Sta. (1974). BS 1964, MS 1966, Univ. of Mo.; PhD 1969, Iowa St. Univ. (GF)
- POSTON, FREDDIE L.**, Asst. Prof. of Entomology; Research Entomologist, Field Crop Insects and Ecology, Agr. Exp. Sta. (1975). BS 1971, West Tex. St. Univ.; MS 1973, PhD 1975, Iowa St. Univ. (GF)
- POWERS, WILLIAM L.**, Prof. of Agronomy; Dir., Kan. Water Resources Research Institute; Research Soil Physicist, Agr. Exp. Sta. (1966, 1970, 1976). BS 1958, Colo. St. Univ.; MS 1962, PhD 1966, Iowa St. Univ. (GF)
- QUINLAN, LEDN REED**, Prof. of Landscape Architecture Emeritus (1927, 1965). BS 1921, Colo. St. Univ.; MLA 1925, Harvard Univ.
- RANEY, ROBERT J.**, Assoc. Prof. of Agronomy; Research Agronomist in charge, Irrigation Experimental Field (P.O. Scandia), Agr. Exp. Sta. (1953, 1965). BS 1952, MS 1954, Kan. St. Univ.
- RICHARDSON, ORAYTFORD**, Prof. of Animal Science and Industry; Meat Animal Research Nutritionist, Agr. Exp. Sta. (1951). BS 1938, Clemson Agricultural Col.; MS 1950, PhD 1951, Iowa St. Univ. (GF)
- RILEY, JACK G.**, Assoc. Prof. of Animal Science and Industry; Beef Cattle Research Scientist, Agr. Exp. Sta. (1971). BS 1962, MS 1963, PhD 1968, Univ. of Mo. (GF)
- RILEY, JOHN B.**, Asst. Prof. of Agricultural Economics, Research Agr. Econ., Agribusiness Management, Agr. Exp. Sta. (1973). BS 1969, MS 1971, Va. Polytechnic Inst. and St. Univ.; PhD 1974, Okla. St. Univ.
- ROBERTS, HAROLD A.**, Asst. Prof. of Dairy and Poultry Science; In charge Dairy Foods Processing Center and Dairy Foods Research Technologist, Agr. Exp. Sta. (1963, 1969). BS 1959, MS 1967, Kan. St. Univ.
- ROBINSON, ROBERT J.**, Assoc. Prof. of Grain Science and Industry, Research Cereal Chemist, Agr. Exp. Sta. (1957, 1970). BS 1939, Shaw Univ.; BA 1949, Cornell Univ.; MA 1950, N.Y. Univ.; PhD 1957, Kan. St. Univ. (GF)
- RUSS, OLIVER G.**, Assoc. Prof. of Agronomy; Weed Control Research Agronomist, Agr. Exp. Sta. (1949, 1965). BS 1950, MS 1953, Kan. St. Univ. (GF)
- SANFORD, PAUL EVERETT**, Prof. of Dairy and Poultry Science, Poultry Research Nutritionist, Agr. Exp. Sta. (1949, 1960). BS 1941, Kan. St. Univ.; MS 1942, PhD 1949, Iowa St. Univ. (GF)
- SAUER, DAVID B.**, Asst. Prof. of Plant Pathology; Research Stored Grain Plant Pathologist, U.S.D.A. Agricultural Research Service (1967). BA 1961, Kent St. Univ.; MS 1964, PhD 1967, Univ. of Minn. (GF) (Adjunct Appointment)
- SAUER, RICHARD J.**, Prof., Head of Department of Entomology; Research Entomologist, Agr. Exp. Sta. (1976). BS 1962, St. John's Univ.; MS 1964, Univ. of Mich.; PhD 1967, N.D. St. Univ. (GF)
- SCHALLES, ROBERT R.**, Assoc. Prof. of Animal Science and Industry; Animal Breeding Research Scientist, Agr. Exp. Sta. (1966, 1970). BS 1963, Colo. St. Univ.; MS 1966, PhD 1966, Va. Polytechnic Inst. (GF)
- SCHNAKE, LAWRENCE D.**, Asst. Prof. of Agricultural Economics; Research Agricultural Economist, Grain Marketing, U.S.D.A. Economic Research Service (1971). BS 1960, Univ. of Mo.; MS 1967, PhD 1972, Okla. St. Univ. (Adjunct Appointment)
- SCHRUBEN, EDWARD WILLIAM**, Prof. of Agricultural Economics; Research Agr. Econ. Grain Marketing; Assoc. Dir., Food and Feed Grain Institute, Agr. Exp. Sta. (1949, 1951). BS 1939, Kan. St. Univ.; MS 1940, Univ. of Ill.; MPA 1948, MA 1949, PhD 1949, Harvard Univ. (GF)
- SCHUENEMAN, THOMAS J.**, Asst. Prof. of Horticulture and Forestry, Food Crops, Sedgwick Co. Exp. Field (P.O. Wichita); Agr. Exp. Sta. (1976). BS 1964, MS 1971, PhD 1974, Mich. St. Univ.
- SCHWENK, FRED W.**, Assoc. Prof. of Plant Pathology; Research Soybean Pathologist, Agr. Exp. Sta. (1969, 1974). BS 1960, MS 1964, N.D. St. Univ.; PhD 1969, Univ. of Calif. (GF)
- SCHWULST, FRANKLYN J.**, Asst. Prof.; Meat Animal Research Scientist, Colby Branch Agr. Exp. Sta. (1974). BS 1961, Wisc. St. Univ.; MS 1966, PhD 1968, Univ. of Neb.
- SCOVILLE, ORLIN J.**, Prof. of Agricultural Economics Emeritus (1966, 1976). BS 1931, MS 1933, Colo. St. Univ.; PhD 1949, Harvard Univ.
- SEIB, PAUL A.**, Assoc. Prof. of Grain Science and Industry; Research Biochemist, Agr. Exp. Sta. (1970). BS 1958, PhD 1965, Purdue Univ. (GF)
- SHELLENBERGER, JOHN A.**, Distinguished Univ. Prof. of Grain Science and Industry Emeritus (1944, 1970). BS 1928, Univ. of Wash.; MS 1930, Kan. St. Univ.; PhD 1933, Univ. of Minn.
- SHEPARD, JAMES F.**, Prof., Head of Department of Plant Pathology, Research Plant Pathologist, Agr. Exp. Sta. (1976). BS 1963, Cornell Univ.; MS 1965, PhD 1967, Univ. of Calif. (GF)
- SJO, JOHN B.**, Prof. of Agricultural Economics, Research Agr. Econ., Regional and Community Dev., Agr. Exp. Sta. (1948, 1967). BS 1949, MS 1952, Kan. St. Univ.; PhD 1960, Mich. St. Univ. (GF)
- SKIOMORE, EDWARD L.**, Prof. of Agronomy; Research Soil Physicist, Wind Erosion Lab., U.S.D.A. Agricultural Research Service (1963, 1975). BS 1958, Utah St. Univ.; PhD 1963, Okla. St. Univ. (GF) (Adjunct Appointment)
- SLOAN, ROBERT F.**, Assoc. Prof. of Agronomy; Research Agronomist in charge, Cornbelt Experimental Field (P.O. Powhattan), Agr. Exp. Sta. (1936, 1967). BS 1938, MS 1941, Kan. St. Univ.
- SMITH, EOGAR FITZHUGH**, Prof. of Animal Science and Industry; Beef Cattle Research Scientist and Range Management Research, Agr. Exp. Sta. (1946, 1961). BS 1941, Tex. A & M Col.; MS 1947, Kan. St. Univ.; PhD 1956, Tex. A & M Col. (GF)
- SMITH, FLOYOW.**, Prof., Dir., Agr. Exp. Sta. (1946, 1965). BS 1942, Kan. St. Univ.; MS 1946, PhD 1949, Mich. St. Univ. (GF)
- SMITH, ROGER CLETUS**, Prof. of Entomology Emeritus (1920, 1958). AB 1911, Miami Univ.; AM 1915, Ohio St. Univ.; PhD 1917, Cornell Univ.
- SMITH, WALTER H.**, Assoc. Prof. of Animal Science and Industry; Meat Animal Research Geneticist and Horse Husbandry Research, Agr. Exp. Sta. (1948, 1965). BS 1943, MS 1949, Kan. St. Univ. (GF)
- SORENSEN, EDGAR LAVELL**, Prof. of Agronomy; Research Alfalfa Geneticist, U.S.D.A., Agricultural Research Service (1955, 1970). BS 1941, MS 1952, Utah Agricultural Col.; PhD 1955, Univ. of Wis. (GF) (Adjunct Appointment)
- SORENSEN, LEONARDO ORLO**, Prof. of Agricultural Economics; Research Agr. Econ., Transportation and Marketing, Agr. Exp. Sta. (1955, 1968). BA 1951, MS 1953, PhD 1963, Univ. of Minn. (GF)
- STAHLMAN, PHILLIP W.**, Asst. Prof., Research Agronomist, Fort Hays Branch Agr. Exp. Sta. (1975, 1976). BS 1970, Panhandle St. Col.; MS 1973, N.D. St. Univ.
- STEGMEIER, WILLIAM D.**, Assoc. Prof.; Research Agronomist, Forage and Specialty Crops, Fort Hays Branch Agr. Exp. Sta. (1958, 1971). BS 1956, MS 1959, Colo. St. Univ.; PhD 1971, S.D. St. Univ.
- STILL, STEVEN M.**, Asst. Prof. of Horticulture and Forestry; Research Horticulturist, Ornamentals, Agr. Exp. Sta. (1974). BS 1966, MS 1968, PhD 1974, Univ. of Ill. (GF)
- STINSON, T. BRUCE**, Asst. Prof. Emeritus, Tribune Branch Agr. Exp. Sta. (1924, 1970). BS 1924, Kan. St. Univ.
- STONE, LOYO R.**, Asst. Prof. of Agronomy; Research Soil Physicist, Agr. Exp. Sta. (1973). BS 1967, MS 1969, Okla. St. Univ.; PhD 1973, S.D. St. Univ. (GF)
- STUTEVILLE, DONALD L.**, Assoc. Prof. of Plant Pathology; Research Forage Pathologist, Agr. Exp. Sta. (1964, 1969). BS 1959, MS 1961, Kan. St. Univ.; PhD 1964, Univ. of Wis. (GF)
- SUH, HYOUNG W.**, Instr.; Crops Research Agronomist, Tribune Branch Agr. Exp. Sta. (1976). BA 1964, Yon Sei Univ.; BS 1968, Utah St. Univ.; MS 1972, PhD 1976, Kan. St. Univ.



**SUNDERMAN, HERBERT D.**, Asst. Prof., Soils Research Scientist, Colby Branch Agr. Exp. Sta. (1975). BS 1965, MS 1967, Kan. St. Univ., PhD 1975, Tex. A & M Univ.

**SWALLOW, CLARENCE W.**, Asst. Prof. of Agronomy, Research Agronomist in charge, Agronomy Research Farms, Agr. Exp. Sta. (1954, 1964). BS 1951, MS 1955, Kan. St. Univ.

**TEARE, IWAN D.**, Assoc. Prof. of Agronomy, Crops Research Physiologist, Agr. Exp. Sta. (1969). BS 1953, Univ. of Idaho, MS 1959, Wash. St. Univ., PhD 1963, Purdue Univ. (GF).

**THIEN, STEPHEN J.**, Assoc. Prof. of Agronomy, Research Soil Scientist, Agr. Exp. Sta. (1970, 1976). BS 1966, Iowa St. Univ., MS 1968, PhD 1971, Purdue Univ.

**THOMPSON, CARLYLE A.**, Asst. Prof., Soils Research Scientist, Fort Hays Branch Agr. Exp. Sta. (1964). BS 1958, MS 1959, Kan. St. Univ.

**THOMPSON, HUGH E.**, Assoc. Prof. of Entomology, Research Entomologist, Trees, Turf, Ornamental Shrubs and Forest Insects, Agr. Exp. Sta. (1956, 1963). BS 1947, Univ. of R.I., PhD 1953, Cornell Univ. (GF).

**THROCKMORTON, RAY IAMS**, Dean and Dir. Emeritus, Agriculture (1911, 1952). BS 1911, Pa. St. Univ., MS 1922, Kan. St. Univ.

**TILLMAN, RONALD W.**, Asst. Prof. of Plant Pathology, Pest Management Research Pathologist, Agr. Exp. Sta. (1973). BA 1966, Miami Univ., MS 1969, PhD 1971, Univ. of Md. (GF).

**TSEN, CHO C.**, Prof. of Grain Science and Industry, Research Cereal Chemist, Agr. Exp. Sta. (1969). BS 1944, MS 1946, National Chekiang Univ., PhD 1958, Univ. of Calif. (GF).

**VANDERLIP, RICHARD L.**, Prof. of Agronomy, Crop Production Research Agronomist, Agr. Exp. Sta. (1964, 1969, 1976). BS 1960, Kan. St. Univ., MS 1962, PhD 1965, Iowa St. Univ. (GF).

**VARRIANO-MARSTON, ELIZABETH**, Asst. Prof. of Grain Science and Industry, Research Cereal Scientist, Agr. Exp. Sta. (1976). BS 1968, MS 1971, PhD 1975, Univ. of Minn.

**WALTER, TED L.**, Asst. Prof. of Agronomy, Crop Research Scientist, Crop Performance Testing, Agr. Exp. Sta. (1951). BS 1949, Univ. of Neb., MS 1951, Colo. St. Univ.

**WARD, ARLIN B.**, Prof. of Grain Science and Industry, Milling Technology Research Scientist, Agr. Exp. Sta. (1961, 1967). BS 1942, MS 1951, Kan. St. Univ. (GF).

**WARD, GEORGE M.**, Prof. of Dairy and Poultry Science, Dairy Cattle Research Nutritionist, Agr. Exp. Sta. (1955, 1966). BS 1941, Univ. of Vt., MS 1947, Rutgers Univ., PhD 1950, Mich. St. Univ. (GF).

**WASSOM, CLYDE E.**, Prof. of Agronomy, Corn Research Geneticist, Agr. Exp. Sta. (1954, 1962, 1976). BS 1949, MS 1951, PhD 1953, Iowa St. Univ. (GF).

**WETZEL, DAVID L.**, Assoc. Prof. of Grain Science and Industry, Research Analytical Chemist, Agr. Exp. Sta. (1973). AB 1956, Augustana Col., Ill., MS 1962, PhD 1973, Kan. St. Univ.

**WHEAT, JOHN D.**, Prof. of Animal Science and Industry, Meat Animal Research Geneticist, Agr. Exp. Sta. (1954, 1969). BS 1942, MS 1951, Tex. A & M Univ., PhD 1954, Iowa St. Univ. (GF).

**WILBUR, DONALD A.**, Prof. of Entomology Emeritus (1928, 1970). BS 1925, Dre. St. Col., AM 1928, Ohio St. Univ.

**WILDE, GERALD E.**, Assoc. Prof. of Entomology, Research Entomologist Field Crop Insects, Agr. Exp. Sta. (1966, 1973). BS 1962, Tex. Tech. Col.; PhD 1966, Cornell Univ. (GF).

**WINZER, JACK W.**, Asst. Prof. of Horticulture and Forestry, Research Horticulturist in charge, Southeast Kansas Experimental Field (P.O. Chetopa), Agr. Exp. Sta. (1963, 1966). BS 1957, MS 1959, Tex. A & M Col.

**WITHEE, LAURESTON VAN**, Prof. of Agronomy (1953, 1972). BS 1947, Kan. St. Univ., MS 1952, Univ. of Neb., PhD 1963, Kan. St. Univ. (GF).

**WITT, MERLE D.**, Asst. Prof., Research Agronomist, Garden City Branch Agr. Exp. Sta. (1969). BS 1967, Fort Hays State Col.; MS 1969, Kan. St. Univ.

## College of Architecture and Design

**AUSTIN, RICHARD L.**, Asst. Prof. of Landscape Architecture (1973). BS 1967, Tex. Tech. Col., MS 1972, North Tex. St. Univ. Registered Landscape Architect (GF).

**BARNES, ALTON A.**, Assoc. Prof. of Landscape Architecture (1976). BLA 1965, Univ. Ga., MLA 1969, Univ. of Ill., Registered Landscape Architect. (GF).

**BECKWITH, MARGARETTE**, Asst. Prof. of Pre-Design Professions (1976). BA 1965, Mich. St. Univ., MLA 1972, Univ. of Mich.

**BEREUTER, DOUGLAS K.**, Assoc. Prof. of Planning (1975). BA 1961, Univ. of Neb., MCP 1966, Harvard Univ. (GF).

**BRYANT, DALE A.**, Assoc. Prof. of Architecture (1977). BArch 1968, Univ. of Wash., MArch 1969, Univ. of Mich.

**BURNHAM, ROBERT**, Assoc. Prof. of Architecture (1976). BArch 1966, Carnegie Inst. of Tech., MArch 1970, Univ. of Calif., Berkeley.

**CASTRO, RICARDO L.**, Asst. Prof. of Pre-Design Professions (1975). BArch 1972, Univ. Los Angeles, MArch 1974, Univ. of Dre., MA 1976, Univ. of Dre.

**CHADWICK, THEODORE A.**, Prof. of Architecture Emeritus (1927, 1973). BS Arch 1927, N.D. St. Univ., MArch 1954, Mass. Inst. Tech.

**CHANG, AMOS T. T.**, Prof. of Architecture (1966). BS Civil Engg. 1939, National Chung King Univ., MFA in Arch. 1949, PhD in Arch. 1951, Princeton Univ. Registered Architect (GF).

**CHELZ, ANTHONY W.**, Asst. Prof. of Pre-Design Professions (1975). B Art Ed 1966, Sch. Art Inst. Chicago, MFA 1970, Univ. of Syracuse.

**CHRISTENSEN, KEITH M.**, Assoc. Prof. of Architecture (1966). BArch 1950, Univ. of Neb., MArch 1957, Univ. of Mich. Registered Architect. (GF).

**CLARK, THOMAS L.**, Assoc. Prof. of Architecture (1975). BArs 1964, BArch 1966, Univ. of Minn., MArch 1974, Tex. A & M Univ. Registered Architect.

**DAY, DENNIS J.**, Assoc. Prof. of Landscape Architecture (1966, 1973). BSLA 1964, Mich. St. Univ., MLA 1966, Univ. of Mich. Registered Landscape Architect (GF).

**DEINES, VERNON PHILIP**, Prof. of Planning (1957, 1966, 1970); Head, Department of Regional and Community Planning (1969). Dir. of the Center for Community Planning (1966). BS 1952, MRP 1961, Kan. St. Univ. Registered Professional Engineer (GF).

**DESMARAIS, PAUL A.**, Asst. Prof. of Architecture (1973). BA 1963, Lehigh Univ., BArch 1969, Univ. of Va., MArch 1974, Univ. of Calif. at Los Angeles.

**DEVILBISS, EDWARD A.**, Assoc. Prof. of Architecture (1975). BArch Eng. 1953, Univ. of Colo. Registered Architect.

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**EALY, ROBERT P.**, Prof. of Landscape Architecture, Dir. of the Curriculum in Landscape Architecture (1961). Head, Department of Landscape Architecture (1969). BS 1941, Dkila St. Univ., MS 1946, Kan. St. Univ., PhD 1955, La. St. Univ. Registered Landscape Architect (GF).

**EDISON, MARGUERITE L.**, Instr. of Landscape Architecture (1976). BSLA 1972, Iowa St. Univ.

**EIDSON, PATRICIA L.**, Asst. Prof. of Interior Architecture (1975). BArch 1966, Kan. St. Univ. Registered Architect.

**ERNST, F. GENE**, Assoc. Prof. of Architecture (1967, 1972). BArch 1953, Kan. St. Univ., MArch (Urban Design) 1971, Univ. of Wash. Registered Architect (GF).

**FISCHER, EMIL C.**, Prof. of Architecture Emeritus (1955, 1963, 1975). AB 1929, Columbia Col., BS in Arch. 1932, MS in Arch. 1933, Columbia Univ. Registered Architect (GF).

**FOERSTER, BERND**, Prof. Dean, Col. of Architecture and Design (1971). BS in Arch. 1954, Univ. of Cincinnati, MArch 1957, Rensselaer Polytechnic Inst. (GF).

**FRIEDBERG, LAWRENCE P.**, Asst. Prof. of Architecture (1974). BArch 1965, Univ. of Dkila, MS Arch 1975, Cornell Univ. Registered Architect.

**HALDEMAN, THOMAS G.**, Asst. Prof. of Landscape Architecture (1975). BA 1967, Syracuse Univ., MLA 1975, Univ. of Ill. Registered Landscape Architect.

**HALL, CHARLES L.**, Assoc. Prof. of Architecture (1964, 1968). BArch 1953, Pa. St. Univ., MArch 1967, Univ. of Kan. Registered Architect (GF).

**HAYCOCK, GARY E.**, Asst. Prof. of Interior Architecture (1976). BFA 1970, Pratt Inst., MArch 1972, Univ. of Dre.

**HEINTZELMAN, JOHN CRANSTON**, Prof. of Architecture (1947, 1954). Assoc. Institute for Environmental Research, BArch 1938, Mass. Inst. of Technology, MArch 1941, Columbia Univ. Registered Architect (GF).

**JAHNKE, WILLIAM R.**, Prof. of Architecture (1968, 1974). Asst. Dean, Col. of Architecture and Design (1970). BSME 1948, Duke Univ. Registered Professional Engineer (GF).

**KEITHLEY, CLAUDE A.**, Asst. Prof. of Planning (1970, 1973). BArch 1965, MRCP 1973, MArch 1974, Kan. St. Univ. (GF).

**KELLER, JOHN W.**, Asst. Prof. of Planning (1972). BA 1967, St. Benedict's, MA 1968, Kan. St. Univ., MS 1971, PhD 1974, Rutgers Univ. (GF).

**KREMER, EUGENE R.**, Assoc. Prof. of Architecture (1973). Head, Department of Architecture (1974). BArch 1960, Rensselaer Polytechnic Inst., MArch 1967, Univ. of Calif. at Berkeley, Registered Architect (GF).

**KRIDER, ALDEN**, Prof. of Pre-Design Professions (1949, 1962). BS Arch. 1933, MS 1955, Kan. St. Univ. Registered Architect (GF).

**LAW, DENNIS L.**, Asst. Prof. of Pre-Design Professions (1974, 1976). BS 1967, Tex. Tech. Univ., MLA 1976, Kan. St. Univ. Registered Architect.

**LIN, MIKE W.**, Asst. Prof. of Landscape Architecture (1975). BS Arch 1965, Taipei Inst. of Tech., MSLA 1972, Univ. of Wisc. Registered Landscape Architect.

**LIPPENBERGER, RAY E.**, Asst. Prof. of Architecture (1964). BS 1936, Kan. St. Univ. Registered Architect.

**LOCKER, FRANK M.**, Instr. of Architecture (1975). BArch 1970, Univ. of Dre. Registered Architect.

**LONGSTRETH, RICHARD W.**, Asst. Prof. of Pre-Design Professions (1976). BA 1964, Univ. of Penn.

**MARSHALL, THOMAS R.**, Asst. Prof. of Pre-Design Professions (1972). BArch 1970, MArch 1972, Syracuse Univ.

**MARTIN, WILLIAM MICHAEL**, Assoc. Prof. of Pre-Design Professions (1971, 1975). BArch 1969, Univ. of Colo., MArch 1971, Univ. of Wash.

**MCDONALD, CHARLES R.**, Instr. of Pre-Design Professions (1974). BS 1960, Kan. St. Univ. Registered Professional Engineer.

**MCGRAW, EUGENE THOMAS**, Assoc. Prof. of Interior Architecture (1958, 1964, 1968). BArch 1957, Dkila St. Univ., MRP 1963, Kan. St. Univ. (GF).

**MELNICK, ROBERT**, Asst. Prof. of Pre-Design Professions (1974, 1976). BA 1970, Bard Col., MLA 1975, St. Univ. of N.Y., Col. of Environmental Science and Forestry.

**MROSS, JOANNA W.**, Asst. Prof. of Architecture (1976). BArch 1971, MArch 1971, Va. Poly. Inst.

**MURPHY, STEPHEN M.**, Asst. Prof. of Interior Architecture (1968). BS 1968, Kan. St. Univ., MED 1974, Univ. of Mo.

**NANETTI, RAFFAELLA**, Asst. Prof. of Planning (1975). Laurea 1967, Univ. Milano, MUP 1970, Univ. of Ill.

**OBLINGER, WARREN J.**, Assoc. Prof. of Landscape Architecture (1969, 1970). BSLA 1950, Iowa St. Univ. Registered Landscape Architect (GF).

**PAGE, ROBERT L.**, Assoc. Prof. of Landscape Architecture (1971, 1975). BSLA 1963, Kan. St. Univ., MLA 1965, Harvard Univ. Registered Landscape Architect (GF).

**PAYNE, IFAN**, Assoc. Prof. of Pre-Design Professions (1976). Head, Department of Pre-Design Professions (1976). BArch 1966, Univ. of Wales, PhD 1969, Univ. of London, Registered Architect Royal Institute.

**PLESUMS, GUNTIS**, Visiting Assoc. Prof. of Architecture (1976). BArch 1961, Univ. of Minn., MArch 1964, Mass. Inst. Tech.

**QUINLAN, LEON REED**, Prof. of Landscape Architecture Emeritus, Ornamental Horticulturist and Landscape Architect, Agr. Exp. Sta. (1927, 1931, 1964). BS 1921, Colo. St. Univ., MLA 1925, Harvard Univ. (GF).

**QUINN, GEORGE E.**, Asst. Prof. of Architecture (1975). BArch 1970, Ariz. St. Univ., MPL & Urban Design, 1975, Univ. of Southern Calif.

**REID, RONALD L.**, Assoc. Prof. of Architecture and Planning (1969). BArch 1962, Kan. St. Univ., MArch 1968, Univ. of Calif. Registered Architect (GF).

**ROTHMAN, BRIAN L.**, Instr. of Pre-Design Professions (1976). BSLA 1971, Univ. of Ariz.

**SANNER, ALBERT E.**, Assoc. Prof. of Architecture (1963). BSArch 1948, BSArch Engg. 1950, Univ. of Ill., MArch 1966, Univ. of Neb. Registered Architect (GF).

**SELFBRIDGE, O. JOHN**, Assoc. Prof. of Architecture and Planning (1969, 1976). BA 1959, Univ. of Kan., MCP 1964, Yale Univ. (GF).

**SHEPARD, JIM B.**, Asst. Prof. of Architecture (1967). BA 1959, Kan. St. Univ. Registered Architect.

**SLACK, EARL REX**, Assoc. Prof. of Architecture (1965, 1969). BArch 1952, Univ. of Dkila, Registered Architect.

**SNEAD, BRUCE C.**, Instr. of Architecture (1976). BArch 1974, Calif. Polytech., San Luis Obispo.

**SPURGEON, BETTY K.**, Asst. Prof. of Pre-Design Professions (1972). B BldgSci 1970, BArch 1970, Rensselaer Polytechnic Inst.; MArch 1972, Columbia Univ.



