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KANSAS STATE UNIVERSITY

BULLETIN

MANHATTAN, KANSAS

GENERAL CATALOG 1966-1968



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KANSAS STATE UNIVERSITY BULLETIN



GENERAL CATALOG 1966-1968

DECEMBER 1966

KANSAS STATE UNIVERSITY
OF AGRICULTURE AND APPLIED SCIENCE
MANHATTAN, KANSAS

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The Kansas State University Bulletin is published monthly by the Kansas State University of Agriculture and Applied Science, Anderson Hall, Manhattan, Kansas 66502.

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Business Directions

General information about the University is obtainable from the President.

Prospective undergraduate students should communicate with the Dean of Admissions.

Prospective graduate students should communicate with the Dean of the Graduate School.

The experiment stations and the various departments are always ready to respond to requests for information in their special fields. Those who need scientific and practical information should write to the head of the department concerned with the work under consideration.

Requests for publications of the Agricultural Experiment Station or the Engineering Experiment Station should be made to the director of the station.

CALENDAR

FIRST SEMESTER, 1966-67

Sept. 1, Thurs. Beginning of pay period for 9-months staff.
Sept. 5, Mon. Holiday—Labor Day.
Sept. 11, 2:30 p.m., Sun. Convocation for new students and their parents.
Sept. 12-14, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
Sept. 15, Thurs. Classes begin. Late enrollment fee, \$2.50.
Sept. 17, Noon, Sat. Regular registration closes for University staff, elementary and secondary school teachers.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Sept. 24, Noon, Sat. Last day to enroll without special permission from student's Dean (2nd week).
Oct. 5, Wed. Last day for all students except new undergraduate students to drop courses without a Wd or Failure being recorded (18th class day).
Oct. 22, Noon, Sat. Last day to withdraw and receive a fee refund (6th week).
Oct. 29, Noon, Sat. Mid-semester grade reports due in Registrar's Office (7th week).
Nov. 12, Noon, Sat. Last day for new undergraduate students to drop courses without a Wd or Failure being recorded (9th week).
Nov. 22, 10:00 p.m., Tues. Thanksgiving student recess begins.
Nov. 24, Thurs. Holiday—Thanksgiving Day.
Nov. 28, Mon. Classes resume.
Dec. 21, 10:00 p.m., Wed. Christmas student recess begins.
Dec. 26, Mon. University holiday for Christmas Day.
Jan. 2, Mon. University holiday for New Year's Day.
Jan. 5, Thurs. Classes resume.
Jan. 14, Noon, Sat. Last day subject may be dropped before end of semester.
Jan. 23-28, Mon.-Sat. Semester examinations for *all* students.
Jan. 30, 12:00 Noon, Mon. Deadline for grade reports to Registrar.
Feb. 1, 8:00 a.m., Wed. Reports of failures from Registrar to Deans' offices.

SECOND SEMESTER, 1966-67

Feb. 2-Feb. 4, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
Feb. 6, Mon. Classes begin. Late enrollment fee, \$2.50.
Feb. 11, Noon, Sat. Regular registration closes for University staff, elementary and secondary teachers.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Feb. 14, 3:00 p.m., Tues. Senate meeting to approve candidates for degrees.
Feb. 18, Sat. Last day to enroll without special permission from student's Dean (2nd week).
Feb. 25, Noon, Sat. Last day for all students except new undergraduate students to drop courses without a Wd or Failure being recorded (18th class day).
Mar. 18, Noon, Sat. Last day to withdraw and receive a fee refund (6th week).
Spring student recess begins.
Mar. 27, Mon. Classes resume.
Apr. 1, Noon, Sat. Mid-semester grade reports due in Registrar's Office (7th week).
Apr. 15, Noon, Sat. Last day for new undergraduate students to drop courses without a Wd or Failure being recorded (9th week).
May 20, Noon, Sat. Last day a subject may be dropped before end of semester.
May 29-June 3, Mon.-Sat. Semester examinations for all students *except candidates for degrees*.
May 29, Noon, Mon. Grades to Registrar for all candidates for degrees.
June 1, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
June 3-4, Sat.-Sun. Commencement weekend.
June 5, Noon, Mon. Deadline for grade reports to Registrar.
June 8, 8:00 a.m., Thurs. Reports of failures from Registrar to Deans' offices.