- STDTESBURY, SIDNEY D.**, Assoc. Prof. of Architecture (1972). BS 1957, Fla. St. Univ.; MA 1969, PhD 1975, Univ. of Calif. at Berkeley (GF)
- TILSDN, WILLIAM L.**, Instr. of Pre-Design Professions (1975). BArch 1973, MArch 1975, Va. Polytechnic Inst.
- VAN OUDENALLEN, HARRY**, Asst. Prof. of Pre-Design Professions (1976). BA 1966, Harvard Univ.; BArch 1971, Univ. of Ore
- WEIGEL, PAUL**, Prof. of Architecture Emeritus (1921, 1924, 1959). BArch 1912, Cornell Univ. Registered Architect. (GF)
- WEISENBURGER, RAY B.**, Assoc. Prof. of Planning (1964, 1970). BArch 1959, Univ. of Ill.; MRP 1971, Cornell Univ. Registered Architect. Registered Landscape Architect. (GF)
- WEISMAN, GERALD D.**, Asst. Prof. of Pre-Design Professions (1975). BArch 1969, Carnegie-Mellon Univ.; MArch 1970, Univ. of Mich. (GF)
- WELLS, WARD V.**, Instr. of Interior Architecture (1973). BArch 1973, Kan. St. Univ.; MArch 1976, Univ. of Okla
- WENDT, EUGENE G.**, Assoc. Prof. of Pre-Design Professions (1962, 1969, 1975). BArch 1959, MArch 1970, Kan. St. Univ. Registered Architect.
- WINDLEY, PAUL G.**, Asst. Prof. of Architecture (1972). BS 1967, Idaho St. Univ.; BArch 1969, Univ. of Colo.; MArch 1970, DArch 1972, Univ. of Mich. (GF)

## College of Arts and Sciences

- ABERLE, NELLIE**, Prof. of English Emerita (1921, 1959). BS 1912, MS 1914, Kan. St. Univ. (GF)
- ADAMS, MARJORIE**, Assoc. Prof. of English (1954, 1961). BA 1941, La. Polytechnic; MA 1948, PhD 1951, Univ. of Tex. (GF)
- AKKINA, KRISHNA RAO**, Asst. Prof. of Economics (1972). BA 1963, Univ. of Andhra, MA 1965, Delhi School of Economics, PhD 1972, Univ. of Minn. (GF)
- ALEXANDER, LOREN B.**, Asst. Prof. of Modern Languages and Education (1965, 1971). BM 1951, Southwestern Col.; MA 1954, Colo. St. Col. of Education; MA 1965, Mich. St. Univ.; PhD 1971, Mich. St. Univ.
- ALSOP, INEZ**, Assoc. Prof. of History Emerita (1923, 1960). BS 1916, Kan. St. Teachers Col. (Emporia), MS 1920, Univ. of Kan. (GF)
- ALTHOFF, PHILLIP STANLEY**, Assoc. Prof. of Political Science (1970, 1975). BA 1963, Ill. St. Univ.; MA 1966, PhD 1970, Univ. of Iowa (GF)
- AMEEL, DONALD JULES**, Prof. of Biology Emeritus (1937, 1972). AB 1928, Wayne Univ.; MA 1930, SDC 1933, Univ. of Mich. (GF)
- ANDREWS, ARTHUR CLINTON**, Prof. of Chemistry Emeritus (1926, 1970). BS 1924, Univ. of Wis.; MS 1929, Kan. St. Univ.; PhD 1938, Univ. of Wis. (GF)
- ANSDELL, DRAJDYE**, Assoc. Prof. of English (1946, 1966). BS 1932, Kan. St. Univ.; MA 1939, Univ. of Mich.; BLS 1946, Univ. of Chicago; PhD 1956, Univ. of Colo. (GF)
- APPGATE, ROBERTA G.**, Assoc. Prof. of Journalism and Mass Communications (1964, 1973). AB 1940, Mich. St. Univ.; MS 1942, Northwestern Univ.
- ARMAGDST, JAMES L.**, Asst. Prof. of Speech (1973). BA 1963, Univ. of Calif., Santa Barbara, MA 1972, PhD 1973, Univ. of Wash., Seattle (GF)
- ASENETA, LYDIA**, Asst. Prof. of Speech (1967, 1973). BS 1949, MA 1958, The National Teachers' Col. of the Philippines, MA 1968, Kan. St. Univ.
- ATKINS, MARTHA A.**, Instr. of Speech (1973). BA 1960, MA 1972, Kan. St. Univ.
- AVERY, MADALYN**, Assoc. Prof. of Physics Emerita (1924, 1946). BS 1924, MS 1932, Kan. St. Univ.
- BABCOCK, MICHAEL W.**, Asst. Prof. of Economics (1972). BSBA 1967, Drake Univ.; MA 1969, PhD 1973, Univ. of Ill. (GF)
- BABCOCK, RODNEY WHITEMORE**, Prof. of Mathematics Emeritus; Dean Emeritus (1930, 1960). AB 1912, Univ. of Mo.; MA 1915, PhD 1924, Univ. of Wis. (GF)
- BAGLEY, EDGAR SIDNEY**, Prof., Asst. Head of Economics, Teaching and Graduate Studies, Economist, Agr. Exp. Sta. (1940, 1950). BA 1935, MA 1936, Univ. of Calif. at Los Angeles; PhD 1950, St. Univ. of Iowa (GF)
- BAKER, LYMAN A., JR.**, Instr. in English (1972). BA 1964, Univ. of Mo.; MA 1968, Stanford Univ.
- BARFOOT, DOROTHY**, Prof. of Art Emerita (1930, 1962). BA, St. Univ. of Iowa; MA 1928, Columbia Univ. (GF)
- BARK, LAURENCE DEAN**, Prof. of Physics, Assoc. Meteorologist, Agr. Exp. Sta. (1956, 1967). BS 1948, MS 1950, Univ. of Chicago; PhD 1954, Rutgers Univ. (GF)
- BARKLEY, THEODORE M.**, Prof., Division of Biology; Curator of the Herbarium; Taxonomist, Agr. Exp. Sta. (1961, 1967, 1975). BS 1955, Kan. St. Univ.; MS 1957, Dre. St. Univ.; PhD 1960, Columbia Univ. (GF)
- BARNES, VERNON L.**, Instr. of Speech (1969). BA 1957, Dttawa Univ.; MA 1964, Kan. St. Univ.
- BARNETT, MARK A.**, Asst. Prof. of Psychology (1975). BA 1971, PhD 1975, Northwestern Univ. (GF)
- BASHAM, EDWIN**, Instr., Computer Science, (1976). BS 1946, U.S. Military Academy; MS 1959, Ga. Inst. of Tech.
- BAUER, RICHARD H.**, Asst. Prof. of Psychology (1977). BA 1963, MA 1965, Univ. of Mont.; PhD 1970, Univ. of Wash.
- BECK, HENRY VOORHEES**, Prof. of Geology (1946, 1961). BS 1946, MS 1949, Kan. St. Univ.; PhD 1955, Univ. of Kan. (GF)
- BEESON, MARGARET E.**, Assoc. Prof. of Modern Languages (1960, 1968). AB 1948, Wesleyan Col.; MA 1949, Emory Univ.; PhD 1954, Univ. of Tex. (GF)
- BENSON, JANET**, Asst. Prof. of Anthropology (1972). BA 1964, Ariz. St.; MA 1969, PhD 1974, Brandeis
- BHALLA, CHANDER P.**, Prof. of Physics (1966, 1972). BS 1952, BSc 1954, MS 1955, Punjab Univ.; PhD 1960, Univ. of Tenn. (GF)
- BOOE, VERNON C.**, Prof. of Biology (1970). BS 1955, Univ. of Mo.; PhD 1962, Univ. of Ill. (GF)
- BOLAN, JOHN ELOON**, Instr. of Health, Phys. Ed. and Recreation (1967). BA 1952, Dttawa Univ.; MS 1970, Kan. St. Univ.
- BONTRAGER, ROBERT D.**, Assoc. Prof. of Journalism and Mass Communications (1970). BA 1945, Taylor Univ.; STB 1948, New York Theological Seminary, BS 1950, Taylor Univ.; MA 1950, Syracuse Univ.; PhD 1969, Syracuse Univ. (GF)
- BRADLEY, DOROTHY G.**, Instr. of Economics (1947, 1975). BS 1932, Northwestern Univ.; MS 1950, Kan. St. Univ.
- BREDE, RICHARD M.**, Asst. Prof. of Sociology (1971). BA 1962, MS 1964, Univ. of Dre.; PhD 1971, Univ. of Ill.
- BRONOELL, WILLIAM JOHN**, Asst. Prof. of English (1964). AB 1959, MA 1964, PhD 1964, Univ. of Mo. (GF)
- BROOKHART, CHARLES EDWARD**, Prof. of Music (1975). BM 1949, MM 1950, PhD 1960, George Peabody Col. (GF)
- BROWN, JANET**, Instr. of Social Work (1975). BA 1966, Ala. St. Univ.; MSW 1971, Univ. of Hawaii.
- BROWN, MERLE J.**, Research Assoc. of Physics (1975). BS 1942, Kan. St. Col. of Pittsburg; Cert. of Meteorology, 1943, Univ. of Chicago; MS 1967, Kan. St. Univ.
- BROWN, WILBUR E.**, Asst. Prof. of Journalism (1970). BS 1949, Kan. St. Univ.
- BULMAHN, HEINZ**, Asst. Prof. of Modern Languages (1972). BSE 1966, Drake Univ.; MA 1969, PhD 1974, Univ. of Wis.
- BUNGE, WALTER**, Prof. and Head of Journalism and Mass Communications (1973). BS 1956, MS 1961, Univ. of Wis.; PhD 1972, Univ. of Minn. (GF)
- BUNKER, SUZANNE L.**, Instr. of Speech. BS 1971, Eastern Ore. St. Col.; MS 1976, Univ. of Ore.
- BUNTON, NORMA D.**, Prof. and Head, Department of Speech (1954, 1960). BS 1939, Southwest Tex. St. Col.; MED 1947, Univ. of Tex.; PhD 1954, St. Univ. of Iowa. (GF)
- BURCKEL, ROBERT B.**, Assoc. Prof. of Mathematics (1971). BS 1961, Univ. of Notre Dame; MA 1963, PhD 1968, Yale Univ. (GF)
- BURKE, WILLIAM L.**, Assoc. Prof. of Speech (1964). BS 1959, MA 1960, PhD 1965, Northwestern Univ. (GF)
- BURKE, JENNY S.**, Instr. of English (1975). BA 1959, Northwestern Univ.
- BURKHARD, RAYMOND KENNETH**, Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1950, 1965). AB 1947, Ariz. St. Col.; PhD 1950, Northwestern Univ. (GF)
- BUSSING, CHARLES EARL**, Asst. Prof. of Geography (1964, 1966). BA 1959, Colo. St. Col.; MA 1961, Univ. of Colo.; PhD 1968, Univ. of Neb. (GF)
- BUSSING, SANDRA I.**, Instr. of English (1974). BA 1957, Univ. of Colo.
- CAINE, HOMER D.**, Asst. Prof. of Music (1966). BM 1940, Drake Univ.; MS 1957, Kan. St. Univ. (GF)
- CALHDUN, MYRON AMMON**, Asst. Prof. of Computer Science (1971). AA 1961, Graceland Col.; BS 1963, Univ. of Kan.; MS 1964, Colo. St. Univ.; PhD 1967, Ariz. St. Univ. (GF)
- CAMP, HENRY J.**, Asst. Prof. of Sociology (1971). BS 1966, Ill. St. Univ.; MA 1969, Univ. of Neb.; PhD 1974, Univ. of Neb. (GF)
- CANTOR, MADELINE R.**, Instr. of Health, Phys. Ed. and Rec. (1975). AB 1973, Colo. Univ.; MA 1975, Univ. of Mich.
- CARDWELL, ALVIN BOYD**, Prof. of Physics Emeritus (1936, 1955, 1973). BS 1925, DSc 1961, Univ. of Chattanooga, MS 1927, PhD 1930, Univ. of Wis. (GF)
- CAREY, JAMES CHARLES**, Prof. of History (1948, 1954). BA 1937, Neb. St. Teachers Col. (Wayne); MA 1940, PhD 1948, Univ. of Colo. (GF)
- CARPENTER, WILLIAM E.**, Assoc. Dean and Assoc. Prof. of English (1973, 1974). BA 1960, Centenary Col.; PhD 1967, Univ. of Kan. (GF)
- CARVER, CHARLEY A.**, Prof. and Head of Military Science (1975). BS 1955, Tex. A & M Univ.; MA 1972, Kan. St. Univ.
- CENTER, MELVIN S.**, Asst. Prof. of Biology (1970). BS 1962, Univ. of Ga.; MS 1964, PhD 1967, Medical Col. of Ga. (GF)
- CHALMERS, JOHN**, Vice President for Academic Affairs; Prof. of Economics (1963, 1969). AB 1938, Middlebury Col.; PhD 1943, Cornell Univ. (GF)
- CHAPIN, ERNEST KNIGHT**, Assoc. Prof. of Physics Emeritus (1923, 1968). AB 1918, MS 1923, Univ. of Mich. (GF)
- CHAPMAN, SARA S.**, Asst. Dean and Assoc. Prof. of English (1976). BA 1962, Morris Harvey Col.; MA 1966, Marshall Univ.; PhD 1970, Ohio Univ. (GF)
- CHAUDHURI, SAMBHUDAS**, Assoc. Prof. of Geology (1966). BS 1956, Calcutta Univ., India; MS 1958, Jadavpur Univ., India; MS 1961, Univ. of Ind.; PhD 1966, Ohio St. Univ. (GF)
- CHAWLA, LAL M.**, Prof. of Mathematics (1970). BA 1937, MA 1939, Panjab Univ., Lahore; PhD 1955, Oxford Univ. (GF)
- CHAPIN, ROSEMARY**, Instr. of Sociology (1975). BA 1969, Kan. St. Univ.; MSW 1971, Univ. of Minn.
- CHELIKOWSKY, JOSEPH RUDDLPH**, Prof. of Geology Emeritus (1937, 1977). BA 1931, MA 1932, PhD 1935, Cornell Univ. (GF)
- CLARK, JANE C.**, Instr. of English (1974). BS 1951, Kan. St. Univ.
- CLARKE, CLARENCE S.**, Prof. of Aerospace Studies (1975). BS 1960, Univ. of Neb., Omaha; MS 1968, Univ. of Mo.
- CLEGG, ROBERT E.**, Prof. of Biochemistry, Biochemist, Agr. Exp. Sta. (1948, 1954). BS 1936, R.I. St. Col.; MS 1939, N.C. St. Col.; PhD 1948, Iowa St. Univ. (GF)
- CLELAND, MARJORIE V.**, Instr.; Asst. to the Dean of Arts and Sciences (1970). BA 1968, MS 1970, Kan. St. Univ.
- CLIMENHAGA, JOEL**, Assoc. Prof. of Speech (1968). BA 1953, MA 1958, Univ. of Calif. at Los Angeles. (GF)
- CLORE, ROBERT ALVIN**, Instr. of Art (1970). AA 1966, Casper Col.; BA 1968, MA 1970, Univ. of Northern Colo.
- COCKE, CHARLES L.**, Assoc. Prof. of Physics (1969, 1974). AB 1962, Havford Col.; PhD 1967, Calif. Inst. of Tech. (GF)
- COHEN, PETER Z.**, Asst. Prof. of English (1961, 1973). BS 1953, MA 1961, Univ. of Wyo.
- COLLINS, MARIA C.**, Asst. Prof. of Modern Languages (1975). BEd 1963, MA 1971, Univ. of Miami; PhD, Univ. of Ky. (GF)
- COMPAN, ALVIN**, Asst. Prof. of Physics (1973). AB 1965, Calvin Col.; MS 1966, PhD 1971, Univ. of Chicago. (GF)
- CONRAO, GARY W.**, Assoc. Prof. of Biology (1970, 1975). BS 1963, Union Col.; MS 1965, PhD 1968, Yale Univ. (GF)
- CONROW, KENNETH**, Assoc. Prof. of Computer Science, Assoc. Dir. Computing Center (1961, 1964). BA 1954, Swarthmore Col.; PhD 1957, Univ. of Ill. (GF)
- CONROW, MARGARET E.**, Asst. Prof. of English (1964, 1969). BA 1954, Swarthmore Col.; MA 1955, PhD 1962, Univ. of Ill. (GF)
- CONSIGLI, RICHARD ALBERT**, Prof. of Biology (1963, 1969). BS 1954, Brooklyn Col.; MA 1956, PhD 1960, Univ. of Kan. (GF)
- COON, ROBERT L.**, Prof. and Head of Modern Languages (1971). BA 1951, Dartmouth Col.; MA 1953, PhD 1961, Princeton Univ. (GF)
- COPELAND, JAMES L.**, Prof. of Chemistry (1962, 1974). BS 1952, Univ. of Ill.; PhD 1962, Ind. Univ. (GF)



- CORBIN, CHARLES B.**, Prof. of Health, Phys. Ed. and Rec. (1971). BS 1960, Univ. of N. M.; MS 1962, Univ. of Ill.; PhD 1965, Univ. of N. M. (GF)
- COWAN, THADDEUS M.**, Prof. of Psychology (1970). BA 1957, Centre Col. of Ky.; MS 1959, Univ. of Conn.; PhD 1964, Univ. of Conn. (GF)
- COX, DAVID J.**, Prof. and Head of Biochemistry, Biochemist, Agr. Exp. Sta. (1973). BA 1956, Wesleyan Univ.; PhD 1960, Univ. of Pa. (GF)
- COX, RICHARD H.**, Asst. Prof. of Health, Phys. Ed. and Rec. (1974). BS 1967, MS 1968, Brigham Young Univ.; PhD 1973, Univ. of Ore. (GF)
- CRAWFORD, FRANCIS W.**, Assoc. Prof. of Physics Emeritus (1960, 1972). AB 1924, Phillips Univ.; MS 1929, Univ. of Okla. (GF)
- CRAWFORD, GOLDA M.**, Assoc. Prof. of History (1946, 1964). BS 1928, MS 1940, Kan. St. Univ.; PhD 1963, Syracuse Univ. (GF)
- CRAWFORD, NAOMI Z.**, Instr. in Chemistry Emerita (1922, 1963). BS 1919, MS 1922, Univ. of Neb.
- CROSS, STANLEY A.**, Asst. Prof. of Sociology and Anthropology (1973). BA 1968, Univ. of Calif., Berkeley; MA 1968, PhD 1973, Univ. of Ill. (GF)
- CULLEN, PETER**, Asst. Prof. of Military Science (1975). BA 1965, MA 1975, Kan. St. Univ.
- CULLERS, ROBERT L.**, Assoc. Prof. of Geology (1976). BS 1959, MA in Chemistry 1962, Ind. Univ.; PhD 1971, Univ. of Wis. (GF)
- CULLEY, LUANN F.**, Asst. Prof. of Art (1971). BFA 1957, MA 1967, Univ. of N. M.; PhD 1975, Stanford Univ.
- CUNNINGHAM, BRYCE A.**, Assoc. Prof. of Biochemistry, Assoc. Biochemist, Agr. Exp. Sta. (1963, 1972). BA 1955, BS 1958, PhD 1963, Univ. of Minn. (GF)
- CURNUTTE, BASIL, JR.**, Prof. of Physics, Assoc. Physicist, Agr. Exp. Sta. (1954, 1964). BS 1945, U. S. Naval Academy, PhD 1953, Ohio St. Univ. (GF)
- CURTIS, W. D.**, Assoc. Prof. of Mathematics (1970). BA 1966, Univ. of Fla.; PhD 1970, Univ. of Mass. (GF)
- DACE, WALLACE**, Prof. of Speech (1963, 1968). AB 1943, Ill. Wesleyan Univ., MFA 1948, Yale Univ.; PhD 1952, Denver Univ. (GF)
- DALE, BETTIE M.**, Instr., Dean of Arts and Sciences (1964). BS 1946, Baylor, MS 1951, PhD 1954, Ohio St. Univ.
- DALE, E. BRDCK**, Prof. of Physics (1957, 1967). BS 1940, MS 1944, Univ. of Okla.; PhD 1953, Ohio St. Univ. (GF)
- DALY, ROBERT K.**, Instr. of Journalism and Mass Communications (1973). AB 1967, Marquette Univ.; MA 1973, Sangamon St. Univ.
- DANEN, WAYNE C.**, Assoc. Prof. of Chemistry (1967, 1972). BA 1964, St. Norbert Col.; PhD 1967, Iowa St. Univ. (GF)
- DAVIS, EARLE RUSCO**, Prof. of English Emeritus (1949, 1975). AB 1927, BM 1929, Monmouth Col.; MA 1928, Univ. of Ill.; PhD 1935, Princeton Univ. (GF)
- DAVIS, LAWRENCE CLARK**, Asst. Prof. of Biochemistry, Asst. Biochemist, Agr. Exp. Sta. (1975). BS 1966, Haverford Col.; PhD 1970, Yeshiva Univ. (GF)
- DAYTON, ARTHUR D.**, Assoc. Prof., Head and Dir., Department of Statistics and Dir., Statistical Laboratory, Agr. Exp. Sta. (1966, 1975). BS 1960, Berea Col.; MS 1964, PhD 1967, Mich. St. Univ. (GF)
- DEAN, MARY PAT**, Instr. of Speech (1975). BS 1970, MA 1973, Univ. of Ill.
- DeCOU, DONALD FRANK**, Assoc. Prof. of Economics Emeritus (1947, 1973). BS 1929, Kan. St. Teachers Col. of Pittsburg; MBA 1934, Northwestern Univ.; 1966, Univ. of Wis. (GF)
- DEES, JEROME STEELE**, Asst. Prof. of English (1976). BA 1958, Catawaba Col.; MA 1961, Fla. St. Univ.; PhD 1968, Univ. of Ill., Urbana (GF)
- DEHON, CLAIRE LOUISE**, Asst. Prof. of Modern Languages (1972). BA 1962, Royal Art Institute of Brussels, MA 1964, MA 1969, Univ. of Kan.; M. Phil. 1971, Univ. of Kan.; PhD 1973, Univ. of Kan. (GF)
- OEIBLER, GERALD WILLIAM**, Assoc. Prof. of Art (1956, 1970). BA 1951, Univ. of Neb.; MFA 1955, Univ. of Colo. (GF)
- DELEHANTY, JOHN A.**, Assoc. Prof. of Economics (1966). BBA 1952, MA 1956, Univ. of Miami, PhD 1962, Ind. Univ.
- DENELL, ROBIN**, Asst. Prof. of Biology (1972). BA 1965, Univ. of Calif.; MA 1968, PhD 1969, Univ. of Tex.
- DESMARTEAU, DARRYL D.**, Assoc. Prof. of Chemistry (1971, 1973). BS 1963, Wash. St. Univ.; PhD 1966, Univ. of Wash. (GF)
- DIXON, LYLE J.**, Prof. of Mathematics (1963). BS 1948, MS 1950, Okla. St. Univ.; PhD 1963, Univ. of Kan. (GF)
- DOLLAR, DIANE A.**, Instr. of Art (1976). BS 1955, MA 1967, Kan. St. Univ.
- DONNELLY, MICHAEL L.**, Asst. Prof. of English (1972). AB 1963, Harvard Col.; PhD 1970, Harvard Univ. (GF)
- DONOVAN, ROBERT KENT**, Asst. Prof. of History (1964). BA 1954, Harvard Univ.; BA 1958, MA 1963, Cambridge Univ.; PhD 1965, Harvard Univ. (GF)
- DOUGLAS, LOUIS HARTWELL**, Prof. of Political Science (1949). AB 1931, Hastings Col.; MA 1937, PhD 1949, Univ. of Neb. (GF)
- DOYLE, BARNEY L.**, Res. Assoc. of Physics (1976). BS 1971, Kan. St. Univ.; PhD 1976, Univ. of N. C. at Chapel Hill
- DRAUSDORF, R. DEAN**, Prof. of Physics (1948, 1956). SB 1944, PhD 1948, Mass. Inst. of Tech. (GF)
- DRESSLER, ROBERT E.**, Assoc. Prof. of Mathematics (1970, 1973). BA 1965, Univ. of Rochester, MS 1966, PhD 1969, Univ. of Ore. (GF)
- DRISS, ANN**, Instr. of Modern Languages (1967). AB 1952, Washburn Univ.; MS 1966, Kan. St. Teachers Col.
- DUSHKIN, LELAH**, Asst. Prof. of Sociology (1968). AB 1953, Smith Col.; MS 1956, PhD 1974, Univ. of Pa. (GF)
- EADS, JOHN W.**, Instr. of Biology (1974). BA 1967, MA 1969, Adams St. Col.
- EATON, GEORGE R.**, Dir. of KSU Printing Service, Asst. Prof. of Journalism and Mass Communications (1955). BS 1947, S. D. St. Col.
- EBBERTS, GEORGE DRVAL**, Asst. Prof. Emeritus (1946, 1956, 1974). BS 1949, MS 1951, Kan. St. Univ.
- ECK, JOHN S.**, Assoc. Prof. of Physics (1969, 1974). BS 1962, PhD 1967, The Johns Hopkins Univ. (GF)
- EDWARDS, ROBERT L.**, Asst. Prof. of Music (1972). BM 1961, MM 1963, Wichita St.; DMA 1972, Univ. of Ore. (GF)
- EITNER, WALTER H.**, Assoc. Prof. of English (1954, 1959). AB 1948, Univ. of Denver, AM 1949, Univ. of Mich.; PhD 1959, Univ. of Denver. (GF)
- ELLSWORTH, LOUIS DANIEL**, Prof. of Physics (1946, 1954). BS 1937, Case Inst. of Tech.; MS 1938, PhD 1941, Ohio St. Univ. (GF)
- EMERSON, M. JARVIN**, Prof. of Economics (1962, 1969). BA 1957, Luther Col.; MA 1960, PhD 1963, Univ. of Iowa (GF)
- ENDAL, ANDREW S.**, Asst. Prof. of Physics (temporary) (1976). BS 1971, Univ. of Rochester; PhD 1974, Univ. of Fla.
- EVANS, THOMAS MARION**, Prof. of Health, Phys. Ed. and Rec. Emeritus (1942, 1950). BS 1930, Kan. St. Univ.; MS 1942, Univ. of Mich.; PEOr 1958, Ind. Univ. (GF)
- EVANS, WILLIAM E.**, Asst. Prof. of English (1969). BA 1963, Wayne St. Univ.; MA 1965, Univ. of Mich.; PhD 1973, Ohio Univ.
- EXDELL, JOHN B.**, Asst. Prof. of Philosophy (1972). BA 1967 Dickinson Col.; PhD 1973, Univ. of Tex. at Austin (GF)
- FATELEY, WILLIAM G.**, Prof. and Head of Chemistry Department (1972). AB 1951, Franklin Col.; PhD 1955, Kan. St. Univ. (GF)
- FEDDER, NORMAN J.**, Assoc. Prof. of Speech (1970). BA 1955, Brooklyn Col.; MA 1956, Columbia Univ.; PhD 1962, N. Y. Univ. (GF)
- FERGUSON, CLYDE RANDOLPH**, Asst. Prof. of History (1960, 1963). BA 1955, Univ. of Okla.; MA 1957, PhD 1960, Duke Univ. (GF)
- FEYERHERM, ARLIN M.**, Prof. of Statistics, Statistical Consultant, Agr. Exp. Sta. (1953, 1964). BS 1946, Univ. of Minn.; MS 1948, Univ. of Iowa, PhD 1952, Iowa St. Univ. (GF)
- FIDLER, ROBERT B.**, Instr. of Journalism and Mass Communications (1972). BA 1963, Cedarville Col.; MA 1967, Central Mo. St. Col.
- FINA, LOUIS R.**, Prof. of Biology, Microbiologist, Agr. Exp. Sta. (1954, 1962). AB 1942, MS 1948, PhD 1950, Univ. of Ill. (GF)
- FINNEGAN, MICHAEL**, Asst. Prof. of Anthropology (1973). BA 1967, MA 1970, PhD 1972, Univ. of Colo.
- FIRLING, JANICE D.**, Instr. of Speech (1974). BS 1967, MA 1970, Kan. St. Univ.
- FISHER, PAUL S.**, Assoc. Prof. and Head of Computer Science (1967, 1973). BA 1963, MA 1964, Univ. of Utah, PhD 1969, Ariz. St. Univ. (GF)
- FLANAGAN, BRUCE**, Prof. of Speech (1966). BS 1953, Western Mich. Univ.; MS 1958, Southern Ill. Univ.; PhD 1966, Univ. of Fla. (GF)
- FLORA, CORNELIA BUTLER**, Assoc. Prof. of Sociology (1970). BA 1965, Univ. of Calif.; MS 1966, PhD 1970, Cornell Univ. (GF)
- FLORA, JAN L.**, Asst. Prof. of Sociology (1970). BA 1964, Univ. of Kan.; MS 1967, PhD 1971, Cornell Univ. (GF)
- FLDUE, JACK**, Assoc. Prof. of Music (1971). BME 1960, Marshall Univ.; MM 1962, Eastman School of Music, DM 1971, Ind. Univ. (GF)
- FOLLAND, NATHAN D.**, Assoc. Prof. of Physics (1966, 1972). BA 1959, Concordia Col.; PhD 1965, Iowa St. Univ. (GF)
- FRAHM, ROBERT L.**, Adjunct Clinical Instr. of Med. Tech. (1976). BM 1958, Bethany Col.
- FRETWELL, STEPHEN D.**, Asst. Prof. of Biology (1969). BS 1964, Bucknell Univ.; PhD 1968, N. C. St. Univ. (GF)
- FREY, MARSHA L.**, Asst. Prof. of History (1973). BA and BSc in Educ. 1967, MA 1968, PhD 1971, Ohio St. Univ. (GF)
- FRIEDMANN, EUGENE ALVIN**, Prof., Head of Department of Sociology and Anthropology (1965). AB 1947, MA 1949, PhD 1953, Univ. of Chicago (GF)
- FRIEMAN, JEROME**, Assoc. Prof. of Psychology (1968). BA 1963, MS 1965, Western Reserve Univ.; PhD 1969, Kent St. Univ. (GF)
- FRYER, HOLLY CLAIRE**, Prof., Department of Statistics, Consultant, Agr. Exp. Sta. (1940, 1946, 1959). BS 1931, Univ. of Ore.; MS 1933, Ore. St. Univ.; PhD 1940, Iowa St. Univ. (GF)
- FULLER, LEDNARD EUGENE**, Prof. of Mathematics (1952, 1959). BS 1941, Univ. of Wyo.; MS 1947, PhD 1950, Univ. of Wis. (GF)
- FUNKHOUSER, SARA**, Instr. of Music (1976). BM 1974, MM 1975, Univ. of Mo.; Kansas City
- GALLAGHER, TOM L.**, Dir., Computing Center, Assoc. Prof. of Computer Science (1970). BA 1953, MS 1954, North Tex. St. Col.; DSc 1967, Wash. Univ. (GF)
- GARZIO, ANGELO C.**, Prof. of Art (1957, 1966). BA 1949, BS 1949, Syracuse Univ.; Diploma di Profetto, 1950, Univ. of Florence, Italy; MA 1954, MFA 1955, St. Univ. of Iowa (GF)
- GEISSLER, WINNIFRED J.**, Instr. in English (1954). B. Music Ed. 1940, Bethany Col.; MS 1954, PhD 1976, Kan. St. Univ.
- GENCH, BARBARA E.**, Asst. Prof. of Health, Phys. Ed. and Rec. (1968, 1970). BS 1963, MS 1967, Kan. St. Univ.; EdD 1974, Univ. of Northern Colo.
- GEYER, KATHERINE**, Prof. of Health, Phys. Ed. and Rec. Emerita (1927, 1945, 1974). BS 1927, Ohio St. Univ.; MA 1934, Columbia Univ. (GF)
- GIER, HERSCHEL THOMAS**, Prof. of Biology Emeritus, Embryologist, Agr. Exp. Sta. (1947, 1960). AB 1931, Kan. St. Col. of Pittsburg, PhD 1936, Ind. Univ. (GF)
- GILLESPIE, VINCENT E.**, Asst. Prof. of English (1966). BA 1952, Sterling Col.; MA 1956, Univ. of Kan.; PhD 1970, Univ. of Kan.
- GIVEN, KINGSLEY WALTON**, Prof. of Speech Emeritus (1920, 1950). BS 1926, Park Col.; MA 1929, St. Univ. of Iowa (GF)
- GLENN, ESTHER BEACHEL**, Asst. Prof. of English Emerita (1948, 1954). AB 1930, Kan. Wesleyan Univ.; MS 1938, Kan. St. Univ. (GF)
- GLENN, KATHLEEN M.**, Asst. Prof. of Modern Languages (1973). AB 1957, AM 1958, PhD 1964, Stanford Univ. (GF)
- GONAZALEZ-DEL-VALLE, LUIS T.**, Asst. Prof. of Modern Languages (1972). BA 1968, Wilmington Col.; MA 1971, PhD 1972, Univ. of Mass. (GF)
- GODDRICH, ARTHUR LEDNARD**, Prof. of Biology Emeritus (1929, 1970). BS 1928, Col. of Idaho, MS 1929, Univ. of Idaho, PhD 1938, Cornell Univ. (GF)
- GORMELY, PATRICK JOSEPH**, Assoc. Prof. (1967, 1975). AB 1963, Catholic Univ. of America, PhD 1967, Duke Univ. (GF)
- GRAF, WILLIAM G.**, Instr. of Journalism and Mass Communications (1976). BA 1966, Mich. St. Univ.; MS 1973, Syracuse
- GRANDROSE, CHERLYN S.**, Instr. of Biology (1974). BS 1964, MS 1966, Univ. of Mich.
- GRAY, MARION WILSON, JR.**, Asst. Prof. of History (1969). BA 1964, Tex. Christian Univ.; MA 1966, PhD 1971, Univ. of Wis. (GF)
- GRAY, THOMAS F.**, Asst. Prof. of Speech (1974). BA 1962, MA 1967, Univ. of Northern Iowa, PhD 1975, Univ. of Minn.
- GRAY, TOM J.**, Prof. of Physics (visiting) (1975). BS 1960, MS 1962, North Tex. St. Univ.; PhD



- 1967 Fla St Univ
- GREECHIE, RICHARD J.**, Assoc. Prof. of Mathematics (1967, 1970) BS 1962, Boston Col.; PhD 1966, Univ. of Fla (GF)
- GRIFFITT, WILLIAM B.**, Prof. of Psychology (1968, 1975) BA 1964, Kan St Univ; PhD 1967, Univ. of Tex (GF)
- GRINDELL, ROBERT M.**, Asst. Prof. of English (1972). AB 1956, Harvard Univ; MA 1964, N Y Univ; PhD 1972, Univ. of Ariz (GF)
- GROSH, DORIS L.**, Assoc. Prof. of Industrial Engineering, Joint Appt. with Department of Statistics (1965, 1968) BS 1946, Univ. of Chicago, MS 1949, PhD 1969, Kan St Univ (GF)
- GUHL, ALPHAEUS MATTHEW**, Prof. of Biology Emeritus (1943, 1968) AB 1922, North Central Col.; MS 1939 PhD 1943, Univ. of Chicago (GF)
- GUSTAFSON, MERLIN DeWAYNE**, Assoc. Prof. of Political Science (1960, 1968). BS 1943, MS 1947, Kan St Univ; PhD 1956, Univ. of Neb (GF)
- HAGAN, PATRICIA W.**, Asst. Instr. of Art (1974) BS 1970, Kan St Univ
- HAGGART, EDMOND Q.**, Asst. Prof. of Economics (1973). BA 1967, Kan. Univ; PhD 1973, Univ. of Minn
- HAJDA, JOSEPH**, Dir. of International Activities (1965) Assoc. Prof. of Political Science (1957, 1960) BA 1951, MA 1952, Miami Univ; MA, PhD 1955, Ind Univ (GF)
- HAMILTON, JAMES R.** Asst. Prof. of Philosophy (1971) BA 1964, Pfeiffer Col.; MA 1967, Emory Univ; MDiv 1968, Union Theological Seminary, PhD 1974, Univ. of Tex at Austin (GF)
- HAMLIN-SCHENCK, WILLIAM J.**, Asst. Prof. of Speech, BS 1969, MA 1971, Kan St Univ PhD 1976 Univ. of Dre (GF)
- HAMMAKER, ROBERT M.**, Prof. of Chemistry (1961, 1974). BS 1956, Trinity Col.; PhD 1960, Northwestern Univ (GF)
- HAMSCHER, III, ALBERT N.**, Asst. Prof. of History (1972, 1973) BA 1968, Pa. St. Univ.; MA 1970, PhD 1973, Emory Univ (GF)
- HANKLEY, WILLIAM JOHN**, Assoc. Prof. of Computer Science (1972) BSEE 1962, MS 1964, Northwestern Univ; PhD 1967, Ohio St Univ (GF)
- HANSEN, MERLE FREDRICK**, Prof. and Assoc. Dir. of Biology, Parasitologist, Agr. Exp. Sta (1950, 1963) AB 1939, MA 1941, Univ. of Minn.; PhD 1948, Univ. of Neb (GF)
- HARRIS, OSCAR L.**, Instr. of Aerospace Studies (1977)
- HARRIS, RICHARD J.**, Asst. Prof. of Psychology (1974) BA 1968, Col. of Wooster, MA 1971, PhD 1974, Univ. of Ill (GF)
- HARRIS, T. ROBERT**, Asst. Prof. of Sociology and Anthropology (1973) BA 1965, Reed Col.; PhD 1972, The Johns Hopkins Univ (GF)
- HARRIS, VIDA AGNES**, Assoc. Prof. of Art Emerita (1924, 1963) BS 1914, Kan St Univ.; AM 1927, Univ. of Chicago (GF)
- HARRISS, STELLA**, Asst. Prof. of Chemistry Emeritus (1919, 1953) BS 1917, MS 1919, Kan St Univ
- HATHAWAY, CHARLES**, Prof. and Head of Physics (1964, 1969, 1975) BS 1958, Tex A & M Col.; PhD 1964, Univ. of Okla (GF)
- HAWES, JOSEPH M.**, Asst. Prof. and Head of History (1971, 1973) BA 1960, Rice Univ; MA 1962 Dkla St Univ; PhD 1969, Univ. of Tex at Austin (GF)
- HAWLEY, M. DALE**, Assoc. Prof. of Chemistry (1966, 1970) BA 1960, MA 1962, Univ. of Northern Iowa, PhD 1965, Univ. of Kan (GF)
- HEDGECOCK, CHARLIE JR.**, Prof. of Biochemistry, Biochemist, Agr. Exp. Sta (1965, 1976) BS 1961, PhD 1965, Univ. of Tex (GF)
- HERMAN, LOUIS M.**, Asst. Prof. of Mathematics (1970) BS 1963, MS 1965, Univ. of Fla; PhD 1970, Univ. of Mass (GF)
- HEWETT, PHILLIP W.**, Asst. Prof. of Music (1969, 1971) BME 1959, Tex Christian Univ; MS 1970, Kan St Univ
- HIGGINSON, FRED H.**, Prof. of English (1950, 1969) AB 1942, MA 1947, Univ. of Wichita, PhD 1953, Univ. of Minn (GF)
- HIGHAM, BARBARA C.**, Instr. in Economics (1974) BA 1948, Mt. Holyoke, MA 1950, Columbia Univ
- HIGHAM, ROBIN**, Prof. of History (1963, 1966) AB 1950, Harvard Col.; MA 1953, Claremont Graduate School, PhD 1957, Harvard Univ (GF)
- HILL, OPAL BROWN**, Assoc. Prof. of Art Emerita (1944, 1954) BS 1944, MS 1950, Kan St Univ (GF)
- HILL, RANDALL CONRAD**, Prof. of Sociology Emeritus (1929, 1970) BS 1924, MS 1927, Kan St Univ; PhD 1929, Univ. of Mo (GF)
- HINRICH, CARL**, Asst. Prof. of Speech (1964) AB 1959, MA 1960, Univ. of N C (GF)
- HDLT, DONALD N.**, Assoc. Prof. of Journalism and Mass Communications (1974) BA 1950, Univ. of Colo.; MS 1970, Univ. of Wis
- HOOK, PATRICIA W.**, Instr. of Biology (1970) BA 1963, MS 1965, Kan St Univ; PhD 1970, Dre St Univ
- HDSTETTER, HELEN PANSY**, Prof. of Journalism Emerita (1926, 1964) AB 1917, Univ. of Neb; BS 1940, Kan St Univ; MS 1926, Northwestern Univ (GF)
- HOUSER, DAVID J.**, Asst. Prof. of English (1969) BS 1964, Iowa St Univ; MS 1966, PhD 1970, Univ. of Wis (GF)
- HOWE, F. VIRGINIA**, Prof. of Journalism and Mass Communications (1947, 1959) AB 1935, Elmira Col.; MS 1949, EdD 1958, Boston Univ (GF)
- HSU, CHEN-JUNG**, Prof. of Mathematics (1965). BS 1941, DS 1961, Tohoku Univ (Japan) (GF)
- HUFF, GEORGE A.**, Asst. Prof. of Mathematics (1971) BA 1966, Kenyon Col.; MA 1968, Lehigh Univ; PhD 1973, Stanford Univ
- HULBERT, LLOYD C.**, Prof. of Biology, Ecologist, Agr. Exp. Sta (1955, 1972) BS 1940, Mich St Univ; PhD 1953, Wash St Univ (GF)
- IANDOLO, JOHN J.**, Assoc. Prof. of Biology, Microbiologist, Agr. Exp. Sta. (1967, 1973) BS 1961, Loyola Univ; Chicago, MS 1963, PhD 1965, Univ. of Ill. (GF)
- ILES, IVOR VICTOR**, Prof. of Political Science Emeritus (1911, 1949) BA 1904, MA 1905, Univ. of Kan (GF)
- IYENGAR, SHANTO**, Asst. Prof. of Political Science (1972). BA 1966, Dsmania Univ; MA 1968, PhD 1972, Univ. of Iowa (GF)
- JACK, HULAN E., JR.**, Asst. Prof. of Physics (1971) BS 1960, MS 1964, PhD 1971, N Y Univ (GF)
- JACKSON, T. HANLEY**, Assoc. Prof. of Music (1968, 1975) BA 1965, San Fernando Valley St. Col.; MA 1968, Calif St Col. at Long Beach (GF)
- JACOBS, OAVIO S.**, Adjunct Clinical Associate of Med Tech (1976) BS 1953, MD 1956, Univ. of Mich
- JANES, WILLIAM CHARLES**, Assoc. Prof. of Mathematics Emeritus (1922, 1968). BS 1919, Northwestern Univ.; MA 1922, Univ. of Neb.
- JOHNSON, DALLAS E.**, Assoc. Prof. of Statistics; Consultant, Agr. Exp. Sta. (1975). BS 1960, Kearney St Col.; MA 1966, Western Mich. Univ; PhD 1970, Colo. St. Univ (GF)
- JOHNSON, GEORGE DANA**, Assoc. Prof. of Chemistry (1952, 1967). AB 1940, MA 1941, Oberlin Col.; PhD 1946, Univ. of Mich (GF)
- JOHNSON, MICHAEL P.**, Assoc. Prof. of Biology (1972). BS 1959, Univ. of Calif.; PhD 1966, Univ. of Dre
- JOHNSTON, KENNETH GORDON**, Assoc. Prof. of English (1966, 1972) BA 1948, Univ. of Calif. at Berkeley, MA 1951, Univ. of Calif. at Los Angeles, PhD 1966, Univ. of Minn. (GF)
- JONES, OALE VINCENT**, Assoc. Prof. of English Emeritus (1946, 1951). BS 1931, MS 1941, Kan St Univ (GF)
- JONES, JOHN A.**, Asst. Prof. of Military Science (1976) BS 1968, US Military Acad.
- JONES, KENNETH W.**, Assoc. Prof. of History (1965, 1970) AB 1958, MA 1959, PhD 1966, Univ. of Calif. (GF)
- KAHL, MARY R.**, Instr. in Journalism and Mass Communications (1975). BS 1966, Southwest Mo St.; MS 1974, Iowa St
- KAMMER, ANN E.**, Assoc. Prof. of Biology, Neural Biologist (1972). BS 1956, N Y St. Col. for Teachers, MS 1958, Univ. of N H.; Durham, PhD 1966, Univ. of Calif., Berkeley (GF)
- KAUFMAN, BURTON I.**, Assoc. Prof. of History (1973). BA 1962, Brandeis Univ.; MA 1964, PhD 1966, Rice Univ (GF)
- KAY, KENNETH G.**, Assoc. Prof. of Chemistry (1971, 1974). BS 1965, MS 1965, Polytechnic Inst. of Brooklyn, PhD 1970, The Johns Hopkins Univ. (GF)
- KEISER, GEORGE R.**, Assoc. Prof. of English (1973, 1975) BA 1962, MA 1964, PhD 1971, Lehigh Univ (GF)
- KELLEY, JOHN R., JR.**, Assoc. Prof. of Biology (1975). BS 1963, La Tech Univ.; MS 1965, La St Univ.; PhD 1969, Auburn Univ
- KEMP, KENNETH E.**, Assoc. Prof. of Statistics; Consultant, Agr. Exp. Sta. (1968). BS 1963, MS 1965, PhD 1967, Mich. St Univ (GF)
- KENNEDY, THOMAS E.**, Asst. Prof. of Economics (1973, 1975) BA 1969, Univ. of Calif., Santa Barbara, MA 1974, PhD 1975, The Johns Hopkins Univ (GF)
- KEPLER, JON S.**, Adjunct Prof. of History, Marymount College (1977) BA 1962, MA 1966 Univ. of Tulsa, PhD 1972, Univ. of Kan.
- KIPP, JACOB W.**, Assoc. Prof. of History (1971, 1975) BS 1964, Shippensburg State Col.; MA 1967, PhD 1970, Pa. St. Univ (GF)
- KIRKENDALL, DON R.**, Prof. & Head of Health, Physical Education and Recreation (1976). BS 1963, MS 1965, PhD 1968, Purdue Univ
- KLAASSEN, HAROLD E.**, Asst. Prof. of Biology (1967) AB 1957, Tabor Col.; MS 1959, Kan. St Univ; PhD 1967, Univ. of Wash (GF)
- KLOPFENSTEIN, WILLIAM E.**, Assoc. Prof. of Biochemistry; Assoc. Biochemist, Agr. Exp. Sta (1964, 1972). BS 1958, MS 1961, PhD 1964, Pa St Univ (GF)
- KOCH, WILLIAM E.**, Assoc. Prof. of English (1946, 1947, 1973). BS 1938, N O St Teachers Col.; MS 1949, Kan St Univ (GF)
- KOLONOSKY, WALTER F.**, Asst. Prof. of Modern Languages (1973) BA 1963, Lycoming Col.; MA 1965, Univ. of Pa.; PhD 1972, Univ. of Kan (GF)
- KRAMER, CHARLES LAWRENCE**, Prof. of Biology, Mycologist, Agr. Exp. Sta.; Adjunct Prof. of Plant Pathology (1958, 1966) AB 1950, MA 1953, PhD 1957, Univ. of Kan. (GF)
- KRAMER, KARL J.**, Asst. Prof. of Biochemistry, Research Chemist, Grain Marketing Research Center (1973) BS 1964, Purdue Univ; PhD 1971, Univ. of Ariz. (GF) (Courtesy Appointment)
- KREITNER, GERALD L.**, Instr. of Biology (1974) BS 1963, MS 1966, PhD 1970, Univ. of Ill.
- KREN, GEORGE M.**, Assoc. Prof. of History (1965) BA 1948, Colby Col.; MA 1949, PhD 1960, Univ. of Wis (GF)
- KREN, MARGARETTA H.**, Instr. of Art (1976) BS 1966, Univ. of Wis; MA 1969, Kan St Univ.
- KROMM, DAVID**, Assoc. Prof. of Geography (1967, 1971) BS 1960, Eastern Mich. Univ; MA 1964, PhD 1967, Mich. St Univ (GF)
- LAMAN, RUSSELL**, Asst. Prof. of English Emeritus (1935, 1972) BS 1932, Kan. St. Univ.; MA 1933, St Univ. of Iowa (GF)
- LAMBERT, JACK L.**, Prof. of Chemistry (1950, 1958) AB 1947, MS 1947, Kan. St. Col. of Pittsburg, PhD 1950, Dkla St Univ (GF)
- LANGENKAMP, JERRY REESE**, Assoc. Prof. of Music, BM 1953, Univ. of Dkla; MM 1958, Univ. of Mich.; DMA 1970, Univ. of Mich (GF)
- LANGFORD, ROY CLINTON**, Prof. of Psychology Emeritus (1925, 1941) BS 1925, MS, Kan. St. Univ; PhD 1934, Leland Stanford Junior Univ (GF)
- LANNING, FRANCIS C.**, Assoc. Prof. of Chemistry (1942, 1961) BS 1930, MS 1931, Univ. of Denver, PhD 1936, Univ. of Minn (GF)
- LARMER, OSCAR VANCE**, Prof. of Art (1950, 1970) BFA 1949, Univ. of Kan; MFA 1955, Wichita Univ (GF)
- LASH, MENDEL ELMER**, Prof. of Chemistry Emeritus (1922, 1966) AB 1920, MS 1922, PhD 1928, Ohio St Univ (GF)
- LASHBROOK, RALPH RICHARD**, Prof. and Head Emeritus, Department of Journalism (1934, 1944) BS 1929, Kan St Univ; MS 1942, Univ. of Wis (GF)
- LAUMER, HELMUT W.**, Research Assoc. of Physics (1971). BS 1965, Univ. of Chicago; MS 1967, PhD 1971, Mich St. Univ
- LAURIE, DAVID R.**, Asst. Prof. of Health, Phys. Ed. and Recreation (1968). BS 1963, MS 1966, Kan St Univ; EdD 1974, Dkla St Univ
- LEAVENGOD, LUTHER OMAR**, Prof. of Music Emeritus (1945, 1975). BM 1929, Univ. of Kan.; MM 1936, Univ. of Mich. (GF)
- LEE, RONALD S.**, Assoc. Prof. of Physics (1967, 1974) BA 1961, Luther Col.; PhD 1967, Iowa St Univ (GF)
- LEE, YU-LEE**, Prof. of Mathematics (1967, 1975) BS 1955, MA 1959, National Taiwan Univ.; PhD 1964, Univ. of Dre (GF)
- LEGG, JAMES C.** Prof. of Physics and Dir., Nuclear Science Lab (1967, 1973). BS 1958, Ind. Univ; MA 1960, PhD 1962, Princeton Univ (GF)
- LENHART, ANNE G.**, Asst. Prof. of Chemistry (1967) BA 1958, Hollins Col.; MS 1963, PhD 1965, The Univ. of N M (GF)
- LILLEY, JOHN M.**, Asst. Dean and Assoc. Prof. Music (1976) BME 1961, BM 1962, MM 1964, Baylor, DMA 1971, Univ. of So Calif (GF)
- LIMPER, LOUIS HENRY**, Prof. of Modern Languages Emeritus (1914, 1944) AB 1907, Baldwin-Wallace Col.; AM 1914, Univ. of Wis; PhD 1931, St Univ. of Iowa (GF)