8-WEEK SUMMER SESSION, 1967

June 12, 8:00 a.m., Mon. Registration of all students including physical examinations, testing, and orientation for new students.
June 13, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
June 16, 4:30 p.m., Fri. Regular registration closes for University staff.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Last day to enroll without special permission from student's Dean.
June 23, 4:30 p.m., Fri. Last day for all students except new undergraduate students to drop courses without a Wd or Failure being recorded (9th class day).
June 30, 4:30 p.m., Fri. Last day to withdraw from the 8-week session and receive a fee refund (3rd week).
July 4, Tues. Holiday—Independence Day.
July 7, 4:30 p.m., Fri. Mid-term grade reports due in Registrar's Office (4th week).
July 14, 4:30 p.m., Fri. Last day for new undergraduate students to drop courses without a Wd or Failure being recorded (5th week).
Aug. 1, 4:00 p.m., Tues. Last day subject may be dropped before end of session.
Aug. 4, Fri. Last day for examinations.
Aug. 7, 8:00 a.m., Mon. Deadline for grade reports to Registrar.

NOTE: Registration for short courses will be as announced in the Summer School Catalog for individual courses. Registration in each case will occur on the first day.

CALENDAR (Continued)

FIRST SEMESTER, 1967-68

Sept. 1, Fri. Beginning of pay period for 9-months staff.
 Sept. 4, Mon. Holiday—Labor Day.
 Sept. 10, 2:30 p.m., Sun. Convocation for new students and their parents.
 Sept. 11-13, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
 Sept. 14, Thurs. Classes begin. Late enrollment fee, \$2.50.
 Sept. 16, Noon, Sat. Regular registration closes for University staff, elementary and secondary school teachers.
 End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
 Sept. 23, Noon, Sat. Last day to enroll without special permission from student's Dean (2nd week).
 Oct. 4, Wed. Last day for all students except new undergraduate students to drop courses without a Wd or Failure being recorded (18th class day).
 Oct. 21, Noon, Sat. Last day to withdraw and receive a fee refund (6th week).
 Oct. 28, Noon, Sat. Mid-semester grade reports due in Registrar's Office (7th week).
 Nov. 11, Noon, Sat. Last day for new undergraduate students to drop courses without a Wd or Failure being recorded (9th week).
 Nov. 21, 10:00 p.m., Tues. Thanksgiving student recess begins.
 Nov. 23, Thurs. Holiday—Thanksgiving Day.
 Nov. 27, Mon. Classes resume.
 Dec. 20, 10:00 p.m., Wed. Christmas student recess begins.
 Dec. 25, Mon. Holiday—Christmas Day.
 Jan. 1, Mon. Holiday—New Year's Day.
 Jan. 4, Thurs. Classes resume.
 Jan. 13, Noon, Sat. Last day subject may be dropped before end of semester.
 Jan. 22-27, Mon.-Sat. Noon. Semester examinations for *all* students.
 Jan. 29, 12:00 Noon, Mon. Deadline for grade reports to Registrar.
 Jan. 31, 8:00 a.m., Wed. Reports of failures from Registrar to Deans' offices.