- LIN, CHII-DDNG**, Asst. Prof. of Physics (1976). BA 1969, National Taiwan Univ.; MS 1970, PhD 1974, Univ. of Chicago
- LINDER, ROBERT D.**, Prof. of History (1965, 1973). BS 1956, Kan. St. Teachers Col., MDiv, MRE 1958, Central Baptist Theological Seminary, MA 1960, PhD 1963, Univ. of Iowa (GF)
- LINDLEY, DONALD D.**, Assoc. Prof. of Health, Phys. Ed. and Recreation (1973). BA 1949, Wichita St. Univ.; MEd 1952, Univ. of Minn.; DEd 1970, Univ. of Ore (GF)
- LINFORD, DRMA**, Asst. Prof. of Political Science (1966). BS 1956, Utah St. Univ.; MS 1958, PhD 1964, Univ. of Wis (GF)
- LOCKHART, CHARLES HOWARD**, Assoc. Prof. of Biology Emeritus (1940, 1947, 1972). BS 1934, MS 1938, Kan. St. Univ (GF)
- LOGAN, JOHN D.**, Assoc. Prof. of Mathematics (1973). BS 1966, MS 1968, PhD 1970, Ohio St. Univ (GF)
- LONG, GLENN WESLEY**, Asst. Prof. of Sociology Emeritus (1938, 1970). AB 1926, Baker Univ.; MS 1940, Kan. St. Univ (GF)
- LONGHURST, THOMAS M.**, Assoc. Prof. of Speech (1971, 1975). BS 1966, MS 1968, PhD 1970, Univ. of Minn. (GF)
- LOVE, JUDITH**, Asst. Prof. of Art (1970, 1973). A of A 1961, Cottey Col.; BFA 1964, Kansas City Art Inst.; MFA 1969, Univ. of Neb
- LOWER, CONSTANCE E.**, Adjunct Clinical Instr. of Med. Tech. (1976). BS 1948, Kan. St. Univ
- LYNN, NAOMI B.**, Assoc. Prof. of Political Science (1970, 1975). BA 1954, Maryville Col.; MA 1958, Univ. of Ill.; PhD 1970, Univ. of Kan (GF)
- MACDONALD, JAMES ROBERT**, Prof. of Physics (1968, 1975). BA 1958, Univ. of Toronto, MS 1964, PhD 1966, McMaster Univ. (GF)
- MACFARLAND, DAVID T.**, Asst. Prof. of Journalism and Mass Comm. (1972). BA 1965, MA 1966, Stetson Univ.; PhD 1972, Univ. of Wis
- MADDOX, JEROLD**, Prof. and Head of Art (1974). BS 1954, MFA 1959, Ind. Univ (GF)
- MAHLER, RONNIE J.**, Asst. Prof. of Health, Phys. Ed. and Recreation (1974). Ballet Russe de Monte Carlo 1960-62, National Ballet 1963-67, American Ballet Theatre 1969-72
- MANNEY, THOMAS R.**, Assoc. Prof. of Physics (1971). BA 1958, Western Wash. St. Col.; PhD 1964, Univ. of Calif (GF)
- MARCHIN, GEORGE L.**, Asst. Prof. of Biology (1970). BA 1962, Rockhurst Col.; PhD 1967, Univ. of Kan (GF)
- MARIAMPOLSKI, HYMAN**, Instr. of Sociology (1976). BA 1968, City Univ. of N. Y.; MS 1971, PhD 1977, Purdue Univ
- MARKS, GRAHAM**, Asst. Prof. of Art (1976). BFA 1976, Philadelphia College of Art, MFA 1976, Alfred Univ (GF)
- MARR, JOHN MAURICE**, Prof. of Mathematics (1953, 1958, 1962). BS 1941, Central Mo. St. Col.; MA 1948, Univ. of Mo.; PhD 1953, Univ. of Tenn (GF)
- MARTIN, SISTER MARY LENDRE**, Adjunct Prof. of History, (Saint Mary College) (1977). BA 1947, MS 1958, Saint Mary College, MA 1966, St. Louis Univ
- MARYANSKI, FRED**, Asst. Prof. of Computer Science (1974). BS 1968, Providence Col.; MS 1972, Stevens Inst. of Tech.; PhD 1974, Univ. of Conn. (GF)
- MARYMOUNT, JESSE H.**, Adjunct Clinical Associate of Med. Tech. (1976). BS 1950, Syracuse Univ.; MD 1954, St. Univ. of N. Y. at Syracuse
- MARZOLF, G. RICHARD**, Prof. of Biology (1962, 1973, 1975). AB 1957, Wittenberg Univ.; PhD 1962, Univ. of Mich (GF)
- MATHERNE, BEVERLY M.**, Asst. Prof. of English (1975). BA 1969, MA 1971, Univ. of Southwestern La.; PhD 1974, St. Louis Univ (GF)
- MATTHEWS, KAREN A.**, Asst. Prof. of Psychology (1976). BA 1968, Univ. of Calif., Berkeley, MA 1971, Calif. St. Univ., San Jose; PhD 1976, Univ. of Tex (GF)
- MAXFIELD, JOHN E.**, Prof. and Head of Department of Mathematics (1967). BS 1947, Mass. Inst. of Tech.; MS 1949, Univ. of Wis.; PhD 1951, Univ. of Ore (GF)
- MAXWELL, GEORGE WILLARD**, Asst. Prof. of Physics Emeritus (1927, 1960). AB 1912, MS 1920, Univ. of Mich
- MCCARTHY, PAUL E.**, Prof. of English (1967, 1975). BA 1948, MFA 1951, St. Univ. of Iowa, PhD 1962, Univ. of Tex (GF)
- MCCRACKEN, ELIZABETH UNGER**, Assoc. Prof. of Biology Emerita (1938, 1970). AB 1929, MA 1932, Wellesley Col.; PhD 1937, Univ. of Calif (GF)
- MCCULLOH, JOHN M.**, Asst. Prof. of History (1973). BA 1965, Kan. Univ.; MA 1966, PhD 1971, Univ. of Calif., Berkeley (GF)
- MCDONALD, RICHARD N.**, Prof. of Chemistry (1960, 1968). BS 1954, MS 1955, Wayne St. Univ.; PhD 1957, Univ. of Wash (GF)
- MCGHEE, RICHARD D.**, Assoc. Prof. and Head of English (1967). BA 1962, Univ. of Mo. at KC, MA 1964, PhD 1967, Univ. of Okla (GF)
- MCGRAW, BETTY R.**, Asst. Prof. of Modern Languages (1963, 1970). Licence es Lettres 1961, Universite de Paris
- MCGUIRE, JAMES H.**, Assoc. Prof. of Physics (1972, 1975). BS 1964, Rensselaer Polytechnic Inst.; MS 1966, PhD 1969, Northeastern Univ. (GF)
- MCKENNA, SISTER JEANNE**, Adjunct Prof. of History, (Marymount College) (1977). BA 1954, Loretto Heights Col.; PhD 1968, St. Louis Univ
- MCKINNEY, KATHERYN ANN**, Assoc. Prof. of Health, Phys. Ed. and Rec. (1946, 1972). BS 1934, Kan. St. Univ.; MA 1935, George Peabody Col. for Teachers (GF)
- MEAOE, JAMES H.**, Research Assoc. of Physics (1974). BS 1969, St. Anselm's Col.; MS 1974, PhD 1975, Univ. of Tex. at Dallas
- MELOAN, CLIFTON E.**, Prof. of Chemistry (1959, 1968). BS 1953, Iowa St. Univ.; PhD 1959, Purdue Univ (GF)
- MENDENHALL, BURNEY L.**, Asst. Prof. of Modern Languages (1965). BA 1950, Washburn Univ.; MS 1953, Kan. St. Teachers Col.; PhD 1964, Univ. of Kan (GF)
- MERRIMAN, JANICE E.**, Asst. Prof. of Health, Phys. Ed. and Rec. (1972). BS 1964, Douglas Col.; MS 1967, PED 1973, Ind. Univ.
- MERRIMAN, JOHN W.**, Asst. Prof. of Health, Phys. Ed. and Rec. (1968). BS 1957, Univ. of Kan.; MA 1967, EdD 1971, Univ. of Northern Colo. (GF)
- MILEY, JAMES D.**, Asst. Prof. of Sociology (1970). BA 1959, Millsaps Col.; MA 1963, La. St. Univ.; PhD 1970, Tulane Univ. (GF)
- MILLER, CAROL LYNN**, Asst. Prof. of Modern Languages (1968). BA 1958, MA 1959, Vanderbilt Univ.; PhD 1963, Washington Univ. (GF)
- MILLER, CECIL H.**, Prof. of Philosophy Emeritus (1945, 1972). AB 1930, Univ. of Kan.; MA 1939, Univ. of Calif (GF)
- MILLER, FORREST R.**, Assoc. Prof. of Mathematics (1968, 1975). BS 1962, Univ. of Okla.; MA 1965, PhD 1968, Univ. of Mass (GF)
- MILLER, MICHAEL H.**, Assoc. Dir. Computing Center, Asst. Prof. of Computer Science (1960, 1964). BS 1958, MS 1960, Iowa St. Univ
- MILLERET, MIRIAM H.**, Instr., Dean of Arts and Sciences (1967). BS 1947, Kan. St. Univ
- MILLIKEN, GEORGE A.**, Assoc. Prof. of Statistics, Consultant, Agr. Exp. Sta. (1969). BS 1965, MS 1968, PhD 1969, Colo. St. Univ (GF)
- MITCHELL, HOWARD LEE**, Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1946, 1961). BS 1938, Okla. St. Univ.; PhD 1946, Purdue Univ (GF)
- MITCHELL, JAMES C.**, Prof. of Psychology (1966). BS 1957, MA 1959, PhD 1962, Ohio St. Univ (GF)
- MDLINEUX, BARRY R.**, Instr. of Speech (1970). BS 1966, MA 1968, Kan. St. Univ
- MODRE, FRITZ**, Prof. of Modern Languages Emeritus (1934, 1971). AB 1927, Univ. of Akron; MA 1930, PhD 1932, Univ. of Ill. (GF)
- MORRIS, JIM R.**, Assoc. Prof. of Journalism and Mass Communications (1968). AA 1957, Kilgore Col.; BJourn 1959, Univ. of Tex.; MA 1964, Univ. of Ga.; EdD 1969, North Tex. St. Univ (GF)
- MOSER, HERBERT CHARLES**, Prof. of Chemistry (1957, 1967). BA 1952, San Jose St. Col.; PhD 1957, Iowa St. Univ (GF)
- MOSES, WILLIAM R.**, Prof. of English (1950, 1954). BA 1932, MA 1933, PhD 1939, Vanderbilt Univ (GF)
- MOSSMAN, THIRZA ADELINE**, Assoc. Prof. of Mathematics Emerita (1922, 1965). BA 1916, Univ. of Neb.; MA 1922, Univ. of Chicago (GF)
- MRDZEK, DONALD J.**, Asst. Prof. of History (1972, 1973). BA 1966, Georgetown Univ.; MA 1968, PhD 1972, Rutgers Univ (GF)
- MUELLER, DELBERT D.**, Assoc. Prof. of Biochemistry; Assoc. Biochemist, Agr. Exp. Sta. (1968, 1975). BS 1962, PhD 1966, Univ. of Okla (GF)
- MUENZENBERGER, TOM B.**, Asst. Prof. of Mathematics (1976). BS 1965, MS 1967, Univ. of Fla.; PhD 1972, Univ. of Wyo
- MUNCE, JAMES C.**, Asst. Prof. of Art (1972). BFA 1966, Minneapolis School of Art, MFA 1971, Ind. Univ (GF)
- MUNRO, DONALD FARNHAM**, Assoc. Prof. of Modern Languages Emeritus (1940). BS 1926, MA 1927, Acadia Univ. (Canada), PhD 1933, Univ. of Ill (GF)
- MURPHY, DOUGLAS G.**, Asst. Prof. of Biology (1976). AB 1967, Univ. of Rochester, MS 1969, Syracuse Univ.; PhD 1975, Univ. of Penn (GF)
- NAFZIGER, ESTEL WAYNE**, Assoc. Prof. of Economics (1966, 1973). BA 1960, Goshen Col.; MA 1962, Univ. of Mich.; PhD 1967, Univ. of Ill (GF)
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- NEWCOMB, MARGARET ALICE**, Assoc. Prof. of Biology Emerita (1925, 1970). BS 1925, MS 1927, Kan. St. Univ (GF)
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- NOBLE, M. LARRY**, Asst. Prof. of Health, Phys. Ed. and Recreation (1972). BS 1966, Eastern Ky. Univ.; MA 1968, Univ. of Md.; PhD 1970, Univ. of Tex (GF)
- NOBLETT, DUANE P.**, Asst. Prof. of Art (1973). BFA 1966, Minneapolis Col. of Art and Design, MA 1970, MFA 1972, Univ. of Iowa
- NOONAN, JOHN P.**, Assoc. Dean of Graduate School, Prof. of English (1947, 1966, 1975). BS 1947, Rockhurst Col.; MS 1950, Kan. St. Univ.; PhD 1955, Denver Univ (GF)
- NORDIN, JOHN A.**, Prof. of Economics (1961). BA 1935, MA 1937, PhD 1941, Univ. of Minn (GF)
- NORDIN, PHILIP**, Prof. of Biochemistry, Biochemist, Agr. Exp. Sta. (1954, 1969). BS 1949, MS 1950, Univ. of Saskatchewan (Canada), PhD 1953, Iowa St. Univ (GF)
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- OLSON, EDWIN G.**, Asst. Prof. of Economics (1969). BA 1956, MA 1960, Univ. of Calif.; PhD 1971, Univ. of Wash (GF)
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- PAOY, STUART MCGREGOR**, Prof. of Biology Emeritus, Mycologist, Agr. Exp. Sta. (1945, 1952, 1973). AB 1928, MA 1929, McMaster Univ.; PhD 1933, Univ. of Toronto (GF)
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- RIGGS, HAZEL M.**, Assoc. Prof. of History Emerita (1945-1952) AB 1920, MA 1923, Univ. of Kan. (GF)
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- ROCHAT, ELEANOR S.**, Instr. of English (1974) BS 1947, Eastern Ill. Univ.
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- ROGERSON, BREWSTER**, Prof. of English (1953-1967), AB 1941, Univ. of N.C.; PhD 1946, Princeton Univ. (GF)
- ROHLES, FREDERICK H.**, Prof. of Psychology (1963-1966) BS 1942, Roosevelt Univ.; MA 1950, PhD 1956, Univ. of Tex. (GF)
- ROHRER, WAYNE C.**, Prof. of Sociology, Rural Sociologist, Agr. Exp. Sta. (1959-1965) BS 1946, MS 1948, Tex. A & M Col.; PhD 1955, Mich. St. Univ. (GF)
- ROSASCO, GREG**, Adjunct Prof. of Chemistry (Physicist), BS 1964, Univ. of Scranton, MA 1966, PhD 1970, Fordham Univ.
- ROSENKILDE, CARL EDWARD**, Assoc. Prof. of Physics (1970-1975), BS 1959, Wash. St. Univ.; MS 1960, PhD 1966, Univ. of Chicago. (GF)
- ROUFA, DONALD J.**, Assoc. Prof. of Biology (1975), AB 1965, Amherst Col.; PhD 1970, The Johns Hopkins Univ.
- RUBISON, R. MICHAEL**, Asst. Prof. of Statistics, Consultant, Agr. Exp. Sta. (1976), BS 1970, Quincy Col.; MS 1971, Southern Ill. Univ.; MA 1974, PhD 1976, Ind. Univ. (GF)
- RULIFFSON, WILLARD S.**, Prof. of Biochemistry Biochemist, Agr. Exp. Sta. (1953-1968), BS 1940, Buena Vista Col.; PhD 1953, Univ. of Iowa (GF)
- SAAL, FRANK E.**, Asst. Prof. of Psychology (1957), BA 1968, Univ. of Rochester; MS 1973, Rensselaer Poly. Inst.; PhD 1976, Penn. St. Univ. (GF)
- SAGESER, ADELBERT BOWER**, Prof. of History Emeritus (1938-1941-1973), AB 1925, Neb. St. Teachers Col. (Wayne); MA 1930, PhD 1934, Univ. of Neb. (GF)
- SAMELSON, FRANZ**, Prof. of Psychology (1957), Diploma in Psychology 1952, Univ. of Munich (Germany), PhD 1956, Univ. of Mich. (GF)
- SAMLSON, PHOEBE**, Instr., Dean of Arts and Sciences (1968) BA 1950, Bates; MN 1953, Yale.
- SCALES, MARGARET B.**, Adjunct Clinical Assoc. of Med. Tech. (1976) AB 1946, Barnard Col.; MA 1947, PhD 1955, Columbia Univ.; MO 1960, Univ. of N.C.
- SCHEER, RICHARD K.**, Assoc. Prof. of Philosophy (1968) AB 1950, Univ. of Neb.; MA 1951, Univ. of Fla.; PhD 1958, Univ. of Neb. (GF)
- SCHIEVEL, ULRICH W.**, Research Assoc. of Physics (1976) BS 1967, Gynasium Alfenkirchen, Germany, MS 1972, PhD 1975, Univ. of Giessen, Germany
- SCHMIEDEKAMP, ANN M.**, Research Assoc. of Physics (1976) BS 1970, PhD 1976, Univ. of Tex.
- SCHMIEDEKAMP, CARL W.**, Research Assoc. of Physics (1976) BS 1970, PhD 1975, Univ. of Tex.
- SCHMIDT, TERESA TEMPERO**, Asst. Prof. of Art (1972-1976) BA 1963, MA 1971, Central Wash. St. Coll.; MFA 1972, Wash. St. Univ.
- SCHNEIDER, HAROLD WILLIAM**, Asst. Prof. of English (1961-1969), BA 1950, Univ. of Minn.
- SCHNEIDER, MARY WILLIS**, Asst. Prof. of English (1964-1968) BA 1949, MA 1952, St. Univ. of Iowa; PhD 1964, Univ. of Minn. (GF)
- SCHNUR, ALFRED C.**, Prof. of Sociology (1970) BA 1941, Univ. of Pittsburgh, PhD 1944, PhD 1949, Univ. of Wis. (GF)
- SCHRENK, WILLIAM G.**, Prof. of Chemistry Emeritus (1938-1951-1975), AB 1932, Westmar Col.; MS 1936, PhD 1945, Kan. St. Univ. (GF)
- SCHWAB, CHARLES M., JR.**, Instr. in Aerospace Studies (1972).
- SEAMAN, GREGORY**, Assoc. Prof. of Physics (1968-1969) BA 1958, Col. of Wooster, MS 1960, PhD 1965, Yale Univ. (GF)
- SELF, HUBER**, Assoc. Prof. of Geography (1947-1953-1975), BS 1941, Central Okla. St. Col.; MS 1947, Okla. St. Univ. (GF)
- SETHNA, PROCHY P.**, Research Assoc. of Physics (1975), BS 1960, Bombay Univ.; MS 1972, PhD 1975, Kan. St. Univ.
- SETSER, DONALD W.**, Prof. of Chemistry (1963-1970) BS 1956, MS 1958, Kan. St. Univ.; PhD 1961 Univ. of Wash. (GF)
- SEYLER, H. L.**, Asst. Prof. of Geography (1970) BA 1963, MA 1967, Kan. St. Univ.; PhD 1971, Ind. Univ.
- SHANLINE, RIX O.**, Asst. Prof. of Social Work (1969) BS 1951, MSW 1953, Univ. of Kan.
- SHANTEAU, JAMES C.**, Assoc. Prof. of Psychology (1971-1975) BA 1966, San Jose St. Col.; PhD 1970, Univ. of Calif., San Diego (GF)
- SHAPIRO, LINDA G.**, Asst. Prof. of Computer Science (1974) BS 1970, Univ. of Ill. at Urbana, Champaign MS 1972, PhD 1974, Univ. of Iowa (GF)
- SHAVER, HAROLD C.**, Asst. Prof. of Journalism (1972) BA 1960, Muskingum Col.; MS 1963, PhD 1976, Syracuse Univ.
- SHAW, BRADLEY A.**, Asst. Prof. of Modern Languages (1974) BA 1968, Lewis & Clark Col.; MA 1969, Northwestern Univ.; PhD 1974, Univ. of N.M. (GF)
- SHELTON, LEWIS E.**, Asst. Prof. of Speech (1973) BA 1963, Taylor Univ.; MA 1965, Ind. Univ.; MA 1968, PhD 1971, Univ. of Wis.
- SHELTON, LYNN M.**, Asst. Prof. of Speech (1973) BS 1966, N.Y. Univ.; MA 1968, PhD 1973 Univ. of Wis.
- SHENKEL, CLAUDE WESLEY, JR.**, Prof. of Geology (1949-1958) BS 1941, Kan. St. Univ.; MS 1947, PhD 1952, Univ. of Colo. (GF)
- SHULL, PAUL**, Assoc. Prof. of Music (1960) BME 1950, MME 1951, Univ. of Colo.; OMA 1966, Eastman School of Music (Univ. of Rochester) (GF)
- SHULT, ERNEST E.**, Distinguished Regents Prof. (1974) BA 1958, MA 1961, Southern Ill. Univ.; PhD 1964, Univ. of Ill. (GF)
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- SILKER, RALPH**, Prof. of Chemistry Emeritus (1941-1970) BA 1927, Univ. of Dubuque MS 1931, PhD 1934, St. Univ. of Iowa (GF)
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- SIOTANI, MINORU**, Prof. of Statistics (1971) BA 1950, Univ. of Tokyo, DSc 1962, Kyushu Univ. (GF)
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- SLOAT, FLOYD B.**, Assoc. Prof. of Mathematics (1946-1966) BA 1938, Duachita Col.; MA 1941, Univ. of Ark.
- SLOOP, JEAN C.**, Assoc. Prof. of Music (1959-1975) BA 1953, Gettysburg Col.; MA 1956, OMA 1974, Eastman School of Music (Univ. of Rochester) (GF)
- SMITH, ANN S.**, Instr. of Biology (1970) BS 1958, Augustana Col.; MS 1960, Univ. of Colo.
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**WAGNER, G. JACK**, Instr. of Aerospace Studies (1972)

**WALKER, MARGARET Y.**, Instr. of Music (1971). BM 1970, Kan. St. Univ.; MM 1974, Tex. Christian Univ.

**WALKER, RODNEY G.**, Asst. Prof. of Music (1966). BME 1959, Univ. of Neb.; MME 1961, Wichita St. Univ. (GF)

**WALKER, WARREN VINCENT**, Prof. of Music (1948, 1959). BA 1946, Univ. of Wash.; MM 1948, Cincinnati Conservatory of Music. (GF)

**WALLENTINE, VIRGIL E.**, Assoc. Prof. of Computer Science (1972). BS 1965, MS 1970, PhD 1972, Iowa St. Univ. (GF)

**WALTERS, CHARLES P.**, Prof. of Geology (1936, 1972). BS 1936, MS 1937, Kan. St. Univ.; PhD 1957, Cornell Univ. (GF)

**WARREN, LELAND E.**, Asst. Prof. of English (1976). BA 1966, Emory Univ.; MA 1968, Univ. of Georgia, PhD 1976, Univ. of Ill.

**WAUTHIER, RAYMOND AUGUST**, Assoc. Prof. of Health, Phys. Ed. and Rec. (1949). BS 1945, Albion Col.; MS 1947, Drake Univ. (GF)

**WEAVER, OLIVER LAURENCE**, Assoc. Prof. of Physics (1970, 1975). BS 1965, Calif. Inst. of Tech.; PhD 1970, Duke Univ. (GF)

**WEIS, JERRY S.**, Assoc. Prof. of Biology, Plant Physiologist, Agr. Exp. Sta. (1966, 1972). AB 1958, Kan. Wesleyan Univ.; MA 1960, PhD 1964, Univ. of Kan. (GF)

**WEISENBURGER, PATRICIA A.**, Instr. of English (1975). BA 1956, MA 1959, Univ. of Ill.

**WEST, RONALD R.**, Assoc. Prof. of Geology (1969, 1974). AA 1955, Centralia Jr. Col.; BS 1958, Univ. of Mo. at Rolla, MS 1962, Univ. of Kan.; PhD 1970, Univ. of Okla. (GF)

**WEYERTS, ALFRED C.**, Instr. of Chemistry (1963). BS 1948, Denver Univ.

**WHITE, ALFREDO EVERETT**, Prof. of Mathematics Emeritus (1909, 1950). BS 1904, MS 1909, Purdue Univ. (GF)

**WHITE, CHAPPELL**, Prof. of Music (1974). BA 1940, Emory Univ.; BM 1947, Westminster Choir Col.; PhD 1957, Princeton Univ. (GF)

**WHITE, MARY FRANCES**, Assoc. Prof. of English (1947, 1966). BS 1928, MS 1930, Kan. St. Univ.; PhD 1955, Denver Univ. (GF)

**WHITE, STEPHEN E.**, Asst. Prof. of Geography (1975). BA 1969, MA 1972, PhD 1974, Univ. of Ky. (GF)

**WHITTEMORE, DONALD O.**, Asst. Prof. of Geology (1972). BS 1966, Univ. of N. H.; PhD 1972, Pa. St. Univ. (GF)

**WIENER-AVNEAR, ELIEZER**, Prof. of Physics (visiting) (1976). MS 1961, The Hebrew Univ.; PhD 1966, The Weizmann Inst. of Sci.

**WILCOXON, GEORGE DENT**, Prof. of History (1946, 1948). AB 1936, MA 1938, PhD 1941, Univ. of Calif. at Los Angeles. (GF)

**WILLIAMS, DUDLEY**, Distinguished Regents Prof. of Physics (1964). AB 1933, MA 1934, PhD 1936, Univ. of N. C. (GF)

**WILLIAMS, HELEN**, Asst. Prof. of English (1974). AB 1961, Bard Col.; MA 1965, Ohio St. Univ.; PhD 1973, Univ. of Denver.

**WILLIAMS, LARRY G.**, Asst. Prof. of Biology (1970). BS 1961, MS 1963, Univ. of Neb.; PhD 1968, Calif. Inst. of Tech. (GF)

**WILLIAMS, ROBERT E.**, Asst. Prof. of Mathematics (1965). BS 1959, MA 1961, PhD 1965, Univ. of Mo. (GF)

**WILLIAMS, TIMOTHY ALDEN**, Assoc. Prof. of Political Science (1967). AB 1954, Davidson Col.; PhD 1964, Univ. of N. C. (GF)

**WILSON, FRED E.**, Assoc. Prof. of Biology, Physiologist, Agr. Exp. Sta. (1965). AB 1958, MA 1960, Univ. of Kan.; PhD 1965, Wash. St. Univ. (GF)

**WIMMER, EDWARD JOSEPH**, Prof. of Biology Emeritus (1928, 1971). AB 1925, MA 1927, PhD 1928, Univ. of Wis. (GF)

**WINEGARDNER, CARROLL**, Asst. Prof. of Art (1966, 1972). BFA 1960, Kan. City Art Inst.; MFA 1963, Univ. of Okla.

**WLOOT, GRACE S.**, Instr. of Mathematics Emerita (1946). AB 1927, Ohio Wesleyan Univ.

**WONG, PETER P.**, Asst. Prof. of Biology (1976). BS 1966, Calif. St. Univ.; BA 1967, PhD 1971, Oregon St. Univ. (GF)

**WOODWARD, GARY L.**, Asst. Prof. of Art (1971, 1972). AB 1961, Northern Colo. Univ.; MA 1964, Univ. of Iowa, MFA 1969, Univ. of Wash.

**YEE, KANE**, Prof. of Mathematics (1968, 1973). BS 1957, MS 1958, PhD 1963, Univ. of Calif. at Berkeley. (GF)

**YOUNG, PAUL M.**, Prof. of Mathematics, Vice President for Univ. Development (1970). AB 1937, Miami Univ.; MA 1939, PhD 1941, Ohio St. Univ. (GF)

**ZIMMERMAN, JOHN L.**, Assoc. Prof. of Biology (1963, 1968). BS 1953, MS 1958, Mich. St. Univ.; PhD 1963, Univ. of Ill. (GF)

**ZUTI, WILLIAM B.**, Asst. Prof. of Health, Phys. Ed. and Rec. (1972). BS 1965, Slippery Rock St. Col.; MA 1971, PhD 1972, Kent St. Univ. (GF)

## College of Business Administration

**BARTON-DOBENIN, JOSEPH**, Prof. of Business Administration (1958, 1972). BS 1956, MA 1958, PhD 1966, Univ. of Neb. (GF)

**BROWN, THOMAS L.**, Assoc. Prof. of Business Administration (1972, 1976). BS 1966, MBA 1968, PhD 1972, Okla. St. Univ. (GF)

**BUZENBERG, MILORED E.**, Asst. Prof. of Business Administration (1964, 1968). BA 1938, Mich. St. Univ.; MS 1951, Kan. St. Univ.

**CALOWELL, CHARLES W.**, Asst. Prof. of Business Administration (1976). BS 1966, MBA 1972, Univ. of Tenn.

**CASTRO, CONSTANZA**, Instr. in Business Administration (1976). BS 1975, Univ. of Ore.; MBA 1976, Kan. St. Univ.

**CLARK, WILLIAM J.**, Prof. of Business Administration Emeritus (1946, 1961). BS 1929, Kan. St. Teachers Col. (Pittsburg), MA 1940, St. Univ. of Iowa, CPA 1954, Kansas. (GF)

**CLEMENT, BETTYE K.**, Instr. of Business Administration (1974, 1976). BS 1971, Austin Peay St. Univ.

**COLEMAN, RAYMOND J.**, Prof. of Business Administration (1965, 1969). BS 1948, Univ. of Kan.; MA 1963, Central Mo. St. Col.; PhD 1967, Univ. of Ark. (GF)

**DOERING, MILOREO**, Asst. Prof. of Business Administration (1974). BS 1965, Univ. of Minn.

**ERIKSEN, CONRAO J. K.**, Assoc. Prof. of Business Administration Emeritus (1946, 1947). BA 1929, Univ. of Kan.; MBA 1931, Harvard Univ.

**FOX, KENNETH L.**, Prof. of Business Administration (1969). BA 1953, MA 1960, Baylor Univ.; CPA 1958, Texas, Louisiana, and Kansas, CPA 1971, Kansas, PhD 1966, Univ. of Ill. (GF)

**GENTRY, JAMES**, Asst. Prof. of Business Administration (1973). BS 1969, Kan. St. Univ.; MBA 1971, DBA 1973, Ind. Univ. (GF)

**GINN, MARY LEA**, Instr. in Business Administration (1973). BS 1969, MEd 1972, Univ. of Ark.

**GRAHAM, JOHN**, Assoc. Dean; Assoc. Prof. of Business Administration (1970). BA 1967, Kan. St. Univ.; MBA 1968, PhD 1970, Univ. of Ark. (GF)

**GROTHER, ELAINE M.**, Instr. in Business Administration (1976). BS 1972, Kan. St. Col.; Pittsburg, MBA 1975, Kan. St. Univ.

**GUDGELL, DOROTHY B.**, Asst. Prof. of Business Administration Emeritus (1943, 1954, 1976). BS 1938, MS 1946, Kan. St. Univ.



- GUGLER, MERLE E.**, Assoc. Prof. of Business Administration (1947, 1959). BS 1940, Kan. St. Teachers Col. (Emporia); MS 1948, Kan. St. Univ.; CPA 1956, Kansas (GF)
- HOLLINGER, ROBERT D.**, Asst. Prof. of Business Administration (1966). BS 1964, MS 1968, PhD 1973, Kan. St. Univ.
- JONES, C. CLYDE**, Prof. of Business Administration (1960). AB 1944, Marshall Univ.; MA 1950, PhD 1954, Northwestern Univ. (GF)
- LAUGHLIN, EUGENE J.**, Prof. of Business Administration (1955, 1970). BS 1951, Rockhurst Col.; MS 1959, Kan. St. Univ.; CPA 1960, Kan.; PhD 1965, Univ. of Ill. (GF)
- LYNN, ROBERT A.**, Dean, Prof. of Business Administration (1968). BS 1951, Maryville Col.; MS 1955, Univ. of Tenn.; PhD 1958, Univ. of Ill. (GF)
- MCCARTY, NAOMI J.**, Asst. Prof. of Business Administration (1977). BA 1967, Kan. St. Col. of Pittsburg; MBA 1972, PhD 1974, Univ. of Ark.
- MILLER, JAMES J.**, Asst. Prof. of Business Administration (1973). BS 1964, MS 1965, Univ. of N.O.
- MULANAX, ALVIN E.**, Assoc. Prof. of Business Administration (1947, 1966). BS 1946, MS 1951, Kan. St. Univ. (GF)
- NORVELL, WAYNE**, Asst. Prof. of Business Administration (1974). BS 1964, Ark. Polytechnic Col.; MBA 1965, Univ. of Ark.; DBA 1973, Miss. St. Univ. (GF)
- O'BRIEN, TERENCE V.**, Prof. of Business Administration (1976). AB 1963, Univ. of Calif. at Berkeley; MBA 1966, Calif. St. Univ. at Long Beach; PhD 1969, Columbia Univ. (GF)
- POHLMAN, RANDOLPH A.**, Asst. Prof. of Business Administration (1976). BS 1967, MS 1969, Kan. St. Univ.; PhD 1976, Okla. St. Univ.
- RAPP, CHARLES W.**, Asst. Prof. of Business Administration Emeritus (1955, 1968). BS 1931, MS 1946, Kan. St. Teachers Col. (Emporia).
- REUTZEL, EDWARD**, Asst. Prof. of Business Administration (1974). BS 1967, Carnegie-Mellon Univ.; MBA 1973, Pa. St. Univ.
- RICHARDS, VERLYN D.**, Prof. of Business Administration (1965, 1975). BS 1956, MS 1960, Kan. St. Univ.; CPA 1961, Kansas; PhD 1967, Univ. of Ill.
- RILEY, MERRILL J.**, Asst. Prof. of Business Administration (1966). BS 1951, John Brown Univ.; MBA 1955, Univ. of Ark.
- STARK, MARUICE E.**, Assoc. Prof. of Business Administration (1976). BS 1959, MS 1966, Kan. St. Univ.; PhD 1972, Univ. of Mo.
- STEWART, KAY C.**, Asst. to Dean, Instr. in Business Administration (1972). BS 1966, W. Va. Inst. of Tech.; MS 1971, Ft. Hays St. Col.
- STOCKARD, JANE B.**, Instr. in Business Administration (1971). BS 1969, MS 1971, Kan. St. Univ.; CPA 1971, Kansas.
- STOUT, CECIL E.**, Instr. in Business Administration (1976). BS 1970, MBA 1976, Kan. St. Univ.
- STREIT, IRVA KAY**, Instr. in Business Administration (1973). BS 1969, MS 1973, Kan. St. Univ.
- THIESSEN, EMIL A.**, Assoc. Prof. of Business Administration (1968). AB 1948, Tabor Col.; MS 1951, Kan. St. Teachers Col. (Emporia); EdD 1959, Colo. St. Col.
- VADEN, RICHARD E.**, Assoc. Prof. of Business Administration (1969, 1973). BBA 1960, The Univ. of Tex. at Austin; MBA 1965, DBA 1970, Tex. Tech. Univ. (GF)
- WINKLER, ALBERT L.**, Assoc. Prof. of Business Administration (1976). BA 1967, MA 1968, PhD 1970, Kan. St. Univ.

## College of Education

- ALBRACHT, JAMES J.**, Assoc. Prof. (1966, 1970). BS 1948, MS 1954, Univ. of Neb.; PhD 1966, Mich. St. Univ. (GF)
- ALEXANDER, LOREN R.**, Asst. Prof. of Education and Modern Languages (1972). BM 1951, Southwestern Col.; MA 1954, Colo. St. Col. of Education; MA 1965, PhD 1972, Mich. St. Univ.
- APPEL, J. DALE**, Prof., Assoc. State Club Leader (1962, 1967). BS 1950, Kan. St. Univ.; MS 1961, The American Univ.; PhD 1966, Univ. of Chicago (GF)
- BAILEY, GERALD D.**, Assoc. Prof. (1972, 1976). BS 1966, MEd 1969, EdD 1972, Univ. of Neb. (GF)
- BAKER, HARRY LEIGH**, Prof. of Education Emeritus (1946, 1963). AB 1920, LLD 1951, Baker Univ.; BS 1922, Kan. St. Univ.; AM 1928, Univ. of Chicago; PhD 1934, Yale Univ. (GF)
- BARTEL, ROY A.**, Assoc. Prof. and Coordinator of Field Experiences (1963, 1970). AB 1942, Bethel Col.; MSE 1949, EdD 1959, Univ. of Kan. (GF)
- BLOOMQUIST, MARGARET CHRISTINE**, Dir. of Student Personnel Services and Instr. (1967). AB 1941, Bethany Col.; MBA 1949, Univ. of Denver.
- BOWERS, ELLEN M.**, Asst. Prof. and Coordinator, Graduate Student Personnel Services (1976). BS 1951, MS 1966, Ind. Univ.; EdD 1976, Okla. St. Univ.
- BOYER, JAMES BUCHANAN**, Prof. (1971, 1975). BS 1956, Bethune-Cookman Col., Fla.; MEd 1964, Fla. A & M Univ.; PhD 1969, Ohio St. Univ. (GF)
- BRAOLEY, FRED O.**, Assoc. Prof. (1972, 1976). BA 1962, Colo. St. Col.; MEd 1970, PhD 1972, Univ. of Wyo. (GF)
- BRAOLEY, HOWARD RALEY**, Prof. Emeritus (1951, 1963). BS 1930, MS 1937, Kan. St. Univ. (GF)
- BYARS, JACKSON A.**, Asst. Prof. (1969). BA 1959, Municipal Univ. of Omaha; MA 1964, Colo. St. Col.; PhD 1970, Univ. of Neb. (GF)
- CAINE, HOMER O.**, Asst. Prof. of Education and Music (1966). BM 1940, Orake Univ.; MS 1957, Kan. St. Univ. (GF)
- CALVANO, MICHAEL A.**, Asst. Prof. (1972). BS 1968, Georgetown Univ.; MS 1970, Univ. of Bridgeport (Conn.); PhD 1973, Southern Ill. Univ. (GF)
- CARPENTER, FRANK R.**, Asst. Dean, Col. of Agriculture and Assoc. Prof. (1961, 1969). BS 1948, MS 1951, Kan. St. Univ.; PhD 1967, Univ. of Mo. (GF)
- CRAIG, M. DOROTHY**, Asst. Prof. of Education Emerita (1959, 1973). BS 1931, Bethany Col.; BS 1941, Kan. St. Teachers Col. (Emporia); MA 1944, Columbia Univ.
- DANSKIN, DAVID G.**, Prof. of Psychology and Education, Center for Student Development (1959, 1966, 1968). AB 1950, Univ. of Redlands; MA 1951, PhD 1954, Ohio St. Univ. (GF)
- DE CHENNE, JAMES A.**, Asst. Prof. (1976). BS 1970, MS 1971, Southern Ill. Univ.; EdD 1976, Va. Polytechnic Inst. & St. Univ.
- DE MAND, JOHN WESLEY**, Prof. (1940, 1959). AB 1937, Univ. of Kan.; MS 1940, Kan. St. Univ.; EdD 1953, Univ. of Colo. (GF)
- DIXON, LYLE**, Prof. of Mathematics (1963, 1969). BS 1948, MS 1950, Okla. St. Univ.; PhD 1963, Univ. of Kan. (GF)
- DOTTS, WAYNE**, Asst. Prof. (1975). BS 1965, MA 1966, N. Ariz. Univ.; PhD 1972, Univ. of Ore. (GF)
- DYCK, NORMA J.**, Asst. Prof. (1976). BA 1957, Bethany Col.; MS 1970, EdD 1972, Univ. of Kan.
- EAVES, THOMAS A.**, Asst. Prof. (1976). BS 1967, MS 1970, EdD 1976, N.C. St. Univ.
- FIELD, RALPH G.**, Prof. (1972, 1976). BS 1950, MS 1966, Kan. St. Univ.; PhD 1970, Purdue Univ. (GF)
- GOODENOW, PHILLIP E.**, Asst. Instr. (1967). BA 1953, Kan. Wesleyan (Salina).
- GOODYEAR, RODNEY K.**, Asst. Prof. (1976). AB 1969, Augustana Col.; EdM 1970, PhD 1972, Univ. of Ill. (GF)
- GREEN, FINIS McGRADY**, Prof. of Education Emeritus (1948, 1967). BS 1922, Kan. St. Teachers Col. (Pittsburg); MS 1929, Univ. of Kan.; EdD 1949, Univ. of Colo. (GF)
- GREEN, GARY**, Asst. Prof. (1975). BS 1966, Southwestern Okla. St. Univ.; MS 1972, Univ. of Mo.; EdD 1974, Okla. St. Univ.
- GRIFFITH, MARY EVAN**, Assoc. Prof. (1969). BS 1950, Kan. St. Univ.; MS 1957, Iowa St. Univ.; PhD 1966, Ohio St. Univ.
- HALL, LAWRENCE FENOR**, Assoc. Prof. of Education Emeritus (1926, 1966). BS 1923, MS 1927, Kan. St. Univ. (GF)
- HANNA, GERALD**, Prof. (1967, 1972, 1976). AB 1956, MA 1959, Long Beach St. Col.; EdD 1965, Univ. of Southern Calif. (GF)
- HARRIS, MARY M.**, Asst. Prof. (1974). AB 1967, Goucher Col., Md.; EdM 1969, Shippensburg St. Col., Pa.; PhD 1975, Univ. of Pittsburgh. (GF)
- HAUSE, RICHARD G.**, Prof. (1966, 1970, 1975). AB 1954, MA 1955, Colo. St. Col.; EdD 1966, Univ. of Colo. (GF)
- HAUSMANN, EVELYN L.**, Assoc. Prof. (1976). BS 1961, Lindenwood Col.; MEd 1965, St. Louis Univ.; PhD 1976, Univ. of Mo.
- HAZLETT, EMERSON L.**, Asst. Prof. of Economics and Commerce (1969). BS 1948, MS 1964, Univ. of Kan.; PhD 1973, Kan. St. Univ.
- HEERMAN, CHARLES**, Asst. Prof. (1975). BA 1966, MS 1970, EdD 1974, Okla. St. Univ. (GF)
- HERSHEY, MYRLISS A.**, Asst. Prof. (1976). BS 1951, Tabor Col.; MS 1965, Kan. St. Teachers Col.
- HEWITT, THOMAS W.**, Asst. Prof. (1974). BA 1960, MA 1966, W. Mich. Univ.; EdD 1971, Univ. of Houston.
- HOLEN, MICHAEL C.**, Assoc. Prof. and Head, Dept. of Administration and Foundations (1971, 1975, 1976). BA 1967, Stanford Univ.; MA 1968, PhD 1971, Univ. of Ore. (GF)
- HOYT, DONALD P.**, Dir. of Office of Educational Research and Prof. (1968). BS 1948, Univ. of Ill.; MA 1950, PhD 1954, Univ. of Minn. (GF)
- JAMES, ROBERT K.**, Prof. (1969, 1973, 1976). BS 1959, Northwest Mo. St.; MA 1962, Univ. of Northern Iowa; PhD 1969, Univ. of Iowa (GF)
- JOHNSON, ROBERT L.**, Prof. and State Leader, Extension Staff and Program Development (1965). BS 1951, Univ. of Neb.; MS 1956, PhD 1958, Univ. of Wis. (GF)
- JONES, EDWARD E.**, Asst. Prof. (1974). BA 1969, MS 1970, Wichita St. Univ.; EdD 1974, Okla. St. Univ. (GF)
- JORNS, WILLIAM J.**, Asst. Prof. and Coordinator, Extension Staff Development (1971). BS 1954, MS 1960, Kan. St. Univ.; EdD 1971, N.C. St. Univ. (GF)
- KAISER, HERBERT EMIL**, Assoc. Prof. (1961, 1969). BS 1941, Concordia Teachers Col.; MS 1943, Okla. St. Univ.; PhD 1959, Univ. of Neb. (GF)
- KATER, CLIFFORD**, Instr. (1975). BA 1958, Southwestern Col., Winfield; MS 1975, Kan. St. Univ.
- KEYS, SAMUEL R.**, Prof. (1969). AB 1948, Olivet Col., Kankakee, Ill.; MA 1949, Univ. of Mo., Kansas City; PhD 1959, Univ. of Minn. (GF)
- KURTZ, VERNON RAY**, Prof. (1970, 1971, 1976). BS 1955, MS 1959, Ft. Hays Kan. St. Col.; EdD 1967, Univ. of Neb. (GF)
- LITTELL, J. HARVEY**, Prof. (1954, 1966). BA 1935, Iowa St. Teachers Col.; MA 1939, St. Univ. of Iowa; EdD 1950, Univ. of Mo. (GF)
- LITZ, CHARLES E.**, Assoc. Prof. (1971, 1975). BA 1963, Ohio Univ.; MA 1967, PhD 1970, Univ. of Mich. (GF)
- LOEB, JOE HENRY**, Asst. Prof. (1956). BA 1948, Northeastern St. Col.; MS 1951, Kan. St. Teach. Col. (Pittsburg); EdD 1957, Univ. of Ark. (GF)
- LYNCH, MICHAEL L.**, Asst. Prof., Center for Student Development (1972). BS 1967, MS 1968, EdD 1972, Ind. Univ.
- MAERTENS, NORBERT W.**, Prof. and Head, Department of Curriculum and Instruction (1974). BS 1958, Mankato St. Col.; MA 1960, PhD 1967, Univ. of Minn. (GF)
- MARTIN, WILLIAM**, Asst. Prof. (1975). BA 1966, Hobart Col.; MA 1967, Columbia Univ.; PhD 1975, Mich. St. Univ.
- McANARNEY, HARRY EDWARD**, Assoc. Prof. (1957, 1966). BS 1943, Kan. St. Teachers Col. (Emporia); MS 1947, EdD 1958, Univ. of Kan. (GF)
- McCain, JAMES ALLEN**, President Emeritus (1950). Prof. of Higher Education (1970). AB 1926, LLO 1951, Wofford Col.; MA 1929, Duke Univ.; EdD 1948, Stanford Univ.; LLO 1965, Mont. St. Univ.; LLO 1965, Colo. St. Univ.; DSc 1967, Andhra Pradesh St. Univ. (India). (GF)
- McILVAINE, JOSEPH**, Asst. Prof. (1970). BS 1961, Pa. St. Univ.; MSH 1967, Central Mo. St. Univ.; PhD 1970, Ohio Univ. (GF)
- McKINNEY, KATHERYN ANN**, Assoc. Prof. of Health, Phys. Ed. and Recreation (1946, 1972). BS 1934, Kan. St. Univ.; MA 1935, George Peabody Col. for Teachers.
- MEISNER, ROBERT G.**, Prof. and Head, Department of Adult and Occupational Education (1969, 1972). BS 1948, Okla. A & M Col.; MS 1957, Okla. St. Univ.; EdD 1967, Univ. of Calif., Berkeley. (GF)
- MOGGIE, MAURICE CHARLES**, Prof. of Education Emeritus (1930, 1945, 1973). BS 1929, MS 1931, Kan. St. Univ.; PhD 1941, Ohio St. Univ. (GF)
- NEELY, MARGERY A.**, Assoc. Prof. (1974). AB 1955, Southwest Mo. St. Univ.; MEd 1968, PhD 1971, Univ. of Mo., Columbia (GF)
- NELSON, WILLARD J.**, Instr. (1971). AA 1952, Luther Jr. Col.; BA 1954, Bethany Col.
- NEWHOUSE, ROBERT C.**, Assoc. Prof. (1972, 1976). BS 1967, MA 1969, Western Mich. Univ.; PhD 1972, Univ. of Ore.
- NOLTING, EARL**, Assoc. Prof. of Education and Dir., Center for Student Development (1974). BS 1959, MS 1961, Ind. Univ.; PhD 1967, Univ. of Minn. (GF)
- OAKLIEF, CHARLES R.**, Assoc. Prof. (1974). BS 1959, MS 1962, Ohio St. Univ.; PhD 1970, Wis. St. Univ. and Ohio St. Univ.



**OHLSSEN, ROBERT L.**, Assoc. Prof. (1976). BA 1952, Ottawa Univ.; ME 1957, Wichita Univ.; EdD 1963, Univ. of Kan.

**OLSON, GEORGE ARTHUR**, Prof. of Education Emeritus (1949, 1969). AB 1928, AM 1931, Univ. of Kan.; PhD 1953, Northwestern Univ. (GF)

**OWENS, RICHARD E.**, Prof. and Dir., Office of Educational Improvement and Innovation (1964, 1969, 1974). AB and BS 1949, Northwest Mo. St. Col.; MA 1953, EdD 1964, Univ. of Northern Colo. (GF)

**PARISH, THOMAS S.**, Assoc. Prof. (1976). BA 1968 Northern Ill. Univ.; MA 1969, Iff. St. Univ.; PhD 1972, Univ. of Ill. (GF)

**PARSONS, GERALD E.**, Prof. (1977). BS 1952, MS 1959, PhD 1970 Iowa St. Univ.

**PERL, MICHAEL F.**, Asst. Prof. (1976). BA 1966, St. Mary's Col. (Minn.); MS 1970, Winona St. Col. (Minn.); PhD 1976, Univ. of S.C.

**POWELL, MERTON E.**, Asst. Prof. (1976). BS 1949, Univ. of Mo.; MS 1965, Univ. of Wis.; EdD 1975, Montana Univ.

**PRAWL, WARREN L.**, Prof.; Extension Specialist, Staff Development (1952, 1969). BS 1954, Kan. St. Univ.; MS 1958, EdD 1962, Cornell Univ. (GF)

**PRICE, FLOYD HAMILTON**, Prof. and Asst. Head, Dept. of Curriculum and Instruction (1963, 1965, 1970, 1976). AB 1951, Friends Univ.; MEd 1957, Wichita St. Univ.; EdS 1960, George Peabody Col.; EdD 1965, Univ. of Okla. (GF)

**READENCE, JOHN E.**, Prof. (1976). BA 1969, Cleveland St. Univ.; MA 1971, Ohio St. Univ.; PhD 1975, Ariz. St. Univ. (GF)

**ROMERO, CHRISTIAN**, Asst. Prof. (1975). BS 1965, Col. of Santa Fe; MST 1970, N.M. Inst. of Tech.; EdD 1973, Okla. St. Univ.

**SCHELL, LEO M.**, Prof. (1966, 1969, 1973). AB 1955, Bethany Col.; MS 1962, Univ. of Kan.; PhD 1964, Univ. of Iowa. (GF)

**SCOTT, ROBERT**, Prof. (1970, 1973). AA 1951, Independence, Kan., Jr. Col.; BS 1953, MS 1956, Kan. St. Teachers Col.; EdD 1965, Univ. of Mo. (GF)

**SHERRARO, PETER**, Asst. Prof., Counseling Center (1973). BA 1961, Wheaton College; MDiv 1967, THM 1971, Princeton Theological Seminary; ED 1973, Univ. of Mass.

**SHOOP, ROBERT J.**, Asst. Prof. (1976). BA 1968, MDiv 1972, Wittenberg Univ.; PhD 1974, Univ. of Mich.

**SIMMONS, JAMES E.**, Asst. Prof. (1976). BS 1953, MS 1959, Okla. St. Univ.; PhD 1976, Univ. of Neb.

**SMETHERS, HOWARD OEWIGHT**, Asst. Prof. of Education Emeritus (1947, 1972). BS 1927, Kan. St. Teachers Col. (Emporia); MS 1935, Kan. St. Univ.

**SPARKMAN, WILLIAM**, Asst. Prof. (1975). BA 1969, MEd 1973, PhD 1975, Univ. of Fla. (GF)

**STANIUS, VIOA E.**, Asst. Dean and Asst. Prof. (1975). BA 1965, McMaster Univ.; MS 1969, Fla. St. Univ.; PhD 1975, Univ. of Wis., Madison.

**STEFFEN, JOHN D.**, Asst. Prof., Center for Student Development (1967). BA 1956, Hamline Univ.; PhD 1968, Univ. of Minn. (GF)

**STEWART, G. KENT**, Assoc. Prof. (1973, 1976). BS 1955, Ind. St. Univ.; MEd 1958, Univ. of Ill.; EdD 1964, Ind. Univ. (GF)

**SULLIVAN, RITA J.**, Asst. Prof. (1966, 1974). BS 1956, Kan. St. Teachers Col. (Pittsburg); MS 1964, EdD 1974, Univ. of Kan.

**TEAGUE, FRED A.**, Assoc. Prof. (1966, 1972). BS 1959, Central St. Col., Edmond, Okla.; EdM 1963, EdD 1966, Univ. of Okla. (GF)

**TERRASS, JOYCE J.**, Assoc. Prof. (1973). BS 1942, Kan. St. Univ.; MS 1957, Colo. St. Univ.; PhD 1969, Purdue Univ. (GF)

**TREAOWAY, KATHRYN**, Asst. Prof. (1975). BS 1971, MS 1973, EdD 1975, Okla. St. Univ.

**TRENNEPOHL, HARLAN JEAN**, Assoc. Prof. (1956, 1963). BS 1947, MS 1951, Kan. St. Teachers Col. (Emporia); EdD 1956, Univ. of Colo. (GF)

**URBANSOK, CAROLE**, Asst. Prof. (1975). BA 1971, Wittenberg Univ., MA 1973, PhD 1975, Univ. of Toledo. (GF)

**UTSEY, JORDAN**, Prof. and Dean of Col. of Education (1969, 1973, 1974, 1976). BA 1952, Col. of Idaho; MEd 1958, EdD 1963, Univ. of Ore. (GF)

**VAN METER, EODY J.**, Assoc. Prof. (1971). BA 1968, Univ. of N.M.; MA 1969, EdD 1971, N.M. St. Univ. (GF)

**VICKER, RICHARD L.**, Asst. Prof. (1976). BS 1965, MS 1967, MSLS 1970, Univ. of Wis., Madison; PhD 1974, Univ. of Iowa.

**VOLLANO, KATHY**, Instr. (1975). BS 1968, MS 1974, Kan. St. Univ.

**WARD, JIMMY I.**, Instr. (1976). BS 1962, Okla. St. Univ.; MS 1973, Kan. St. Univ.

**WAUTHIER, RAYMOND AUGUST**, Assoc. Prof. of Physical Education (1949). BS 1945, Albion Col.; MS 1947, Drake Univ. (GF)

**WELTON, RICHARD F.**, Assoc. Prof. (1977). BS 1959, MS 1966, Colo. St. Univ.; PhD 1971, Ohio St. Univ.

**WILSON, ALFRED P.**, Prof. (1972, 1975). BS 1961, MEd 1965, EdD 1969, Utah St. Univ. (GF)

**WISSMAN, JANICE R.**, Instr. (1968). BS 1963, MS 1968, Kan. St. Univ.

Univ.; MS 1938, Va. Polytechnic Inst., PhD 1941, Iowa St. Univ. Professional Engineer, 1959. (GF)

**BAUGHER, EARL EUGENE**, Asst. Prof. of Agricultural Engineering (1967). BS 1958, MS 1964, Kan. St. Univ.

**BENNETT, CDRWIN A.**, Prof. of Industrial Engineering, Assoc., Institute for Environmental Research (1970). BS 1950, Iowa St. Univ.; MA 1951, PhD 1954, Univ. of Neb., Certified Psychologist, N.Y. (GF)

**BEST, CECIL HAMILTON**, Prof. of Civil Engineering (1961, 1964). BS 1955, MS 1956, PhD 1960, Univ. of Calif. Professional Engineer, 1962. (GF)

**BISSEY, CHARLES R.**, Assoc. Prof. of Construction Science (1969). BS 1957, Colo. St. Univ.; March 1961, Kan. St. Univ. (GF)

**BLACKMAN, MERRILL**, Assoc. Prof. of Construction Science (1965, 1969). BS in AE 1949, Kan. St. Univ. Registered Architect, 1955. Professional Engineer, 1949

**BRAINARD, BOYD BERTRAND**, Prof. of Mechanical Engineering Emeritus (1923, 1938, 1967). BS 1922, Univ. of Colo., SM 1931, Mass. Inst. of Technology. Professional Engineer, 1945

**BURTON, CHARLES L.**, Asst. Prof. of Architectural Engineering (1970). BS 1963, Kan. St. Univ., MS 1975, Kan. Univ. Professional Engineer, Kansas.

**BUSSEY, LYNN E.**, Assoc. Prof. of Industrial Engineering (1971). BS 1947, Cornell Univ.; MS 1969, PhD 1970, Okla. St. Univ. Professional Engineer, 1948. (GF)

**BYERS, EARLE CONRAD**, Asst. Prof. of Industrial Engineering (1946, 1956). AB 1941, Greenville Col.; MS 1954, Kan. St. Univ.

**CASEY, KENDALL FRANCIS, JR.**, Prof. of Electrical Engineering (1970, 1973). BS 1961, Calif. Inst. of Technology; MS 1962, PhD 1965, Univ. of Southern Calif. (GF)

**CHUNG, DO SUP**, Assoc. Prof. of Agricultural Engineering (1965, 1966). BS 1958, Purdue Univ.; MS 1960, PhD 1965, Kan. St. Univ. (GF)

**CLACK, ROBERT WYNANDUS**, Adjunct Prof. of Nuclear Engineering (1955, 1962). BS 1943, U.S. Naval Academy. Professional Engineer, 1956

**CLARK, STANLEY JOE**, Prof. of Agricultural Engineering; Ag. Exp. Sta. (1966, 1976). BS 1954, MS 1959, Kan. St. Univ.; PhD 1966, Purdue Univ. Professional Engineer, 1969. (GF)

**CLIFTON, JOHN PAUL**, Assoc. Prof. of Industrial Engineering Emeritus (1947, 1956, 1971). BS 1929, Univ. of Kan.; MS 1956, Kan. St. Univ. Professional Engineer, 1956. (GF)

**CONVERSE, HARRY H.**, Adjunct Assoc. Prof. of Agricultural Engineering (1966). BS 1946, MS 1947, Kan. St. Univ. U.S.D.A. Grain Marketing Research Center

**COOPER, PETER B.**, Prof. of Civil Engineering (1966, 1974). BS 1957, MS 1960. PhD 1965, Lehigh Univ. Professional Engineer, 1969. (GF)

**COTTON, MELVIN CLYDE**, Asst. Prof. of Electrical Engineering (1955). BS 1945, MS 1948, Univ. of Kan. Professional Engineer in Kan., 1947, in Mo., 1952. (GF)

**CRANK, ROBERT EUGENE**, Prof. of Mechanical Engineering (1947, 1969, 1976). BS 1947, MS 1950, Kan. St. Univ. Professional Engineer, 1949. (GF)

**CRARY, JAMES FRED**, Asst. Prof. of Civil Engineering (1947, 1952). BS 1947, Kan. St. Univ.; MS 1969, Okla. St. Univ. Professional Engineer, 1948

**CRAWFORD, WILLIAM WESLEY**, Assoc. Prof. of Civil Engineering Emeritus (1923, 1942, 1949). BDi 1903, MDi 1905, Iowa St. Teachers Col.; AB 1912, BS 1917, Iowa St. Univ.

**DAHL, ROBERT E.**, Asst. Prof. of Architectural Engineering (1976). BS 1951, MS 1954, Kan. St. Univ. Professional Engineer.