SECOND SEMESTER, 1967-68

Feb. 1-3, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
 Feb. 5, Mon. Classes begin. Late enrollment fee, \$2.50.
 Feb. 10, Noon, Sat. Regular registration closes for University staff, elementary and secondary teachers.
 End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
 Feb. 17, Sat. Last day to enroll without special permission from student's Dean (2nd week).
 Feb. 24, Noon, Sat. Last day for all students except new undergraduate students to drop courses without a Wd or Failure being recorded (18th class day).
 Mar. 16, Noon, Sat. Last day to withdraw and receive a fee refund (6th week).
 Mar. 23, Noon, Sat. Mid-semester grade reports due in Registrar's Office (7th week).
 Apr. 6, Noon, Sat. Last day for new undergraduate students to drop courses without a Wd or Failure being recorded (9th week).
 Spring student recess begins. (Easter is April 14.)
 Apr. 15, Mon. Classes resume.
 May 18, Noon, Sat. Last day a subject may be dropped before end of semester.
 May 27-June 1, Mon.-Sat. Noon. Semester examinations for all students *except candidates for degrees*.
 May 27, Noon, Mon. Grades to Registrar for all candidates for degrees.
 May 30, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
 June 1-2, Sat.-Sun. Commencement weekend.
 June 3, Noon, Mon. Deadline for grade reports to Registrar.
 June 6, 8:00 a.m., Thurs. Reports of failures from Registrar to Deans' offices.

8-WEEK SUMMER SESSION, 1968

June 10, 8:00 a.m., Mon. Registration of all students including physical examinations, testing, and orientation for new students.
 June 11, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
 June 14, 4:30 p.m., Fri. Regular registration closes for University staff.
 End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
 Last day to enroll without special permission from student's Dean.
 June 21, 4:30 p.m., Fri. Last day for all students except new undergraduate students to drop courses without a Wd or Failure being recorded (9th class day).
 June 28, 4:30 p.m., Fri. Last day to withdraw from the 8-week session and receive a fee refund (3rd week).
 July 4, Thurs. Holiday—Independence Day.
 July 5, 4:30 p.m., Fri. Mid-term grade reports due in Registrar's Office (4th week).
 July 12, 4:30 p.m., Fri. Last day for new undergraduate students to drop courses without a Wd or Failure being recorded (5th week).
 July 30, 4:00 p.m., Tues. Last day a subject may be dropped before end of session.
 Aug. 2, Fri. Last day for examinations.
 Aug. 5, 8:00 a.m., Mon. Deadline for grade reports to Registrar.

NOTE: Registration for short courses will be as announced in the Summer School Catalog for individual courses. Registration in each case will occur on the first day.

THE UNIVERSITY

The University, founded on February 16, 1863, was established under the Morrill Act, under which land-grant colleges came into being. According to the law of its establishment, the object of the University is—

“Without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”

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 campus is at the northwest corner of the city of Manhattan, convenient to both business and residential sections. The campus itself consists of 315 acres carefully landscaped, while beyond the campus there are 4,036 acres of land belonging to the University used for experimental work in agriculture. In addition there are five branches of the Agricultural Experiment Station located at Hays, Colby, Garden City, Mound Valley, and Tribune, totaling 4,555 acres plus a number of outlying experimental fields.

Most of the University buildings are constructed of native limestone. They are so placed as to give maximum effect to the landscaping of the campus.

Objectives of the Educational Program at Kansas State University

The objectives of the educational program at Kansas State University are to develop an individual capable of applying an enlightened judgment in his professional, his personal, and his social life. To that end the University program is designed:

- I. To provide full and efficient counseling and guidance to the student while in the University. Specifically, this means to:
 1. Learn and make known to the student before he enrolls all that is possible and useful about his interests, aptitudes, and abilities.
 2. Apply that knowledge to the student's choice of courses and curriculums as fully as possible without encroaching harmfully on his initiative and feeling of self-responsibility.
 3. Provide continuing guidance for the student according to his needs.
- II. To prepare the student adequately in a technical sense for an occupation or a profession which includes an organized body of information and theory, and educe his creative potentialities in the field of his choice. More specifically this means that the student should acquire:
 1. The ability to recognize and master fundamental principles in his field of specialization.
 2. The knowledge basic to his special field of study.
 3. The ability to reason critically from facts and recognized assumptions to useful technical conclusions.
 4. The basic skills associated with his field of study.
 5. A professional attitude in his chosen work.
- III. To provide every student 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 his communications 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 his personal responsibilities as an effective citizen 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 a well-adjusted personality, good character traits, and a sound philosophy of life.
 7. Prepare for effective participation in family life.
 8. Utilize actively and fully his capacity for esthetic appreciation and enjoyment.
 9. Promote high standards of personal and community health.
- 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.