**DARBY, EARL G.**, Prof. of Industrial Arts Emeritus (1941, 1952, 1963). BS 1923, MS 1943, Kan. St. Univ.

**DOLLAR, JOHN PAUL**, Instr.; Asst. Dean (1960, 1975, 1976). BS 1956, MS 1966, Kan. St. Univ.

**DONNERT, HERMANN JAKOB ANTON**, Prof. of Nuclear Engineering (1966, 1969). PhD 1951, Leopold-Franzens Univ., Austria. (GF)

**OUNCAN, ALLEY H.**, Prof. of Mechanical Engineering (1942, 1952). BS 1937, MS 1949, Kan. St. Univ. Professional Engineer, 1948. (GF)

**OURLAND, MERRILL AUGUSTUS**, Dean and Dir. Emeritus; Prof. of Mechanical Engineering Emeritus (1919, 1961, 1967). BS 1918, MS 1923, Kan. St. Univ. Professional Engineer, 1935.

**ECKHOFF, N. DEAN**, Assoc. Prof.; Head, Department of Nuclear Engineering, Dir. of Neutron Activation Analysis Laboratory; Dir. of Center for Energy Studies (1961, 1969, 1973, 1977). BS 1961, MS 1963, PhD 1964, Kan. St. Univ. (GF)

**ERICKSON, LARRY EUGENE**, Prof. of Chemical Engineering (1964, 1972). BS 1960, PhD 1964, Kan. St. Univ. (GF)

**FAIRBANKS, GUSTAVE EDMUND**, Prof. of Agricultural Engineering, Ag. Exp. Sta. (1941, 1957). BS 1941, MS 1950, Kan. St. Univ. Professional Engineer, 1948. (GF)

**FAN, LIANG-TSENG**, Prof.; Head, Department of Chemical Engineering; Dir., Institute for Systems Design and Optimization, Assoc., Institute for Environmental Research (1958, 1967, 1968). BS 1951, National Taiwan Univ.; MS 1954, Kan. St. Univ.; MS 1958, PhD 1957, West Va. Univ. (GF)

**FAW, RICHARD EARL**, Prof. of Nuclear Engineering, Dir. of Nuclear Reactor Facility (1962, 1966, 1968, 1976). BS 1959, Univ. of Cincinnati; PhD 1962, Univ. of Minn. Professional Engineer, 1970. (GF)

**FENTON, FREDERICK CHARLES**, Prof. of Agricultural Engineering Emeritus; Ag. Exp. Sta. (1928, 1961). BS 1914, MS 1930, Iowa St. Univ. Professional Engineer, 1947.

**FLINNER, ARTHUR ORAN**, Prof. of Mechanical Engineering Emeritus (1929, 1973). BS 1929, MS 1934, Kan. St. Univ.; SM 1937, Mass. Inst. of Technology. Professional Engineer, 1937. (GF)

**GALLAGHER, RICHARD RAY**, Assoc. Prof. of Electrical Engineering; Assoc., Institute for Environmental Research (1968, 1973). BS 1964, MS 1966, PhD 1968, Iowa St. Univ. (GF)

**GARTUNG, JIMMIE L.**, Instr. in Agricultural Engineering (1976). BS 1971, MS 1973, Kan. St. Univ., Irrigation Engineer, Kansas River Valley Experiment Station.

**GERDIS, THOMAS A.**, Instr., Engineering News Editor (1970). BA 1963, Evangel Col.; MS 1970, Kan. St. Univ.

**GOODARO, JAMES F.**, Asst. Prof. of Building Construction (1972). BSBC 1969, Kan. St. Univ.; MS 1972, Univ. of Fla.

**GORTON, ROBERT LESTER**, Prof. of Mechanical Engineering; Assoc., Institute for Environmental Research (1960, 1974). BS 1953, La. Polytechnic Inst.; MS 1960, La. St. Univ.; PhD 1966, Kan. St. Univ. Professional Engineer, 1953. (GF)

**GOWDY, KENNETH KING**, Assoc. Prof. of Mechanical Engineering; Dir., Engineering Technology Program (1957, 1969, 1975). BS 1955, MS 1961, Kan. St. Univ.; PhD 1965, Okla. St. Univ. (GF)

**GROSH, OORIS LLOYD**, Assoc. Prof. of Industrial Engineering (1965, 1968, 1975). BS 1946, Univ. of Chicago; MS 1949, PhD 1969, Kan. St. Univ. (GF)

**GROSH, LOUIS E.**, Assoc. Prof. of Industrial Engineering (1965, 1966). BS 1944, La. St. Univ. ;

## College of Engineering

**AHMED, NASIR**, Prof. of Electrical Engineering (1968, 1976). BS 1961, Univ. Col. of Engineering, Bangalore, India; MS 1963, PhD 1966, Univ. of N.M. (GF)

**AKINS, RICHARD GLENN**, Prof. of Chemical Engineering (1963, 1973). BS 1957, MS 1958, Univ. of Louisville; PhD 1962, Northwestern Univ. (GF)

**ANNIS, JASON CARL**, Prof. of Mechanical Engineering; Staff Assoc., Institute for Environmental Research (1959, 1969, 1976). BS 1953, Univ. of Minn.; MS 1956, Mich. Tech. Univ.; PhD 1969, Kan. St. Univ. (GF)

**APPL, FREDRIC CARL**, Prof. of Mechanical Engineering (1960, 1964). BS 1954, MS 1955, PhD 1958, Carnegie Inst. of Tech. (GF)

**AZER, NAIM ZAKI**, Prof. of Mechanical Engineering; Assoc., Institute for Environmental Research (1958, 1964, 1972). BS 1950, MS 1954, Univ. of Alexandria, Egypt, PhD 1959, Univ. of Ill. (GF)

**BALL, HERBERT DEAN**, Asst. Prof. of Mechanical Engineering (1958, 1972). BS 1952, MS 1958, Univ. of Neb.; PhD 1972, Kan. St. Univ. (GF)

**BATES, HERBERT TEMPLETON**, Prof. of Chemical Engineering (1958, 1960). BS 1935, Iowa St.



- 8S 1947, MS 1949, PhD 1954, Purdue Univ. (GF)
- HAFT, EVERETT EUGENE**, Prof. of Electrical Engineering (1961). 8S 1947, MS 1951, PhD 1955, Univ. of Wis. Professional Engineer in Wis., 1952. (GF)
- HALL, RAYMOND CLARENCE**, Asst. Prof. of Chemical Engineering (1950, 1952). 8S 1941, Iowa St. Univ., MS 1951, Kan. St. Univ. (GF)
- HANSEN, CARL ULLMAN**, Asst. Prof. of Industrial Engineering Emeritus (1957, 1962, 1976). 8S 1936, Kan. St. Univ., MS 1961, Univ. of Neb. Professional Engineer, 1961.
- HARRIS, FLOYD WAYNE**, Assoc. Prof. of Electrical Engineering (1965, 1969). 8S 1956, Univ. of Okla., MS 1962, PhD 1965, Okla. St. Univ. (GF)
- HAY, DELYNN RODNEY**, Asst. Prof. of Extension Agricultural Engineering (1971). 8S 1966, MS 1967, Univ. of Neb.
- HAYTER, RICHARD BROWNING**, Asst. Prof. of Mechanical Engineering; Res. Assoc. Institute for Environmental Research (1975, 1976). 8S 1965, S. D. St. Univ.; MS 1973, PhD 1975, Kan. St. Univ. (GF)
- HEARN, NORVAL KELLY, JR.**, Instr. in Electrical Engineering (1969). 8A 1957, Kan. St. Teachers Col., MS 1966, Kan. St. Univ.
- HELANDER, LINN**, Prof. of Mechanical Engineering Emeritus (1935, 1961). 8S 1915, Univ. of Ill. Professional Engineer, 1941.
- HIGHTOWER, RAY E.**, Asst. Prof. of Nuclear Engineering, Asst. to the Dean (1961, 1969, 1976). 8S 1964, Kan. St. Univ.
- HOBSON, LELAND STANFORD**, Prof. of Mechanical Engineering Emeritus (1946, 1968, 1972). 8S 1927, Kan. St. Univ. Professional Engineer, 1946.
- HOOGES, TEDDY OMAR**, Prof. of Agricultural Engineering; Ag. Exp. Sta.; Assoc. Dean of Engineering, Dir., Engineering Experiment Station (1959, 1974). BS 1950, Tex. A & M, MS 1951, Iowa St. Univ., PhD 1959, Mich. St. Univ. Professional Engineer in Iowa, 1952; Professional Engineer, 1974. (GF)
- HOLMES, ELWYN SPRUIELL**, Prof. of Extension Agricultural Engineering (1966, 1975). 8S 1943, MS 1953, Tex. A & M Univ.
- HONSTEAD, WILLIAM HENRY**, Prof. of Chemical Engineering; Dir., Kansas Industrial Extension Service, Executive Vice Pres. Kan. St. Univ. Research Foundation (1943, 1970, 1972). 8S 1939, MS 1946, Kan. St. Univ.; PhD 1956, Iowa St. Univ. Professional Engineer, 1948. (GF)
- HOSTETTER, ABRAM ELDRED**, Prof. of Industrial Engineering Emeritus (1931, 1952, 1969). BS 1925, McPherson Col., MS 1932, PhD 1938, Kan. St. Univ.
- HU, KUD-KUANG**, Assoc. Prof. of Civil Engineering (1968, 1969, 1975). Graduation, 1956, Taiwan Provincial Taipei Inst. of Technology; MS 1966, PhD 1969, Kan. St. Univ. (GF)
- HUANG, CHI-LUNG**, Prof. of Mechanical Engineering (1964, 1974). BS 1954, National Taiwan Univ., MS 1960, Univ. of Ill.; Doctor of Engineering 1964, Yale Univ. (GF)
- HUMMELS, DONALD RAY**, Assoc. Prof. of Electrical Engineering (1970, 1974). BS 1967, MS 1968, PhD 1969, Ariz. St. Univ. (GF)
- HUNT, ORVILLE DON**, Prof. of Electrical Engineering Emeritus (1923, 1947, 1970). 8S 1923, Wash. St. Univ., MS 1930, Kan. St. Univ. Professional Engineer, 1947.
- HWANG, CHING-LAI**, Prof. of Industrial Engineering; Assoc., Institute for Environmental Research (1964, 1967, 1973). 8S 1953, National Taiwan Univ.; MS 1960, PhD 1962, Kan. St. Univ. (GF)
- JEPSEN, RICHARD LOUIS**, Assoc. Prof. of Extension Agricultural Engineering (1963, 1975). BS 1950, MS 1963, Kan. St. Univ.; PhD 1974, N. C. St. Univ.
- JOHNSON, GARY LEE**, Assoc. Prof. of Electrical Engineering (1966, 1973). BS 1961, MS 1963, Kan. St. Univ.; PhD 1966, Okla. St. Univ. Professional Engineer, 1973. (GF)
- JOHNSON, WILLIAM H.**, Prof., Head, Department of Agricultural Engineering (1970). BS Agriculture, BS Agricultural Engineering 1948, MS 1953, Ohio St. Univ., PhD 1960, Mich. St. Univ. Professional Engineer in Ohio, 1970. (GF)
- JORGENSEN, LOUIS**, Prof. of Electrical Engineering Emeritus (1925, 1951, 1954). BS 1907, MS 1931, Kan. St. Univ.
- KERCHNER, RUSSELL MARION**, Prof. of Electrical Engineering Emeritus (1922, 1934, 1965). 8S 1922, Univ. of Ill.; MS 1927, Kan. St. Univ. Professional Engineer, 1945.
- KIPP, JOHN EDWARD**, Assoc. Prof. of Mechanical Engineering, Assoc., Institute for Environmental Research (1959, 1969). BS 1951, MS 1955, Univ. of Kan.; PhD 1968, Okla. St. Univ. Professional Engineer, 1960. (GF)
- KIRMSE, PHILIP GEORGE**, Prof. of Mathematics; Prof. of Engineering (1942, 1958, 1962). BS 1939, MS 1944, PhD 1958, Univ. of Minn. Professional Engineer, 1961. (GF)
- KNOSTMAN, HARRY DANIEL**, Assoc. Prof. of Civil Engineering (1957, 1973). BS 1951, MS 1961, Kan. St. Univ., PhD 1965, Univ. of Colo. Professional Engineer, 1959. (GF)
- KDEPSEL, WELLINGTON WESLEY**, Prof. of Electrical Engineering (1964, 1976). BS 1944, MS 1951, Univ. of Tex., PhD 1960, Okla. St. Univ. Professional Engineer in Tex., 1952. Professional Engineer in Kan., 1974. (GF)
- KONZ, STEPHAN ANTHONY**, Prof. of Industrial Engineering, Assoc., Institute for Environmental Research (1964, 1969). BS 1956, MBA 1956, Univ. of Mich., MS 1960, St. Univ. of Iowa, PhD 1964, Univ. of Ill. (GF)
- KYLE, BENJAMIN GAYLE**, Prof. of Chemical Engineering (1958, 1964). BS 1950, Ga. Inst. of Technology, MS 1955, PhD 1958, Univ. of Fla. (GF)
- LAGE, PETER R.**, Asst. Prof. of Architectural Engineering (1975). BArch 1967, Univ. of Neb. Registered Architect, Neb., 1971, Kan., 1974. NCARB Certificate 1974.
- LAI, FANG-SHYONG**, Adjunct Prof. of Chemical Engineering (1975). 8S 1965, National Taiwan Univ.; MS 1966, Univ. of Notre Dame, PhD 1974, Kan. St. Univ. (GF)
- LARSON, GEORGE HERBERT**, Prof. of Agricultural Engineering, Ag. Exp. Sta. (1939, 1950). BS 1939, MS 1940, Kan. St. Univ., PhD 1955, Mich. St. Univ. Professional Engineer, 1947. (GF)
- LEE, E. STANLEY**, Prof. of Industrial Engineering (1966, 1970). BS 1953, Ordnance Engineering Col., China; MS 1957, N. C. St. Col., PhD 1962, Princeton Univ. (GF)
- LENHART, DONALD HOWARD**, Assoc. Prof. of Electrical Engineering (1966, 1969). BS 1956, Kan. St. Univ., MS 1958, Syracuse Univ.; PhD 1966, Univ. of N. M.; Professional Engineer, 1973. (GF)
- LESTER, THOMAS W.**, Asst. Prof. of Nuclear Engineering (1974). 8S 1970, MS 1972, PhD 1974, Purdue Univ. (GF)
- LINDHOLM, JOHN C.**, Prof. of Mechanical Engineering (1960, 1974). 8S 1949, Kan. St. Univ.; MS 1957, Univ. of Kan.; PhD 1961, Purdue Univ. Professional Engineer, 1954. (GF)
- LINDLY, EDWIN CURGUS**, Assoc. Prof. of Civil Engineering (1949, 1965). BS 1942, Okla. St. Univ.; MS 1949, Purdue Univ.; MS 1957, Kan. St. Univ., PhD 1964, Iowa St. Univ. Professional Engineer, 1950. (GF)
- LIPPER, RALPH IDEN**, Prof. of Agricultural Engineering, Ag. Exp. Sta. (1964, 1972). 8S 1941, MS 1950, Kan. St. Univ. Professional Engineer, 1953. (GF)
- LUCAS, MICHAEL S. P.**, Prof. of Electrical Engineering (1968, 1970). MS 1962, PhD 1964, Duke Univ. (GF)
- MANGES, HARRY LEO**, Assoc. Prof. of Agricultural Engineering; Ag. Exp. Sta. (1956, 1963, 1971). 8S 1949, MS 1959, Kan. St. Univ.; PhD 1969, Okla. St. Univ. Professional Engineer, 1960. (GF)
- MATTHEWS, JOHN CARTER**, Assoc. Prof. of Chemical Engineering (1962). 8S 1959, DSc 1965, Wash. Univ. (GF)
- MCCORMICK, FRANK JAMES**, Prof. of Civil Engineering Emeritus (1939, 1947, 1976). BS 1927, MS 1931, Iowa St. Univ. Professional Engineer, 1944. (GF)
- MCGINTY, RALPH J.**, Adjunct Asst. Prof. of Agricultural Engineering (1969). 8S 1959, MS 1960, Kan. St. Univ. Agricultural Research Service, U.S. D.A., Grain Marketing Research Center.
- MERKLIN, JOSEPH FREDERICK**, Assoc. Prof. of Nuclear Engineering (1967, 1970). 8S 1957, Manhattan Col. of N.Y.; PhD 1963, Univ. of Minn. (GF)
- MESSENHEIMER, ALVA ERNEST**, Assoc. Prof. of Mechanical Engineering Emeritus (1942, 1963, 1971). 8S 1924, Kan. St. Univ. Professional Engineer, 1948.
- MILLER, PAUL LEROY**, Prof.; Head, Department of Mechanical Engineering; Assoc., Institute for Environmental Research (1958, 1972, 1975). 8S 1957, MS 1961, Kan. St. Univ.; PhD 1966, Okla. St. Univ. Professional Engineer, 1962. (GF)
- MINGLE, JOHN ORVILLE**, Prof. of Nuclear Engineering; Dir., Institute for Computational Research in Engineering; Black and Veatch Professor (1956, 1965, 1974). 8S 1953, MS 1958, Kan. St. Univ.; PhD 1960, Northwestern Univ. Professional Engineer, 1961. (GF)
- MORSE, REED FRANKLIN**, Prof. of Civil Engineering Emeritus (1923, 1945, 1968). BA 1921, Cornell Col.; 8S 1923, Iowa St. Univ.; MS 1933, Kan. St. Univ.; PhD 1941, Cornell Univ. Professional Engineer, 1939.
- MUNGER, HAROLD HAWLEY**, Assoc. Prof. of Applied Mechanics Emeritus (1939, 1954, 1961). 8S 1939, MS 1941, Kan. St. Univ. Professional Engineer, 1941.
- MURPHY, JAMES PATRICK**, Asst. Prof. of Extension Agricultural Engineering (1971). 8S 1968, MS 1970, Kan. St. Univ.
- MUSTERMAN, JOHN L.**, Asst. Prof. of Civil Engineering (1975). 8S 1970, Univ. of Dayton; MS 1972, PhD 1975, Univ. of Cincinnati.
- NELSON, CLARENCE LESLIE**, Instr. in Industrial Engineering Emeritus (1943, 1972).
- NESMITH, DWIGHT ALVIN**, Assoc. Prof. of Mechanical Engineering; Dir., Engineering Co-op Program; Dir., Engineering Minority Program (1948, 1958, 1974, 1975). BS 1948, Northwestern Univ.; MS 1952, Kan. St. Univ. Professional Engineer, 1962.
- PAULI, ROSS IRWIN**, Asst. Prof. of Mechanical Engineering (1947, 1954). BA 1941, Westmar Col.; MS 1947, Kan. St. Col. of Pittsburgh.
- POWELL, G. MORGAN**, Asst. Prof., Natural Resource Engineer, Extension Agricultural Engineering (1977). BS 1965, Kan. St. Univ.; MS 1967, Univ. of Mo.; PhD 1973, Utah St. Univ.
- RATHBONE, DONALD E.**, Dean; Prof. of Electrical Engineering (1973). BS 1951, Purdue Univ.; MS 1956, Northwestern Univ.; PhD 1962, Univ. of Pittsburgh. (GF)
- ROHLES, FREDERICK HENRY, JR.**, Prof. of Psychology; Dir., Institute for Environmental Research (1963, 1973). BS 1942, Roosevelt Univ.; MA 1949, PhD 1956, Univ. of Tex. (GF)
- ROSEBRAUGH, VERNON HART**, Prof. of Civil Engineering (1953, 1973). BS 1933, Ore. Inst. of Technology; BS 1938, Dre. St. Univ.; MA 1952, Univ. of Portland, CE 1956, Ore. St. Univ. Professional Engineer, 1954. (GF)
- ROTH, THOMAS A.**, Assoc. Prof. of Chemical Engineering (1965, 1973). BS 1960, MS 1961, PhD 1967, Univ. of Wis. (GF)
- RUSSELL, EUGENE R.**, Assoc. Prof. of Civil Engineering (1974). BSCE 1958, Univ. of Mo., Rolla; MS 1965, Iowa St. Univ.; PhD 1974, Purdue Univ. Professional Engineer, 1962. (GF)
- SCHINDLER, DALE EUGENE**, Assoc. Prof. of Extension Agricultural Engineering (1955, 1966). BArch 1953, MS 1960, Kan. St. Univ.
- SCHMID, LAWRENCE A.**, Assoc. Prof. of Civil Engineering (1968, 1972). BS 1962, MS 1963, Iowa St. Univ., PhD 1968, Univ. of Kan. Professional Engineer, 1969. (GF)
- SCHARPLAZ, JAMES D.**, Instr. of Agricultural Engineering (1975). BS 1973, MS 1975, Kan. St. Univ.
- SCHROCK, MARK DAVID**, Ext. Asst. of Extension Agricultural Engineering (1973). BS 1969, Kan. St. Univ.; MS 1971, Univ. of Ill.
- SHULTIS, J. KENNETH**, Assoc. Prof. of Nuclear Engineering (1969, 1974). BASc 1964, Univ. of Toronto, MS 1965, PhD 1968, Univ. of Mich. (GF)
- SITZ, EARL LEROY**, Prof. of Electrical Engineering Emeritus (1927, 1948, 1969). BS 1927, Iowa St. Univ.; MS 1932, Kan. St. Univ. Professional Engineer, 1947.
- SMALTZ, JACOB JAY**, Prof. of Industrial Engineering (1939, 1952). BS 1939, Bradley Polytechnic Inst.; MS 1946, Kan. St. Univ. Professional Engineer, 1960. Certified Safety Professional, 1973. (GF)
- SMITH, BOB LEE**, Prof. of Civil Engineering (1948, 1965). BS 1948, MS 1953, Kan. St. Univ.; PhD 1963, Purdue Univ. Professional Engineer, 1953. (GF)
- SNELL, ROBERT ROSS**, Prof.; Head, Civil Engineering (1957, 1968, 1972). BS 1954, MS 1960, Kan. St. Univ.; PhD 1963, Purdue Univ. Professional Engineer, 1959. (GF)
- SPILLMAN, CHARLES KENNARD**, Assoc. Prof. of Agricultural Engineering; Ag. Exp. Sta. (1969, 1973). AS 1958, Vincennes Univ.; BS 1960, MS 1963, Univ. of Ill.; PhD 1968, Purdue Univ. (GF)
- STEVENSON, PAUL NELSON**, Assoc. Prof. of Agricultural Engineering (1957). BS 1948, Univ. of Mo.; MS 1957, Iowa St. Univ. (GF)
- SWARTZ, STUART ENDOSLEY**, Assoc. Prof. of Civil Engineering (1968, 1972). BS 1959, MS 1962, PhD 1968, Ill. Inst. of Technology Professional Engineer, 1970. (GF)
- TAYLOR, DELOS CLIFTON**, Prof. of Applied Mechanics Emeritus (1931, 1956, 1970). BS 1925, MS 1937, Kan. St. Univ. Professional Engineer, 1948.
- TENEYCK, GEORGE ROBERT**, Asst. Prof. of Agricultural Engineering; Superintendent, Sandyland Experiment Field (1964, 1970, 1972). BS 1951, MS 1970, Kan. St. Univ.
- THOMAS, JAMES G.**, Asst. Prof. Irrigation Engineer, Extension Agricultural Engineering (1977). BS 1975, MA 1977, Univ. of Ark.
- THOMPSON, J. GARTH**, Assoc. Prof. of Mechanical Engineering (1971). BS 1960, Brigham Young Univ.; MS 1962, PhD 1967, Purdue Univ. (GF)
- THORSON, I. EUGENE**, Prof.; Head, Department of Architectural Engineering and Construction Science (1948, 1951, 1966). BS 1940, Univ. of Wash. Professional Engineer, Washington 1948, Kansas. (GF)
- TILLMAN, FRANK AUBREY**, Prof.; Head, Department of Industrial Engineering; Assoc. Dir., Institute for Systems Design and Optimization (1965, 1966, 1969). BS 1960, MS 1961, Univ. of Mo.; PhD 1965, St. Univ. of Iowa. (GF)



**TRIPP, WILSON**, Prof. of Mechanical Engineering Emeritus (1936, 1947, 1976). BS 1930, MS 1933, Univ. of Calif.; PhD 1956, Univ. of Ill. Professional Engineer, 1946. (GF)

**TURNQUIST, RALPH OTTO**, Prof. of Mechanical Engineering (1959, 1975). BS 1952, MS 1961, Kan. St. Univ.; PhD 1965, Case Inst. of Technology. (GF)

**WAKABAYASHI, ISAAC**, Instr. in Electrical Engineering (1955). BS 1954, Univ. of Calif.

**WALAWENDOER, WALTER P.**, Assoc. Prof. of Chemical Engineering (1969, 1975). BA 1963, Ulica Col. of Syracuse Univ.; MS 1967, PhD 1969, Syracuse Univ. (GF)

**WALKER, QUANE ELOON**, Instr. in Electrical Engineering (1970). BS 1961, MS 1962, Kan. St. Univ.

**WALKER, HUGH SANDERS**, Prof. of Mechanical Engineering; Assoc. Dir., Institute for Computational Research in Engineering (1964, 1968, 1976). BS 1957, MS 1960, La. St. Univ.; PhD 1965, Kan. St. Univ. Professional Engineer, Kansas 1975, Louisiana 1958. (GF)

**WARO, JOSEPH EVANS, JR.**, Prof. of Electrical Engineering (1940, 1961). BS 1937, The Univ. of Tex.; MS 1940, Univ. of Ill. Professional Engineer, 1948. (GF)

**WENOLING, LEO THEODORE**, Prof. of Extension Agricultural Engineering (1947, 1965). State Leader 1969; BS 1947, MS 1956, Kan. St. Univ.

**WILLIAMS, WAYNE WATSON**, Prof. of Civil Engineering (1965, 1975). BS 1951, MS 1953, Iowa St. Univ. (GF)

**WOOD, JOE NATE**, Prof. of Mechanical Engineering (1936, 1947). BS 1936, St. Univ. of Iowa Professional Engineer, 1948.

**WOODARD, CLAUOE LOWELL**, Assoc. Prof. of Chemical Engineering (1949, 1969). BS 1948, Kan. St. Univ.; MS 1961, PhD 1968, Univ. of Mo. (GF)

**ZERR, ELMER GLEN**, Asst. Prof. of Extension Agricultural Engineering (1975). BS 1968, MS 1971, Kan. St. Univ. Professional Engineer, 1974.

**ZOVNE, JEROME J.**, Asst. Prof. of Civil Engineering (1970). BS 1965, MS 1966, Univ. of Wis.; PhD 1970, Ga. Inst. of Technology. Professional Engineer, 1972. (GF)

## College of Home Economics

**AGAN, ANNA TESSIE**, Assoc. Prof. of Family Economics Emerita; Agr. Exp. Sta. (1929, 1944, 1968). BS 1927, Univ. of Neb.; MS 1930, Kan. St. Univ. (GF)

**ANNIS, PATTY SMITH**, Asst. Prof. of Family Economics, Agr. Exp. Sta. (1958, 1961). BS 1955, Miss. St. Col. for Women; MS 1957, Univ. of Tenn. (GF)

**BARFOOT, OOROTHY**, Prof. of Art Emerita (1930, 1962, 1966). BSA, St. Univ. of Iowa, MA 1928, Columbia Univ. (GF)

**BARNES, JANE WILSON**, Asst. Prof. Emerita (1939, 1963). BS 1912, MS 1932, Kan. St. Univ. (GF)

**BARNHART, NIKKI JANE**, Instr. of Clothing, Textiles and Interior Design (1976). BS 1974, Univ. of Mo., MA 1976, Univ. of Mo.