Undergraduate Degrees

To graduate, a student must complete a prescribed curriculum. Under special conditions such substitutions are allowed as the interests of the student demand. The total requirement for four-year undergraduate curriculums ranges from 120 to 148 semester hours, according to the curriculum taken. (A semester hour is one hour of recitation or lecture work, or two or three hours of laboratory a week, for one semester. When no ambiguity is involved, the term "hour" is used for "semester hour" in this catalog.) For each semester hour of work a student gets points, according to the grades he makes, as follows: A, 4; B, 3; C, 2; D, 1; F, 0. To be awarded an undergraduate degree, students who enter after Sept. 1, 1964, and all who graduate after June, 1970, must have earned a grade-point average of at least 2.0 on all Kansas State University courses taken for resident credit and applied toward a degree. In addition, a 1.85 overall average in all resident courses is required.*

To be considered for an undergraduate degree, a student must have completed in residence 20 of his last 30 undergraduate hours, with not fewer than 30 hours of resident undergraduate credit at this institution. To receive a degree in the College of Arts and Sciences, any student enrolling in the University after September 1, 1960, must have completed 30 hours of resident credit while registered in the College of Arts and Sciences.

Resident work includes all regularly scheduled class or laboratory instruction given by the regular University faculty but excluding extension courses and courses completed by special examination. In special cases, candidates will be considered who have completed three full years of work in this institution and who petition to take their last year of work in an institution approved by the faculty. A student's dean is empowered by the faculty to lift the residence requirements for a degree on the basis of credits transferred from an accredited school of medicine, dentistry, or law. A student who has advanced credit accepted by this University or the equivalent of three semesters or more must, in order to qualify for the above privilege, maintain a grade-point average of 2.75 in the University.

A candidate for spring graduation must attend commencement unless granted the degree *in absentia*. Application to graduate *in absentia* must be filed with the candidate's dean who, if convinced that hardship would result if the request were denied, will present the case to be acted upon at the Senate meeting shown in the academic calendar for passing on candidates for degrees. Summer and fall graduates are invited to participate in the following spring commencement exercises but attendance is not required.

* Students who entered prior to June 1, 1964, are continued under old policy to June, 1970.

DEGREES

The degrees shown below are conferred on completion of the following four-year curriculums: The letter which precedes each curriculum indicates the prerequisite high school courses presented on page 11.

IN THE COLLEGE OF AGRICULTURE

- (E) Agriculture, B. S. in Agriculture, B. S. in Agricultural Journalism, page 50.
 - (Agricultural Economics major), page 50.
 - (Agricultural Journalism major), page 50.
 - (Agricultural Mechanization major), page 50.
 - (Agronomy major), page 50.
 - (Animal Husbandry major), page 51.
 - (Dairy Production major), page 51.
 - (Entomology major), page 51.
 - (Horticulture major), page 51.
 - (Plant Pathology major), page 52.
 - (Poultry Science major), page 52.
- (E) Agricultural Education (Teachers), B. S. in Agriculture, page 53.
- (E) Bakery Science and Management, B. S. in Bakery Science and Management, page 54.
 - (Administration option), page 54.
 - (Science option), page 54.
 - (Operations option), page 54.
- (E) Biochemistry, B. S. in Biochemistry, page 57.
- (E) Dairy Foods Processing, B. S. in Agriculture, page 58.
- (E) Feed Milling Science and Management, B. S. in Feed Milling Science and Management, page 55.
 - (Administration option), page 55.
 - (Chemistry option), page 55.
 - (Operations option), page 55.
- (E) Flour Milling Science and Management, B. S. in Flour Milling Science and Management, page 56.
 - (Administration option), page 56.
 - (Chemistry option), page 56.
 - (Operations option), page 56.