**BERGEN, BETSY**, Assoc. Prof. of Family and Child Development (1966, 1972, 1976). AB 1949, Ottawa Univ.; MS 1964, PhD 1972, Kan. St. Univ. (GF)

**BOLLMAN, STEPHAN RAY**, Prof. of Family and Child Development; Agr. Exp. Sta. (1966, 1969, 1975). BS 1957, MS 1963, PhD 1966, Iowa St. Univ. (GF)

**BOWERS, JANE RAYMONO**, Prof.; Head, Department of Foods and Nutrition, Agr. Exp. Sta. (1966, 1974, 1976). BS 1962, MS 1963, PhD 1967, Kan. St. Univ. (GF)

**BRIIGGS, STEPHANIE PEARL**, Asst. Prof. of Foods and Nutrition (1976). BS 1964, MS 1965, Stanford Univ.; PhD 1976, Univ. of Calif.

**BROCKMAN, HELEN L.**, Prof. of Clothing, Textiles and Interior Design Emerita (1967, 1973). BA 1926, Univ. of Iowa. (GF)

**BROWNING, NINA M.**, Assoc. Prof. of Foods and Nutrition Emerita (1930, 1943, 1970). BS 1923, MS 1927, Kan. St. Univ. (GF)

**CAUL, JEAN FRANCES**, Prof. of Foods and Nutrition, Agr. Exp. Sta. (1967). AB 1937, Lake Erie Col.; MA 1938, PhD 1942, Ohio St. Univ. (GF)

**CORMANY, ESTHER MARGARET**, Assoc. Prof. of Clothing, Textiles and Interior Design Emerita, Agr. Exp. Sta. (1936, 1941, 1975). BS 1926, MS 1932, Kan. St. Univ. (GF)

**CRAIGIE, BARBARA**, Asst. Prof. of Clothing, Textiles and Interior Design Emerita (1954, 1963, 1975). BA 1932, Univ. of Minn.; MA 1942, Univ. of Mo. (GF)

**CROSS, MIRIAM H.**, Instr. of Clothing, Textiles and Interior Design (1973). BS 1964, Wash. St. Univ.; MS 1971, Ore. St. Univ.

**OAVIS, ALBERT J.**, Assoc. Prof. of Family and Child Development (1974). BS 1963, Fordham Univ.; MA 1964, Univ. of Conn.; PhD 1969, Pa. St. Univ. (GF)

**FINKELSTEIN, BEATRICE**, Prof. of Foods and Nutrition, Agr. Exp. Sta. (1967). BA 1933, Hunter Col.; MS 1939, Columbia Univ. (GF)

**FLASHMAN, ROBERT H.**, Asst. Prof. of Family Economics (1975). BS 1970, MS 1972, Kan. St. Univ.; PhD 1976, Ohio St. Univ.

**FRYER, E. BETH**, Prof. of Foods and Nutrition, Agr. Exp. Sta. (1959, 1975). BS 1945, Univ. of N.M.; MS 1949, Ohio St. Univ.; PhD 1959, Mich. St. Univ. (GF)

**GILROY, MARILYN P.**, Instr. of Dietetics, Restaurant and Institutional Management (1975). BS 1962, Col. of St. Francis, MS 1966, St. Louis Univ.

**GRAFF, MARV**, Instr. of Clothing, Textiles and Interior Design (1976). BFA 1973, MA 1976, Univ. of Neb.

**HARRISON, OOROTHY LUCILE**, Prof. of Foods and Nutrition, Agr. Exp. Sta. (1947, 1963). BS 1938, Dakota Wesleyan Univ.; MS 1943, PhD 1947, Iowa St. Univ. (GF)

**HELVENSTON, SALLY**, Instr. of Clothing, Textiles and Interior Design (1975). BME 1970, MS 1975, Fla. St. Univ.

**HILL, OPAL BROWN**, Assoc. Prof. of Clothing, Textiles and Interior Design Emerita (1944, 1954, 1969). BS 1944, MS 1950, Kan. St. Univ. (GF)

**HIRSCH, MARTHA D.**, Instr. of Foods and Nutrition (1976). BS 1957, Cornell, MS 1968, Univ. of Kan.

**HOEFLIN, RUTH**, Dean; Prof. of Home Economics (1957, 1960, 1975). BS 1940, Iowa St. Univ.; MA 1945, Univ. of Mich.; PhD 1950, Ohio St. Univ. (GF)

**HOWE, HAZEL OELL**, Assoc. Prof. of Clothing and Textiles Emerita (1936, 1947, 1967). BS 1921, MS 1935, Kan. St. Univ. (GF)

**IMIG, DAVID RICHARD**, Asst. Prof. of Family and Child Development (1976). BS 1964, MA 1969, PhD 1971, Mich. St. Univ.

**INGALSBE, NOALEEN G.**, Instr. of Dietetics, Restaurant and Institutional Management (1975). BS 1969, Iowa St. Univ.

**JURICH, ANTHONY P.**, Assoc. Prof. of Family and Child Development (1972, 1976). BS 1969, Fordham Univ.; MS 1971, PhD 1972, Pa. St. Univ. (GF)

**KATZ, NORMAN O.**, Asst. Prof. of Family Economics (1976). BA 1970, Clark Univ.; PhD 1976, Rutgers.

**KELL, LEONE BOWER**, Prof. of Family and Child Development Emerita; Agr. Exp. Sta. (1927, 1947, 1965). BS 1923, MS 1928, Kan. St. Univ. (GF)

**KENNEOY, CARROLL E.**, Prof. of Family and Child Development (1970). AB 1949, Wheaton Col.; MS 1953, Kan. St. Univ.; EdD 1963, Univ. of Md. (GF)

**KRAMER, MARTHA MORRISON**, Prof. of Home Economics Emerita (1922, 1960). BS 1916, Univ. of Chicago; MS 1919, PhD 1922, Columbia Univ. (GF)

**KRUCKEBERG, VICKY**, Instr. of Clothing, Textiles and Interior Design (1975). BS 1974, MS 1975, Southern Ill. Univ.

**LARSON, SUSAN S.**, Asst. Prof. of Family and Child Development (1955, 1956, 1962, 1974). BS 1940, Univ. of Iowa, MS 1942, Univ. of Wis.

**LIENKAEMPER, GERTRUOE ELISE**, Assoc. Prof. of Clothing and Textiles Emerita (1941, 1948, 1966). BS 1921, Ore. St. Col.; MS 1938, Univ. of Wash. (GF)

**MCCORO, IVALEE HEOGE**, Prof. of Family and Child Development Emerita (1957, 1963, 1966, 1977). BS 1933, MS 1951, Kan. St. Univ.; PhD 1964, Purdue Univ. (GF)

**McMILLAN, EVA M.**, Assoc. Prof. of Foods and Nutrition Emerita (1930, 1937, 1939, 1958). MS 1918, PhD 1929, Univ. of Chicago (GF)

**McNEIL, JOAN N.**, Instr. of Family and Child Development (1970). BS 1951, Kan. St. Univ.; MS 1956, Univ. of Minn.

**MORSE, RICHARD L. D.**, Prof.; Head, Department of Family Economics, Agr. Exp. Sta. (1955). BA 1938, Univ. of Wis.; PhD 1942, Iowa St. Univ. (GF)

**MULLEN, IVA MANILLA**, Asst. Prof. of Foods and Nutrition Emerita (1936, 1964). BS 1925, Kan. St. Univ.; MS 1928, Iowa St. Univ. (GF)

**MUNSON, DEANNA M.**, Instr. of Clothing, Textiles and Interior Design (1967). BS 1966, MS 1967, Kan. St. Univ.

**NELSON, ROGENE**, Instr. of Clothing, Textiles and Interior Design (1975). BS 1969, Univ. of Neb.; MS 1975, La. St. Univ.

**NEWBY, FRANCES ANN**, Asst. Prof. of Clothing, Textiles and Interior Design (1963, 1971). BFA 1961, Kan. City Art Inst. March 1970, Kan. St. Univ.

**NEWELL, KATHLEEN**, Asst. Prof. of Foods and Nutrition; Agr. Exp. Sta. (1962, 1975). BS 1944, Kan. St. Univ.; MS 1951, Univ. of Wis.; PhD 1973, Univ. of Tenn. (GF)

**ORDONEZ, MARGARET THOMPSON**, Instr. of Clothing, Textiles and Interior Design (1976). BS 1961, MS 1968, Univ. of Tenn.

**OWENS, SUSAN L.**, Instr. of Dietetics, Restaurant and Institutional Management (1975). BS 1970, MS 1975, Univ. of Tenn.

**PERENICH, THERESA A.**, Assoc. Prof.; Head, Department of Clothing, Textiles and Interior Design (1974). BS 1959, Fordham Univ.; MS 1972, PhD 1973, Fla. St. Univ. (GF)

**PETERSON, MARY O.**, Asst. Prof. of Clothing, Textiles and Interior Design (1968, 1975). BS 1958, MS 1959, Univ. of Tenn.; EdD 1975, Okla. St. Univ.

**PHILLIPS, OORIS ELLEN**, Asst. Prof. of Foods and Nutrition (1975). BS 1970, Purdue Univ.; MS 1973, PhD 1975, Univ. of Tenn.

**PORESKY, ROBERT H.**, Asst. Prof. of Family and Child Development (1972). AB 1963, MS 1967, PhD 1969, Cornell Univ. (GF)

**PRICE, FAYE A.**, Instr. of Family and Child Development (1973). BS 1966, MS 1973, Okla. St. Univ.

**RAFFINGTON, MARGARET ELIZABETH**, Asst. Prof. of Family and Child Development Emerita (1938, 1939, 1966, 1970). BS 1924, MS 1928, Kan. St. Univ.; Professional Diploma 1954, Columbia Univ.

**RASMUSSEN, ALBIE C.**, Asst. Prof. of Family Economics (1966, 1967). BS 1962, Univ. of Alaska, MS 1964, Kan. St. Univ.

**REAGAN, BARBARA**, Asst. Prof. of Clothing, Textiles and Interior Design (1976). BS 1968, Syracuse Univ.; MS 1972, PhD 1976, Purdue Univ.

**REEHLING, JEAN ELIZABETH**, Asst. Dean; Asst. Prof. of Home Economics (1964, 1967). BS 1962, Kan. St. Univ.; MA 1963, Univ. No. Colo.

**ROACH, FAITH RUSSELL**, Asst. Prof. of Dietetics, Restaurant and Institutional Management (1965, 1973). BS 1947, MS 1966, PhD 1973, Kan. St. Univ. (GF)

**RUSSELL, CAROL S.**, Asst. Prof. of Family and Child Development (1974). BS 1968, Cornell Univ.; MA 1972, PhD 1975, Univ. of Minn.

**SCHEIOT, RICK JAMES**, Asst. Prof. of Family and Child Development (1976). BA 1967, MA 1969, Calif. St. Univ.; PhD 1973, Univ. of Neb. (GF)

**SCHMIOT, SONIA**, Instr. of Clothing, Textiles and Interior Design (1975). BS 1973, MS 1975, Univ. of Neb.

**SEGO, R. JEAN WHEELER**, Asst. to Dean; Instr. of Home Economics (1967). BA 1960, Friends Univ.; MS 1967, Kan. St. Univ.

**SENECAL, EVELYN JOYCE**, Assoc. Dean, Assoc. Prof. of Home Economics (1976). BS 1959, MA 1960, Mich. St. Univ.; PhD 1969, Univ. of Iowa.

**SETSER, CAROL S.**, Asst. Prof. of Foods and Nutrition (1976). BS 1962, Univ. of Mo.; MS 1964, Cornell; PhD 1971, Kan. St. Univ. (GF)

**SHUGART, GRACE SEVERANCE**, Prof. of Dietetics, Restaurant and Institutional Management Emerita; Agr. Exp. Sta. (1951, 1961, 1975). BS 1931, Wash. St. Univ.; MS 1938, Iowa St. Univ. (GF)

**SKELTON, MARILYN MAE**, Asst. Prof. of Foods and Nutrition, Agr. Exp. Sta. (1975). BS 1957, MS 1958, Kan. St. Univ.; PhD 1970, Univ. of Wyo.

**SPEARS, MARIAN C.**, Prof.; Head, Department of Dietetics, Restaurant and Institutional Management (1975). BS 1942, MS 1947, Western Reserve Univ.; PhD 1971, Univ. of Mo. (GF)

**STITH, MARJORIE MAY**, Prof. of Family and Child Development (1961, 1962, 1966, 1977). BS 1943, Ala. St. Col. for Women; MS 1958, PhD 1961, Fla. St. Univ. (GF)

**STOLPER, JANE**, Asst. Prof. of Clothing, Textiles and Interior Design (1975). BS 1947, MS 1967, PhD 1971, Univ. of Wis.

**STREIT, LES O.**, Instr. of Dietetics, Restaurant and Institutional Management (1974). BS 1970, MS 1973, Kan. St. Univ.



- TINKLIN, GWENDOLYN Laverne**, Prof. of Foods and Nutrition Emerita; Agr. Exp. Sta. (1943, 1956, 1975). BS 1940, MS 1944, Kan. St. Univ. (GF)
- VADEN, ALLENE G.**, Asst. Prof. of Dietetics, Restaurant and Institutional Management (1971, 1973). BS 1960, Univ. of Tex.; MS 1967, Tex. Technological Col.; PhD 1973, Kan. St. Univ. (GF)
- VARNEY, LAURA**, Instr. of Clothing, Textiles and Interior Design (1975). BS 1954, MS 1975, Kan. St. Univ.
- VILLASI, LUDWIG**, Asst. Prof. of Clothing, Textiles and Interior Design (1975). BS 1968, MS 1975, Wayne St. Univ.
- WARREN, CAROLYN C.**, Instr. of Family and Child Development (1974). AA 1966, Freed-Hardeman Col.; BS 1968, Florence St. Univ.; MS 1973, Univ. of Tenn
- WEST, BESSIE BROOKS**, Prof. of Dietetics, Restaurant and Institutional Management Emerita (1928, 1960). AB 1924, Univ. of Calif.; MS 1951, Mich. St. Normal Col. (GF)
- WILLIAMS, JENNIE**, Prof. of Family and Child Development Emerita (1932, 1959). BS 1920, MS 1933, Kan. St. Univ.; Graduate, 1925, Univ. of Mich. School of Nursing. (GF)
- WOODS, R. BRUCE**, Instr. of Family and Child Development (1972). BA 1959, Wichita St. Univ.; MDiv 1962, Central Baptist Seminary; MS 1972, Kan. St. Univ

## College of Veterinary Medicine

- ANDERSON, NEIL V.**, Prof. of Comparative Gastroenterology (1967, 1975). Clinical Research Scientist, Diplomate, American Col. of Veterinary Internal Medicine, 1972. BS 1953, Mankato St. Col.; BS 1959, DVM 1961, PhD 1968, Univ. of Minn. (GF)
- ANTHONY, HARRY D.**, Prof. and Dir. of Diagnostic Lab. (1955, 1971). Research Pathologist. DVM 1952, MS 1957, Kan. St. Univ. (GF)
- BAILIE, WAYNE E.**, Assoc. Prof. of Bacteriology (1972, 1975). Research Bacteriologist. BS 1957, DVM 1957, PhD 1969, Kan. St. Univ.
- BAUGH, ROBERT C.**, Instr. Diagnostic Lab. (1965, 1968). BS 1962, DVM 1965, Kan. St. Univ.
- BLAUCH, BRUCE S.**, Asst. Prof. of Small Animal Medicine (1965, 1972). BS 1949, Pa. St. Univ.; VMD 1956, Univ. of Pa.; MS 1969, Kan. St. Univ. (GF)
- BRANDT, GARY W.**, Asst. Prof. of Equine Medicine (1969). BS 1964, DVM 1966, MS 1971, Univ. of Ill.
- BURROUGHS, ALBERT L.**, Assoc. Prof. of Virology (1960). Research Virologist. BS 1938, Univ. of Wyo.; DVM 1958, Tex. A & M Col.; MS 1941, Mont. St. Col.; PhD 1946, Univ. of Calif. (GF)
- BUTLER, HUGH C.**, Prof. of Surgery (1968). Diplomate, American Col. of Veterinary Surgeons, 1965; BS 1950, DVM 1954, MS 1968, Wash. St. Univ. (GF)
- CARNAHAN, DAVID L.**, Assoc. Prof. of Obstetrics and Gynecology (1961, 1972). BS 1959, DVM 1959, MS 1964, Kan. St. Univ.
- CHAPMAN, THOMAS E.**, Assoc. Prof. of Physiological Chemistry (1969, 1974). Research Nutritional Physiologist. BS 1962, DVM 1964, PhD 1969, Univ. of Calif. (GF)
- CLARENBERG, RUDOLF**, Prof. of Physiological Chemistry (1966, 1974). Research Physiological Chemist. BS 1954, PhD 1959, St. Univ. of Utrecht. (GF)
- COFFEE, E. GUY**, Asst. Prof., Veterinary Medicine Library (1970). AB 1958, Univ. of Mo.; ML 1970, Kan. St. Teach. Col.
- COLES, EMBERT H., JR.**, Prof. and Head, Department of Infectious Diseases (1954, 1964). Research Clinical Pathologist. DVM 1945, Kan. St. Univ.; MS 1946, Iowa St. Col.; PhD 1958, Kan. St. Univ. (GF)
- COOK, JAMES E.**, Prof. and Head, Department of Pathology (1969, 1972, 1975). Dir. of Animal Resource Facility. Research Pathologist. Diplomate, American Col. of Veterinary Pathologists, 1956; DVM 1951, Okla. St. Univ.; PhD 1970, Kan. St. Univ. (GF)
- OENNIS, STANLEY M.**, Prof. of Pathology. Research Pathologist. (1966, 1968). FRCVS 1962, BVSc 1949, PhD 1961, Univ. of Sydney. MRD Path. 1974. (AID Nigeria, 1975-1977.) (GF)
- OORN, ALBERT S.**, Asst. Prof. of Small Animal Surgery (1973). DVM 1965, Univ. of Ill.; MS 1968, Auburn Univ.
- FEDDE, M. ROGER**, Prof. of Physiology (1964, 1973). Research Neurophysiologist. BS 1957, Kan. St. Univ.; MS 1959, PhD 1963, Univ. of Minn. (GF)
- FRANK, EDWARD R.**, Prof. of Surgery Emeritus (1926, 1935, 1962). BS 1918, DVM 1924, MS 1929, Kan. St. Univ.
- FRANK, RONALD E.**, Instr. (1973, 1976). BA 1972, Ft. Hays St. Col.
- FREY, RUSSELL A.**, Prof. and Head, Department of Anatomy and Physiology (1963, 1970, 1975). DVM 1952, PhD 1970, Kan. St. Univ. (GF)
- FRICK, EDWIN J.**, Prof. Emeritus of Surgery and Medicine. (1919, 1935, 1966). DVM 1918, Cornell Univ. (GF)
- GABBERT, NATHAN H.**, Asst. Prof. of Small Animal Medicine (1973). DVM 1963, Wash. St. Univ.
- GRAY, ANDREW P.**, Assoc. Prof., Diagnostic Lab. (1964, 1971). Research Pathologist. DVM 1953, MS 1963, PhD 1966, Kan. St. Univ. (GF)
- GUFFY, MARK M.**, Prof. of Radiology (1963, 1976). Diplomate, American Col. of Veterinary Radiology, 1968. DVM 1949, MS 1966, Colo. St. Univ. (GF)
- HARTKE, GLENN T.**, Asst. Prof. of Anatomy (1962, 1974). BS 1958, DVM 1960, MS 1965, PhD 1974, Kan. St. Univ.
- HOWARD, DENNIS R.**, Instr., Diagnostic Lab. (1972, 1976). BS 1972, MS 1976, Kan. St. Univ.
- JERNIGAN, LOYCE O.**, Temp. Asst. Prof. of Medicine (1965). DVM 1945, Kan. St. Univ.
- JOHNSON, LINDA M.**, Asst. Instr. (1970). BS 1969, Ohio Univ.
- JULIUS, MARCIA F.**, Instr., Asst. to the Dean (1972, 1976). BS 1965, MS 1976, Kan. St. Univ.
- KELLEY, DONALD C.**, Prof. of Public Health (1958, 1969). Research Mycologist, Diplomate, American Board of Veterinary Public Health. DVM 1935, MS 1952, Kan. St. Univ. (GF)
- KENNEDY, GEORGE**, Instr. (1970). DVM 1967, Wash. St. Univ.; PhD 1975, Kan. St. Univ.
- KIMBALL, ALICE DAY**, Instr. in Pathology, Parasitology and Public Health Emeritus (1934, 1955). BS 1935, Kan. St. Univ.
- KITSELMAN, CHARLES H.**, Prof. of Pathology Emeritus (1919, 1933, 1965). VMD 1918, Univ. of Pa.; MS 1927, Kan. St. Univ. (GF)
- KLEMM, ROBERT D.**, Assoc. Prof. of Anatomy (1972). Research Functional Morphologist. BS 1957, Capital Univ.; MS 1959, Ohio Univ.; PhD 1964, Southern Ill. Univ. (GF)
- KRUCKENBERG, SAMUEL M.**, Assoc. Prof. of Pathology (1975, 1976). Research Pathologist. Diplomate, American Col. of Laboratory Animal Medicine, 1968. DVM 1963, MS 1965, PhD 1971, Kan. St. Univ.

- LEASURE, ELDEN E.**, Dean Emeritus; Prof. of Pathology, Parasitology and Public Health Emeritus (1926, 1948, 1964). DVM 1923, MS 1930, Kan. St. Univ. (GF)
- LEIPOLD, HIRST W.**, Prof. of Pathology (1970). Research Pathologist. DVM 1963, Justus Liebig Univ.; MS 1967, PhD 1968, Kan. St. Univ. (GF)
- LELAND, STANLEY E., JR.**, Adjunct Prof. of Parasitology (1967, 1975). Research Parasitologist, Assoc. Dir., Agr. Exp. Sta. (1975). BS 1949, MS 1950, Univ. of Ill.; PhD 1953, Mich. St. Univ. (GF)
- LINDQUIST, WILLIAM D.**, Prof. of Parasitology (1968). Research Parasitologist. BS 1940, MS 1942, Univ. of Idaho; ScD 1949, Johns Hopkins Univ. (GF)
- MILLERET, ROY J.**, Assoc. Prof., Diagnostic Lab. (1960, 1974). Research Pathologist. DVM 1944, MS 1959, Kan. St. Univ.
- MINOCHA, HARISH C.**, Assoc. Prof. of Virology (1969). Research Virologist. BVSc 1955, Ind.; MS 1963, PhD 1967, Kan. St. Univ. (GF)
- MODRE, WILLIAM E.**, Assoc. Prof. of Clinical Pathology (1968, 1973). Research Clinical Pathologist. Diplomate, American Col. of Veterinary Pathologists, 1972. BS 1956, DVM 1958, Cornell Univ.; PhD 1968, Univ. of Minn. (GF)
- MOSIER, JACOB E.**, Prof. and Head, Department of Surgery and Medicine (1945, 1961). Diplomate, American Col. of Veterinary Internal Medicine, 1972. DVM 1945, MS 1948, Kan. St. Univ. (GF)
- NOORDSY, JOHN L.**, Prof. of Surgery, Asst. Dean (1960, 1966, 1976). Research Clinical Scientist. BS 1943, S.D. St. Col.; DVM 1946, MS 1962, Kan. St. Univ. (GF)
- OEHME, FREDERICK W.**, Prof. of Toxicology, Medicine and Physiology (1959, 1973). Research Toxicologist. Diplomate, American Board of Veterinary Toxicology, 1968. BS 1957, DVM 1958, Cornell Univ.; MS 1962, Kan. St. Univ.; Dr. Med. Vet. 1964, Justus Liebig Univ.; PhD 1969, Univ. of Mo. (GF)
- OLSON, JAY R.**, Asst. Prof. of Medicine (1970, 1972). DVM 1945, Kan. St. Univ.
- PHILLIPS, ROBERT M.**, Assoc. Prof., Diagnostic Lab. (1975). Research Virologist. DVM 1951, Kan. St. Univ.; PhD 1972, Univ. of Ga.
- QUINN, MARYLEE E.**, Instr. of Clinical Pathology (1975). BS 1964, Benedictine Col.
- RAILSBACK, LEE T.**, Prof. of Surgery and Medicine (1961, 1976). BS 1936, DVM 1937, Kan. St. Univ.
- SAMUELSON, MARVIN L.**, Asst. Prof. of Small Animal Medicine (1973, 1975). DVM 1956, Kan. St. Univ.
- SCHNEIDER, JACOB E.**, Assoc. Prof. of Equine Medicine (1972). BS 1958, DVM 1960, Colo. St. Univ.
- SCHONEWEIS, DAVID A.**, Asst. Prof. of Food Animal Medicine (1966, 1972). BS 1956, DVM 1956, MS 1971, Kan. St. Univ. (GF)
- SHAW, JOANN S.**, Instr. (1972). BS 1965, St. Univ. of N.Y.; MS 1969, N.C. St. Univ.
- SMITH, JOSEPH E.**, Assoc. Prof. of Pathology (1969). Research Pathologist. Diplomate, American Col. of Veterinary Pathologists, 1972. BS 1959, DVM 1961, Tex. A & M Univ.; PhD 1964, Univ. of Calif. (GF)
- STRAFUSS, ALBERT C.**, Assoc. Prof. of Pathology (1968). Research Pathologist. BS 1952, DVM 1954, Kan. St. Univ.; MS 1958, Iowa St. Univ.; PhD 1963, Univ. of Minn. (GF)
- TAUSSIG, ROBERT A.**, Asst. Prof. of Small Animal Medicine (1966, 1970). DVM 1945, Colo. St. Univ.; MS 1970, Kan. St. Univ.
- TROTTER, DONALD M.**, Dean; Prof. of Anatomy (1956, 1971). Research Anatomist. Assoc. Dir., Agr. Exp. Sta. Diplomate, American Col. of Veterinary Pathologists, 1951; DVM 1946, MS 1957, Kan. St. Univ. (GF)
- UNOERBJERG, GRAVERS K.L.**, Prof. Emeritus of Physiology (1948, 1972). BS 1926, Royal Veterinary and Agricultural Col., Copenhagen; DVM 1943, PhD 1939, Iowa St. Univ. (GF)
- UPSON, OAN W.**, Prof. of Pharmacology (1959, 1974). DVM 1952, MS 1962, PhD 1969, Kan. St. Univ. (GF)
- WEINMAN, DONALD E.**, Assoc. Prof. of Anatomy (1974). Research Anatomist. DVM 1946, Kan. St. Univ.; MSc 1960, PhD 1967, Univ. of Ga. (GF)
- WEST, JOHN L.**, Prof., Diagnostic Lab. (1974). Research Pathologist. DVM 1936, Kan. St. Univ.; MS 1948, PhD 1952, Univ. of Wis. (GF)
- WESTFALL, JANE A.**, Prof. of Microanatomy (1957, 1976). Research Neuroscientist. AB 1950, Col. of Pacific; MA 1952, Mills Col.; PhD 1965, Univ. of Calif. (GF)
- WILLARD, LLOYD H.**, Instr., Animal Resource (1972). BS 1970, Kan. St. Univ.

## Division of Continuing Education

- AYRES, BETTY A.**, Asst. Dir. (1974). BA 1961, MA 1972, Univ. of Iowa.
- BILES, BERTRAM R.**, Instr. (temporary) (1972). BA 1963, PhD 1976, Kan. St. Univ.
- BROCK, STEPHEN C.**, Assoc. Prof. (1975). BA 1964, Lake Forest Col.; MA 1966, PhD 1968, Cornell Univ.
- CASHIN, WILLIAM E.**, Assoc. Prof. (1975). BA 1958, MA 1961, PhD 1969, Catholic Univ. of America.
- CRYER, DENNIS C.**, Asst. Prof. (1975). BA 1969, MA 1970, Univ. of Northern Iowa; PhD 1975, Univ. of Utah.
- DIECKHOFF, KENNETH L.**, Instr. (1969). BA 1965, Ft. Hays St. Col.; MA 1969, Univ. of Kan.
- DRAVES, WILLIAM A.**, Instr. (temporary) (1976). BA 1971, Univ. of Wis.; MA 1976, Geo. Wash. Univ.
- DUNN, MADELINE L.**, Asst. Instr. (1972). BS 1941, Kan. St. Teachers Col.
- DUNN, WELLINGTON J.**, Instr. (1975). BS 1959, Kan. St. Univ.
- FLAHERTY, ROBERTA O.**, Instr. (temporary) (1970, 1975). BEd 1970, Washburn Univ. of Topeka.
- HAROLO, E. NORMAN**, Dir., Asst. Prof. (1963). BA 1960, Emporia Kan. St. Teachers Col.; MA 1962, Vanderbilt Univ.; PhD 1975, Kan. St. Univ.
- HAZLETT, EMERSON L.**, Asst. Prof. (1969, 1974). BS 1952, MS 1964, Univ. of Kan.; PhD 1973, Kan. St. Univ.
- HEBERT, JOSEPH P., JR.**, Instr. (temporary) (1974). BS 1952, Univ. of Southwest La.; MS 1959, St. Louis Univ.; MS 1969, Univ. of Southern Calif.; PhD 1974, Kan. St. Univ.
- IRELAN, WILLIAM W.**, Instr. (temporary) (1975). BS 1972, Kan. St. Univ.
- KILLACKY, CECIL J.**, Instr. (temporary) (1974). BA 1971, MA 1973, Kan. St. Univ.; MSW 1974, Washington Univ. at St. Louis.



**KRAMER, J. LANCE**, Assoc. Dir., Assoc. Prof. (1975). BS 1965, MS 1966, PhD 1972, Univ. of Wis., Madison.

**LOCKHART, WILLIAM E.**, Asst. Prof. (1969, 1972). BS 1957, Kan. St. Col. at Pittsburg; MA 1969, Ariz. St. Univ., PhD 1972, Kan. St. Univ.

**MAES, SUE C.**, Instr. (1974). BS 1969, MS 1972, Kan. St. Univ.

**MARTIN, HENRY M.**, Instr. (1974). BS 1971, Univ. of Ark.; MS 1975, Kan. St. Univ.

**MATHEWSON, MARGARET P.**, Instr. (1975). BA 1969, Cornell Univ.; MA 1972, Univ. of N.C.

**MCCALLUM, WILLIAM A.**, Asst. Prof. (temporary) (1974, 1975). BA 1967, Calif. St. Univ. at Long Beach, MS 1968, Calif. St. Univ. at Los Angeles, PhD 1973, Fla. St. Univ.

**MICHAEL, DAVID E.**, Instr. (temporary) (1971). BA 1961, Kan. Wesleyan Univ.

**MILLER, MAX B.**, Asst. Prof. (1946). BS 1946, MS 1950, Kan. St. Univ.

**NOBLE, MARION L.**, Asst. Prof. (1972). BS 1966, Eastern Ky. Univ.; MA 1968, Univ. of Md., PhD 1970, Univ. of Tex. at Austin.

**RIPPETOE, JOSEPH K.**, Instr. (temporary) (1973). BS 1972, MA 1973, Kan. St. Univ.

**SLAWSON, HUGH M.**, Instr. (1975). BS 1970, MBA 1975, Univ. of Rochester.

**STAMEY, ROBERT W.**, Asst. Dir., Instr. (1972). BS 1971, Kan. St. Univ.

**STEFFEN, JOHN D.**, Asst. Prof. of Education (1967). BA 1956, Hamline Univ.; PhD 1968, Univ. of Minn.

**WILLIAMSON, MICHAEL M.**, Asst. Prof. (1962). BS 1956, MA 1962, Kan. St. Univ.

## Division of Cooperative Extension

**ABELL, JOHN R.**, Asst. Prof.; Extension 4-H Specialist in Outdoor Education (1975). BS 1964, Mich. St. Univ.; MS 1965, Ind. Univ.

**ADAMS, JAMES P.**, Asst. Prof.; Area Extension Specialist, 4-H and Youth (1976). BS 1969, Kan. St. Univ.; MS 1971, Okla. St. Univ.

**ALBRIGHT, KENNETH B.**, Asst. Prof.; Area Extension Specialist, Rural Development (1955, 1976). BS 1952, Kan. St. Univ.; MEd 1967, Colo. St. Univ.

**ALLEN, ERIC B.**, Instr.; Area Extension Economist, Farm Management (1973). BS 1971, MS 1972, Kan. St. Univ.

**ALLEN, GERTRUDE E.**, Prof. Emeritus; Extension Specialist in Foods and Nutrition (1929, 1960). BS 1923, Univ. of Minn.; MS 1936, Kan. St. Univ.

**AMSTEIN, WILLIAM G.**, Prof. Emeritus; Extension Specialist, International Participant Training (1929, 1968). BS 1927, Univ. of Mass.; MS 1928, Kan. St. Univ.

**ANDERSON, ELINOR A.**, Assoc. Prof.; Extension Specialist, Family Economics (1957, 1971). BS 1939, MS 1952, Kan. St. Univ.

**APEL, J. DALE**, Prof.; Assoc. State Leader, 4-H and Youth (1962, 1967). BS 1950, Kan. St. Univ.; MS 1961, The American Univ.; PhD 1966, Univ. of Chicago (GF).

**APPLEBY, MARIELLEN J.**, Asst. Prof.; Area Extension Home Economist (1955, 1965). BS 1955, Kan. St. Univ.; MS 1965, Univ. of Md.

**APPLEBY, THOMAS E.**, Instr.; Area Extension Economist in Farm Management (1960). BS 1959, MS 1967, Kan. St. Univ.

**ASLIN, RAYMOND G.**, Asst. Prof.; Area Extension Forester (1975). BS 1972, MS 1975, Univ. of Mo.

**ATCHISON, FRED D.**, Asst. Prof.; Area Extension Forester (1964). BS 1954, Univ. of Ga.; MS 1972, Ft. Hays Kan. St. Col.

**ATKINSON, DAISY E.**, Asst. Prof.; Extension Specialist in Human Nutrition (1959). BS 1938, Univ. of Iowa, MS 1954, Univ. of Ala.

**BADEN, RANDALL B.**, Asst. Prof.; Area Extension Economist (1976). BS 1973, MS 1975, Okla. St. Univ.

**BAKER, E. KIRK**, Asst. Prof.; Extension Specialist, Community Resource Development (1955, 1966). BS 1949, Okla. St. Univ.; MS 1966, Kan. St. Univ.

**BAKER, RICHARD P.**, Instr.; Extension Specialist, Radio and TV (1977). BS 1972, Kan. St. Univ.

**BALOING, JAMES L.**, Assoc. Prof.; Extension Specialist in Formula Feeds Manufacturing (1965, 1976). BS 1960, MS 1971, Kan. St. Univ.

**BALLOU, RUSSELL S.**, Instr.; Motion Picture Production, Radio and TV (1973). BS 1971, Kan. St. Univ.

**BARTLETT, CLARENCE E.**, Instr. Emeritus; Extension Economist in Farm Management (1947, 1969). BS 1929, Univ. of Neb.

**BARTON, DAVID G.**, Asst. Prof.; Extension Economist, Marketing Information and Agricultural Firm Management (1976). BS 1967, Utah St. Univ.; MS 1970, PhD 1974, Purdue Univ.

**BATES, CHARLES T.**, Assoc. Prof.; Extension Specialist in 4-H and Youth (1956, 1972). BS 1951, Okla. A & M, MS 1960, Univ. of Wis.

**BAUGHMAN, MELVIN J.**, Instr.; Area Extension Forester (1971). BS 1970, MS 1971, Mich. St. Univ.

**BIEBERLY, FRANK G.**, Prof.; Section Leader and Extension Specialist in Crops and Soils (1941, 1949). BS 1938, MS 1949, Kan. St. Univ.

**BILES, LARRY E.**, Asst. Prof.; Area Extension Forester (1967). BS 1967, Univ. of Mo.; MS 1974, Kan. St. Univ.

**BISWELL, CLIFFORD R.**, Assoc. Prof., Asst. St. Extension Forester (1957, 1971). BS 1954, MS 1965, Univ. of Mo.

**BITTEL, STEVEN G.**, Asst. Prof.; Area Extension Specialist, Community Resource Development (1973). BA 1969, Ft. Hays St. Col.; MS 1973, Kan. St. Univ.

**BLANKENHAGEN, ELMER W.**, Asst. Prof. Emeritus, Coordinator, Schedules and Reports (1950, 1973). BS 1948, Kan. St. Univ.

**BLECHA, FRANK O.**, Prof. Emeritus, District Agricultural Agent (1919, 1950). BS 1918, MS 1924, Kan. St. Univ.

**BLEVINS, KENNETH M.**, Extension Specialist, TV Production (1974). BS 1951, Emporia Kan. St. Col.

**BOGGESE, EDWARD K.**, Asst. Prof.; Area Extension Specialist, Wildlife Damage Control (1975). BS 1973, MS 1975, Iowa St. Univ.

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**SCHUSTER, NANCY O.**, Instr., Anderson County, Garnett (1972). BS 1972, Ft. Hays Kan. St. Col.

**SCHWERTFAGER, JOLENE J.**, Instr., McPherson County, McPherson (1971). BS 1969, Ft. Hays Kan. St. Col.

**SEBES, DOROTHY O.**, Instr., Hodgeman County, Jetmore (1967). BS 1967, Bethel Col.

**SHIELDS, SANORA A.**, Instr., Cowley County, Winfield (1965, 1971). BS 1965, Kan. St. Univ.

**SINIARO, JOYCE P.**, Instr., Stanton County, Johnson (1971). BS 1971, Southwest Mo. St.

**STEFFENS, PATRICIA E.**, Instr., Crawford County, Girard (1971). BS 1958, Univ. of Okla.; MEd 1962, Pittsburg Kan. St. Col.

**STEPHENS, JANET F.**, Instr., Greenwood County, Eureka (1970). BS 1970, Pittsburg Kan. St. Col.

**STORY, CONSTANCE L.**, Instr., Wilson County, Fredonia (1975). BS 1975, Kan. St. Univ.

**STRYKER, MARILYN B.**, Instr., Saline County, Salina (1975). BA 1970, Southwestern Col.; MS 1971, Kan. St. Univ.

**STUBBS, EUNICE F.**, Instr., Ottawa County, Minneapolis (1974). BS 1971, Kan. St. Univ.

**SULLIVAN, CARLA M.**, Instr., Chautauqua County, Sedan (1973). BS 1973, Kan. St. Univ.

**SWENSON, SHELLEY C.**, Instr., Cloud County, Concordia (1975). BS 1974, South Dakota St. Univ.

**SWISHER, MARY T.**, Instr., Rush County, LaCrosse (1970). BS 1970, Kan. St. Univ.

**THODEN, NADA F.**, Instr., Miami County, Paola (1965). BS 1965, Colo. St. Univ.

**THOMPSON, LOUISE P.**, Instr., Kiowa County, Greensburg (1968). BS 1945, Kan. St. Univ.

**THORSELL, CATHERINE**, Instr., Clark County, Ashland (1968). BS 1968, Kan. St. Univ.

**TOOT, JANICE C.**, Instr., Seward County, Liberal (1966, 1972). BS 1966, Kan. St. Univ.

**TRAUX, RUBY C.**, Instr., Sedgwick County, Wichita (1959). BS 1936, Kan. St. Univ.

**VICE, FAYE E.**, Instr., Labette County, Altamont (1946). BS 1941, Okla. Col. for Women

**VIOLA, L. ANN**, Instr., Shawnee County, Topeka (1974). BS 1969, Kan. St. Univ.

**WATTS, TRANDA W.**, Instr., Gove County, Gove (1972). BS 1972, Ft. Hays Kan. St. Col.

**WEAVER, JANET I.**, Instr., Clay County, Clay Center (1974). BA 1974, Ottawa Univ.

**WEAVER, MAE K.**, Instr., Barton County, Great Bend (1952). BS 1949, Kan. St. Univ.

**WEAVER, MARSHA K.**, Instr., Dickinson County, Abilene (1976). BS 1972, Kan. St. Univ.

**WELCH, DORIS M.**, Instr., Kearny County, Lakin (1976). BS 1967, Jacksonville St. Univ.

**WILLIAMS, ELIZABETH A.**, Instr., Cheyenne County, St. Francis (1975). BS 1974, Texas Tech.

**WOLFE, FRANCES M.**, Instr., Wyandotte County, Kansas City (1970). BS 1941, Marymount Col.

**WUTKE, BETTY D.**, Instr., Bourbon County, Fort Scott (1968). BS 1968, Pittsburg Kan. St. Col.

**YOUNG, CAROL H.**, Instr., Edwards County, Kinsley (1976). BS 1966, Emporia Kan. St. Col.; MEd 1971, Wichita St. Univ.

## County Extension 4-H Agents

**ANDEREGG, MARVIN K.**, Instr., Labette County, Altamont (1969). BS 1969, Kan. St. Univ.

**BAILEY, MARTHA E.**, Instr., Crawford County, Girard (1976). BS 1974, Kan. St. Univ.

**CASEY, LINDA M.**, Instr., Seward County, Liberal (1974, 1976). BS 1973, No. Dak. St. Univ.

**CHRISTIAN, MICHAEL L.**, Instr., Dickinson County, Abilene (1975). BS 1973, Okla. St. Univ.

**CLAWSON, ELOON L.**, Instr., Shawnee County, Topeka (1965, 1967). BS 1965, Kan. St. Univ.

**DAVIS, ROBERT J.**, Instr., Reno County, Hutchinson (1967, 1971). BS 1964, Kan. St. Univ.

**DeWERFF, DONALD M.**, Instr., Rice County, Lyons (1977). BS 1976, Kan. St. Univ.

**FORD, DENNIS T.**, Instr., Butler County, El Dorado (1976). BS 1975, Okla. St. Univ.

**FORD, RODY O.**, Instr., Sumner County, Wellington (1964, 1977). BS 1964, MS 1975, Okla. St. Univ.

**FULTZ, WILLIAM E.**, Instr., Sedgwick County, Wichita (1962, 1970). BS 1961, Kan. St. Univ.; MEd 1964, Wichita St. Univ.

**GATTON, LILA M.**, Instr., Saline County, Salina (1975). BS 1975, Kan. St. Univ.

**GUETTERMAN, STEPHEN F.**, Instr., Ellis County, Hays (1976). BS 1975, Kan. St. Univ.

**KEHLER, DAVID F.**, Instr., Cherokee County, Columbus (1976). BS 1975, Kan. St. Univ.

**LANHAM, K. EUGENE**, Instr., Wyandotte County, Kansas City (1971). BS 1970, Kan. St. Univ.

**LARSON, CHARYL D.**, Instr., Finney County, Garden City (1976). BS 1976, Kan. St. Univ.

**LAUFERT, CELESTE K.**, Instr., Grant County, Ulysses (1977). BS 1976, Colo. St. Univ.

**LOVEDAY, RITA T.**, Instr., Riley County, Manhattan (1974). BS 1972, Univ. of Tenn.

**MALONE, ALTON B.**, Instr., Lyon County, Emporia (1973). BA 1968, BA 1971, Emporia Kan. St. Col.

**RECTOR, RALPH B.**, Instr., Leavenworth County, Leavenworth (1949, 1956). BS 1952, MS 1969, Kan. St. Univ.

**RICHARDSON, LINDY L.**, Instr., Douglas County, Lawrence (1973, 1977). BS 1973, Kan. St. Univ.

**SHARP, JAMES M.**, Instr., Sedgwick County, Wichita (1973). BS 1971, Kan. St. Univ.

**SMITH, JENELL M.**, Instr., Sedgwick County, Wichita (1974). BS 1971, Kan. St. Univ.

**STOVER, BARBARA J.**, Instr., Miami County, Paola (1976). BS 1976, Kan. St. Univ.

**STUDER, RAYMONO L.**, Instr., McPherson County, McPherson (1966). BS 1961, Kan. St. Univ.

**SULZBACH, JACQUE L.**, Instr., Russell County, Russell (1976). BS 1976, Friends Univ.

**SWISHER, BRIAN A.**, Instr., Montgomery County, Independence (1976). BS 1975, Kan. St. Univ.

**VAN SKIKE, WILLIAM V.**, Instr., Barton County, Great Bend (1950, 1959). BS 1950, Kan. St. Univ.; MEd 1965, Colo. St. Univ.

**VERDOORN, SUSAN M.**, Instr., Franklin County, Ottawa (1974). BS 1974, Iowa St. Univ.

**WEAVER, ELDON R.**, Instr., Cowley County, Winfield (1968). BS 1951, Kan. St. Univ.; MEd 1975, Colo. St. Univ.

**WILSON, MARGARET E.**, Instr., Ford County, Dodge City (1972). BS 1972, Kan. St. Univ.

**WINEINGER, PATRICK S.**, Instr., Harvey County, Newton (1974, 1976). BS 1973, Kan. St. Univ.

## County Extension Horticultural Agents

**KAPS, MARTIN L.**, Instr., Butler County, El Dorado (1977). BS 1964, Ohio Univ.; MS 1976, Ohio St. Univ.

**KIBBY, JIMMIE R.**, Instr., Wyandotte County, Kansas City (1966, 1973). BS 1965, MS 1966, Okla. St. Univ.

**MORRIS, MAX B.**, Instr., Shawnee County, Topeka (1965). BS 1959, Kan. St. Univ.

**STOUSE, LAWRENCE D.**, Instr., Johnson County, Olathe (1966). BS 1963, Kan. St. Univ.

**THOLE, H. THOMAS**, Instr., Barton County, Great Bend (1965, 1966). BS 1965, Okla. St. Univ.

**WARMINSKI, NORMAN C.**, Instr., Sedgwick County, Wichita (1968, 1970). BS 1964, Okla. St. Univ.; MS 1968, Texas A&M

**WELFELT, DAVID S.**, Instr., Harvey County, Newton (1975, 1976). BS 1974, Kan. St. Univ.



# Student Conduct and Records Policy

## Philosophy Of Student Conduct

The members of the university community at K-State expect its students to make mature responses to problem situations and to conduct themselves in exemplary fashion as they interact with all members of the learning community. However, if a student is unable to act as a responsible citizen in the university setting and violates the KSU Honor Conduct Code, the other members of the university community feel that they have an obligation to assist him, help review the action, confront the student and those who have been offended, and make every effort to readjust the student's goals and responsibilities to the extent self-obligations and obligations to others can be fulfilled effectively and fully and continue the student's program toward a degree.

The confrontation necessary to bring about this analysis and potential change is provided by staff members of the Center for Student Development, faculty advisers, and student judicial system.

As the individual is involved in actions which do not meet the requirements of the members of the educated community, he or she is confronted and has the opportunity for change. There may be times when peers and those responsible for the climate of learning of the university feel that the best opportunity for change lies outside the university community. The student may be asked to remove himself or herself from the university setting for a particular amount of time. Such action is not taken lightly and must be taken in the context of concern for the growth and development of the student. It is expected that each student in the university community abide by the University Honor Conduct Code and assist each other student in the university community to do likewise.

## KSU Honor And Conduct Code

Individual responsibility and self-government are the major principles in maintaining honorable relations among K-State students, between the students and the faculty, and between the students and other members of the local community. All students are expected to show both within and outside the university respect for personal honor and the rights of others. A Student's Conduct and Behavior Will Conform to Standards of a Good Citizen When:

1. Kansas State University rules and regulations are adhered to.
2. Local community laws and customs are abided by.
3. He or she is honest in all scholastic work.
4. No irresponsible, destructive, or riotous acts are committed.
5. No acts reflecting adversely on Kansas State University, or acts which are detrimental to the public are committed.
6. The rights of fellow students are respected.

## Academic Honesty

The encouragement of high standards of academic honesty and integrity on the part of students is a function of every member of the faculty. Violations of the K-State Honor Code, instances of plagiarism, and cheating in an examination receive discipline from the instructor involved. While the instructor may exercise considerable discretion in assessing penalties for dishonest practices, if in doubt as to the proper course of action the student should report the case through the Department Head to the office of the Dean of the College. The Office of the Vice President for Student Affairs frequently has access to correlative information which makes possible a more positive and consistent treatment of individual behavioral problems.

Disciplinary actions resulting in dismissal from the University are noted on the student's permanent record; other disciplinary actions become a part of the student's personnel record.

Questions concerning the K-State Honor Code and procedures concerning policies in student affairs and government should be directed to the Office of Student Affairs.

## Student Records

### University Policy Regarding Student Records

Kansas State University maintains various records concerning students, to document their academic progress as well as to record their interactions with



University staff and officials. In order that the student's rights to privacy be preserved, as well as to conform with federal law, the University has established certain policies to govern the handling of students' records. Interpretation of these policies is based on continued experience with educational records, and the policies themselves may subsequently be modified in light of this experience.

### 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 Kansas State, awards and academic honors, degrees and dates awarded, most recent educational institution attended, participation in officially recognized activities and sports, and height and weight of members of athletic teams.

Directory information as defined above will be released by the Office of Admissions and Records for undergraduates and by the Graduate 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 should be made at the Office of Admissions and Records, 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 student records:

**1. Each type of student record is the responsibility of a designated University official, and only that person or the Dean, Director or Vice President to whom that person reports has authority to release the record.** The responsible officials are:

- a. Academic records: For undergraduates, the Director of Records; for graduate students, the Graduate Office
- b. Admissions records: For undergraduates, the Director of Admissions; for graduate students, the Graduate Office
- c. Financial aid records: Director of Aids and Awards

- d. Business records: University Comptroller
- e. Traffic and security records: Head of Traffic and Security Control
- f. Medical records: Director, Student Health Service
- g. Counseling records: Director, Counseling Center
- h. Actions of academic standards committees: College Dean
- i. Academic disciplinary records: Chair, Undergraduate Grievance Committee
- j. Non-academic disciplinary records: Dean of Students
- k. Residence hall records: Director of Residential Area
- l. Housing business records: Director of Housing
- m. Placement records: Director of Career Planning and Placement
- n. Evaluations for admission to graduate or professional programs: Dean or department head
- o. Special academic programs: Faculty member in charge of the program, and Dean of the College
- p. Foreign student records: Foreign student adviser
- q. Test scores for College Level Examination Program (CLEP), American College Testing Program (ACT), Miller Analogies Test (MAT), etc.: Director, Center for Student Development

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.

3. The responsible official may release records to University personnel who have a legitimate need for the information.

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

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—six copies free; one dollar per copy thereafter.



- b. Housing department records—four cents per page.
- c. Medical charts—free for medical, employment or marriage license purposes; otherwise \$7.50 to \$15.00.
- 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: 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 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.

#### **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 Director of Student Records. 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 Records 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 Director of Records.

#### **Review And Challenge Of Records**

Upon request, 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. It will be conducted by a hearing officer appointed by the President. The hearing will be held within two weeks. A decision will be rendered within two weeks after the hearing. The student will have the opportunity at the hearing to present any relevant evidence.

#### **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, Department of HEW, 330 Independence Avenue, S.W., Washington, D.C. 20201.



# Enrollment Summary

## Fall, 1976

### United States

Alabama	11
Alaska	7
Arizona	23
Arkansas	18
California	86
Colorado	56
Connecticut	48
Delaware	1
District of Columbia	7
Florida	31
Georgia	16
Hawaii	14
Idaho	5
Illinois	158
Indiana	28
Iowa	52
Kansas	15,634
Kentucky	9
Louisiana	32
Maine	8
Maryland	28
Massachusetts	52
Michigan	20
Minnesota	27
Mississippi	15
Missouri	524
Montana	5
Nebraska	129
Nevada	3
New Hampshire	1

New Jersey	85
New Mexico	26
New York	118
North Carolina	14
North Dakota	15
Ohio	39
Oklahoma	39
Oregon	10
Pennsylvania	59
Rhode Island	7
South Carolina	7
South Dakota	28
Tennessee	10
Texas	44
Utah	10
Vermont	7
Virginia	27
Washington	10
West Virginia	3
Wisconsin	44
Wyoming	19

U.S. TOTAL	17,669
Puerto Rico	19
International students	532
UNIVERSITY TOTAL	18,220

### International Students

Australia	2
Bangladesh	7
Bolivia	6
Brazil	7
Cameroon	2

Canada	3
Chile	1
Colombia	4
Dominican Republic	2
Ecuador	1
Egypt (U.A.R.)	4
El Salvador	1
Ethiopia	6
France	1
Germany	9
Ghana	3
Guyana	1
Hong Kong	14
India	64
Indonesia	2
Iran	78
Iraq	14
Ivory Coast	2
Japan	7
Jordan	5
Korea	16
Lebanon	4
Lesotho	1
Liberia	2
Libya	2
Malaysia	4
Mauritius	1

Mexico	8
Nepal	2
Netherlands	1
New Zealand	2
Niger	2
Nigeria	47
Pakistan	14
Panama	2
Peru	1
Philippines	7
Samoa	1
Saudi Arabia	11
Sri Lanka	3
Sudan	3
Switzerland	2
Syria	1
Taiwan	94
Tanzania	5
Thailand	22
Turkey	1
United Kingdom (England)	1
Uruguay	1
Venezuela	14
Vietnam	7
Yugoslavia	1
Zaire	1

Number of Countries	58
Number of Students	532
Number of Women	96
Number of Men	436
Number of Undergraduates	169
Number of Graduates	354

The above survey by county does not include permanent resident foreign students

# Degrees Conferred

## Academic Year 1975-76

	Men	Women	Total
<b>Agriculture</b>			
Agriculture	328	69	397
Bakery Science & Mgmt.	5	2	7
Feed Science & Mgmt.	3	0	3
Milling Science & Mgmt.	12	0	12
Food Science & Industry	2	0	2
College Total	349	71	421
<b>Architecture &amp; Design</b>			
Architecture	88	4	92
Interior Architecture	9	6	15
Landscape Architecture	14	3	17
Building Construction	0	0	0
College Total	111	13	124
<b>Arts &amp; Sciences</b>			
Bachelor of Arts	22	59	81
Bachelor of Fine Arts	10	24	34
Bachelor of Music	2	1	3
Bachelor of Science	411	276	687
B.S. in Music Ed.	12	18	30
B.S. in Physical Ed.	9	8	17
Associate of Arts	7	2	9
College Total	474	393	867

### Business Administration

Business Admin.	234	77	311
Associate of Arts	5	0	5
College Total	239	77	316

### Education

Bachelor of Science (Educ.)	36	60	96
B.S. in Elem. Ed.	13	140	153
College Total	49	200	249

### Engineering

Agricultural Engg.	12	1	13
Chemical Engg.	13	0	13
Civil Engg.	34	2	36
Electrical Engg.	43	2	45
Industrial Engg.	19	1	20
Mechanical Engg.	31	4	35
Nuclear Engg.	11	0	11
Engg. Technology	3	0	3
Architectural Engg.	7	0	7
Construction Science	30	0	30
College Total	203	10	213

### Home Economics

Home Economics	9	324	333
Home Econ. & Jour.	1	7	8

Restaurant Mgmt.	4	0	4
Food Science & Ind.	0	0	0
College Total	14	331	345
Total Baccalaureate Degrees	1440	1095	2536

### Veterinary Medicine

Doctor of Veterinary Medicine	82	11	93
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### Graduate School

Master of Architecture	3	0	3
Master of Arts	30	32	62
Master of Landscape Architecture	4	0	4
Master of Regional & Comm. Planning	16	1	17
Master of Science	326	285	311
Master of Bus. Adm.	23	8	31
Master of Music	7	1	8
Doctor of Philosophy	191	88	279
Total	600	415	1015
Total Degrees Conferred	2122	1521	3644



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