IN THE COLLEGE OF ARCHITECTURE AND DESIGN

- (F) Architecture (five years), Bachelor of Architecture, page 93.
- (F) Architectural Structures Option (five years), Bachelor of Architecture, page 94.
- (F) Architectural Interior Option (five years), Bachelor of Architecture, page 95.
- (E) Landscape Architecture (five years), Bachelor of Landscape Architecture, page 96.
- (F) Building Construction, B. S. in Building Construction, page 97.

IN THE COLLEGE OF ARTS AND SCIENCES

- (A) Applied Music, Bachelor of Music, page 118.
- (E) Biological Sciences (including Pre-veterinary), Bachelor of Science, page 108.
- (D) General (Biological Sciences major), Bachelor of Arts, page 115.
- (E) General (Physical Sciences, Pre-medicine, Pre-dentistry majors), Bachelor of Arts, page 115.
- (A) General (Social Sciences, Humanities majors), Bachelor of Arts, page 115.
- (A) Humanities, Bachelor of Arts, page 117.
- (A) Music Education, Bachelor of Science in Music Education, page 110.

- (A) Physical Education, Bachelor of Science in Physical Education, page 178.
- (E) Physical Sciences, Bachelor of Science, page 119.
- (B) Social Sciences, Bachelor of Arts, page 120.

IN THE COLLEGE OF COMMERCE

- (E) Business Administration, B. S. in Business Administration, page 217.
- (E) Accounting, B. S. in Business Administration, page 220.

IN THE COLLEGE OF EDUCATION

- (A) Elementary Education, Bachelor of Science in Elementary Education, page 229.
- (A) Secondary Education, Bachelor of Science, page 231.

IN THE COLLEGE OF ENGINEERING

- (F) Agricultural Engineering, B. S. in Agricultural Engineering, page 245.
- (F) Chemical Engineering, B. S. in Chemical Engineering, page 246.
- (F) Civil Engineering, B. S. in Civil Engineering, page 247.
- (F) Electrical Engineering, B. S. in Electrical Engineering, page 248.
- (F) Industrial Engineering, B. S. in Industrial Engineering, page 249.
- (F) Mechanical Engineering, B. S. in Mechanical Engineering, page 250.
- (F) Nuclear Engineering, B. S. in Nuclear Engineering, page 251.
 (Option I), page 252.
 (Option II), page 252.

Dual degree in Engineering and Business Administration, pages 231, 252.

IN THE COLLEGE OF HOME ECONOMICS

- (C) Home Economics with options. B. S. in Home Economics, page 291.
 (Home Economics Education—Vocational Teaching), page 291.
 (Extension), page 292.
 (Radio and Television), page 292.
 (Clothing and Retailing), page 292.
 (Textile Research), page 293.
 (Fashion Design), page 293.
 (Interior Design), page 294.
 (Community Services), page 294.
 (Preschool Education), page 295.
 (Consumer Interest), page 295.
 (Housing and Equipment), page 296.
 (Foods and Nutrition in Business), page 296.
 (Foods and Nutrition Research), page 297.
 (Dietetics and Institutional Management), page 297.
- (C) Home Economics and Journalism, B. S. in Home Economics and Journalism, page 298.
- (C) Home Economics with Liberal Arts, B. S. in Home Economics, page 299.
- (C) Home Economics and Nursing, B. S. in Home Economics, page 300.
- (C) Restaurant Management, B. S. in Restaurant Management, page 301.

IN THE COLLEGE OF VETERINARY MEDICINE

Veterinary Medicine, Doctor of Veterinary Medicine, page 315.
 (For completion of six-year combination of pre-veterinary curriculum and veterinary medicine curriculum)
 (See College of Arts and Sciences for B. S. degree in connection with College of Veterinary Medicine.)

Admission of Undergraduates

Students interested in attending Kansas State University should write to the Admissions Office for the admission application form. The student should complete the form, indicate the curriculum in which he plans to enroll and return it to the Admissions Office. All correspondence about admission should be addressed to this office.

High School Graduates

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

Specific admission procedures are given to each student at the time he inquires about admission to the University. Students are urged to apply early in their 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 previous section on undergraduate degrees. See pages 9 and 10.

- (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, or one unit of algebra and one unit of geometry.
- (D) One unit of algebra and one unit of geometry.
- (E) One and one-half units of algebra and one unit of geometry.
- (F) Two units of algebra, one unit of geometry, and one-half unit of trigonometry.

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

Transfer Students

All transfer students (those with previous college credit) are expected to have a 2.0 (C) overall average in their previous academic work in order to be considered for admission to the University. This standard applies to both Kansas and out-of-state transfer students.

Most credits from other accredited junior and senior colleges 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 by the University.

Transfer students should apply for admission approximately six 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 high school principal.

Admissions Counseling

The Admissions Office is open weekdays and on Saturday mornings during the academic year for admissions counseling. If a visit to the campus is planned for a Saturday morning, it is advisable to arrive between 9 a. m. and 11 a. m., since campus offices close at noon on Saturdays. During the summer offices are closed all day on Saturdays.

Normally a specific appointment is not needed, since several admissions counselors usually are available to consult concerning educational plans.

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

Advanced Placement

A student who has completed one of the College Entrance Examination Board Advanced Placement Tests should have a report of his scores sent to the director of admissions at Kansas State University. College Board Advanced Placement Tests are given in 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.

Pre-Enrollment

Students who have been admitted to Kansas State University will be scheduled for pre-enrollment. Pre-enrollment for the fall semester normally takes place in July of each year. Students are scheduled in groups of approximately 200 in number for one of the two-day pre-enrollment sessions. Specific information and instructions are sent to each student at the time the acceptance letter is mailed.

New Student Advisement

Each new student is assigned a faculty adviser at the beginning of the school year. This faculty adviser is available to him any time during the year when he needs help. Faculty advisers assist students in defining goals to be reached in college, give information regarding appropriate curriculums and courses, and discuss any personal problems that the students may have, especially those problems related to the student's progress and plans for subsequent work.

Late Admission

A student who seeks to enter the University later than 10 calendar days after the day classes begin for a semester is admitted only by special permission of his dean. Those who enroll after the regular registration period and prior to the end of the first week pay a late enrollment fee of \$2.50. College 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 first week must pay a late enrollment fee of \$5.00. (See University Calendar.)

Physical Examinations

All new students are required to take a physical examination prior to registration under the Board of Regents regulations.

It is recommended that all seniors take a physical examination and chest X ray prior to graduation.

Students who have been out of school one semester or longer are required to have a chest X ray upon return.

Special Students

A special student is one not regularly enrolled in work for a degree. Students who will enroll for only a few courses may wish to apply under this category.

Under certain circumstances, outstanding students are admitted as special students to take several courses in the summer between their junior and senior year in high school. To be considered for such admission the student must have the recommendation of his 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 that they did complete 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, payment of 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 Special Examination

Credit may be granted to entering freshmen and other students in any subject if a satisfactory examination is passed.

In general, permission to take examinations is given by the student's dean after consultation with the head of the department in which the course is given. A small fee is charged. A special examination may be given only to a previously or currently enrolled student. (See page 16.)

However, a first-semester freshman at Kansas State University may take a test to receive credit in English Composition I, Chemistry, Modern Languages, College Algebra and/or Trigonometry without expense to himself. In only exceptional cases should a student without at least two units of high school credit in algebra attempt the test in algebra. A student attempting the test in trigonometry should have at least one-half unit of high school credit in trigonometry. Only first-semester freshmen who have met the standard set by the Department of English in the English placement examination are eligible for the examination in English Composition I.

Failure in these free examinations will not be entered on the student's permanent record. Grades received on all other special examinations will be recorded on the student's permanent record.

Mathematics Proficiency Tests

In all curriculums in which college algebra is required, students will take a proficiency test in algebra within the first two weeks of their enrollment in any course in algebra. The results of this test will be used to determine whether a student shall be required to take the course in intermediate algebra to qualify for college algebra.

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.

Fees

Fees Subject to Change. All fees are subject to change at any time without notice by the Board of Regents.

Payment of Fees. Each student must pay the total amount of his enrollment fees on the day he enrolls. Checks for reasonable amounts are acceptable. Students receiving scholarships or grants from sources other than the Kansas State University Aids and Awards Office must present evidence of the award when enrolling unless this information has been furnished to the Comptroller's Office prior to registration.

Tuition. There is no tuition fee. Fees are charged for personal services such as private music lessons but not for class instruction.

Incidental Fee. The incidental fee is designed to assist in defraying costs of laboratory supplies, plant operation and maintenance, non-academic and administrative personnel, library books and personnel, equipment, and other non-teaching activities not particularized. The incidental fee is not tuition, nor a fee in lieu of tuition, but represents the student's contribution to the costs of non-teaching aspects of the total instructional program. This fee covers approximately 15 to 20 percent of the total costs.

Student Health Fee. For a description of the Department of Student Health and the services provided by this fee. (See page 28.)

Student Union Building Fee. This fee is used to retire the Student Union building revenue bonds.

Student Union Annex Fee. This fee is used to retire the Student Union annex building revenue bonds.

Student Activities Fee. The student activities fee is used for student recreational activities (including intercollegiate athletics); student publications; Union operations; student judging teams; and other student organizations (music, etc.).

Withholding Student Records. When necessary, the University withholds student records for nonpayment of fees, loans and other appropriate charges.

FEES FOR REGULAR SEMESTERS
Effective September 1, 1967

For students enrolled in more than six semester credit hours.

	<i>Residents of Kansas and Staff Members</i>	<i>Non-residents of Kansas</i>
Incidental Fee		
All except Veterinary Medicine students	\$120.00	\$350.00
Veterinary Medicine students	160.00	410.00
Student Health	13.00	13.00
Student Union Building	4.00	4.00
Student Union Annex I	3.50	3.50
Student Union Annex II	5.00	5.00
Student Activities (including Union operations)	18.50	18.50
Totals—All except Veterinary Medicine students	<u>164.00</u>	<u>394.00</u>
Totals—Veterinary Medicine students	<u>204.00</u>	<u>454.00</u>

For students enrolled in six semester credit hours or less.

	<i>Residents of Kansas and Staff Members</i>	<i>Non-residents of Kansas</i>
Incidental Fee per semester credit hour:		
All except Veterinary Medicine students	8.00	27.00
Veterinary Medicine students	11.00	32.00
Student Health	Not Elig.	Not Elig.
Student Union Building	2.65	2.65
Student Union Annex I	2.35	2.35
Student Union Annex II	3.00	3.00
Student Activities (including Union operations)	3.00	3.00

For staff members enrolled in Graduate School.

Incidental Fee per semester credit hour	8.00
Campus Privilege Fees:	
A. If enrolled in more than six semester credit hours:	
Student Health	13.00
Student Union Building	4.00
Student Union Annex I	3.50
Student Union Annex II	5.00
Student Activities (including Union operations)	18.50
B. If enrolled in six semester credit hours or less:	
Student Health	Not Elig.
Student Union Building	2.65
Student Union Annex I	2.35
Student Union Annex II	3.00
Student Activities (including Union operations)	3.00

FEES FOR SUMMER SESSIONS

Effective September 1, 1967

The following schedule of fees covers campus parking privileges and the Incidental, Student Health, Student Union Building, Student Union Annex, and Student Activities fees.

	<i>Residents of Kansas and Staff Members</i>	<i>Non-residents of Kansas</i>
Per semester credit hour :		
Incidental Fee	8.00	27.00
Campus Privilege Fees*	4.00	4.00

* Not applicable to students enrolled in off-campus instruction and not to exceed \$24.00 for each summer session enrollment on campus.

Definitions for the Purpose of Assessing Fees

Residents of Kansas. The residence of students entering Kansas State University is determined by an act of the legislature (Sec. 76-2701 G. S. 1949), which reads as follows: "Persons entering the state educational institutions who, if adults, have not been, or if minors, whose parents have not been residents of the state of Kansas for six months prior to matriculation in the state educational institutions, are non-residents for the purpose of the payment of matriculation and incidental fees: Provided further, that no person shall be deemed to have gained a residence in this state for the aforesaid purpose while or during the elapse of time attending such institution as a student, nor while a student of any seminary of learning, unless, in the case of a minor, his parents shall have become actual residents in good faith of the state of Kansas during such period, or unless, in the case of a minor, he has neither lived with nor been supported by his parents or either of them for three years or more prior to enrollment and during said years has been a resident in good faith of the state of Kansas."

Staff Members. For fee assessment purposes, staff members are those who work four tenths time or more and are paid on the unclassified or classified payrolls during at least a part of the following months:

For fall semesters—September, October and November

For spring semesters—February and March

For summer sessions—June

Also wives and dependent children, but not husbands, of full-time employees paid on the above payrolls.

Private Music Lessons and Practice Facilities. University students enrolled in the Applied Music or Music Education curriculum or for the Bachelor of Arts degree with a major in 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 refund policy outlined below):

	<i>University Students</i>	<i>Non-University Students</i>
Two 30-minute lessons a week, per semester	\$42.00	\$70.00
One 30-minute lesson a week, per semester	24.00	36.00
Two 30-minute lessons a week, summer session	21.00	35.00
One 30-minute lesson a week, summer session	12.00	18.00
Single lessons, each	4.00	4.00
Practice piano, 1 hour daily, per semester	5.00	5.00
Practice piano, 2 hours daily, summer session	5.00	5.00
Practice organ :		
Two-manual, 1 hour daily, per semester	10.00	10.00
Two-manual, 2 hours daily, summer session	10.00	10.00
Three-manual, 1 hour daily, per semester	20.00	20.00
Three-manual, 2 hours daily, summer session	20.00	20.00

Field Geology Fee. The fee for the summer geology field camp is \$45.00, which is the additional amount required from all students enrolled in this course to pay for their transportation and lodging for the field camp.

Refund Policy. (Applicable only to refundable fees, viz., incidental, health, union, activities, field geology and private music lessons.) Refunds will not be made until sufficient time has elapsed to insure that student checks have been honored—usually 15 days after students enroll. If an enrollee withdraws and returns his identification card 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 his student identification and fee receipt card.

	Amount of Refund	
	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 sixth academic week	no refund	no refund

Late Enrollment, Including Re-enrollment After Withdrawal. A late enrollment fee of \$2.50 shall be assessed and collected from each person enrolling after the regularly scheduled enrollment period. A larger late enrollment fee of \$5.00 shall be assessed and collected from each person enrolling, re-enrolling or paying his fees after the first week of a semester or session; however, only one or the other of these fees shall be collected for each late enrollment or re-enrollment. Late enrollment fees shall not be subject to refund, and payment thereof shall be considered a part of the enrollment process.

Special Examination. The fee for taking a special examination to obtain college credit (in lieu of attending classes) is \$2.50 per semester credit hour in which examined for residents of Kansas and staff members; \$7.50 per semester credit hour for undergraduate non-residents of Kansas and \$5.50 for graduate students who are non-residents of Kansas and foreign students on a temporary visa. Permission to take a special examination is issued by the student's dean after consultation with the head of the department in which the course is given. *This fee must be paid before taking the examination and is not subject to refund; this service is available only to students who are or have been regularly enrolled and is not applicable to Continuing Education courses.*

Graduate Research Work in Absentia. The fee for graduate research work *in absentia* is \$3.00 a semester credit hour for all students. Resident staff members may not enroll *in absentia* while regular college sessions are in progress. This fee is not subject to refund.

Auditing Fee. An auditor who is neither an enrollee paying full incidental fee nor a staff member shall be assessed \$1.00 a semester credit hour for courses 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 geology field camps, and for excessive usage or breakage or losses due to personal negligence on the part of the student, and then only for the actual fair value of supplies so used or lost and subject to the approval of the appropriate dean or the President.

Home Study Fees. For a complete listing of fees charged for work offered through the Division of Continuing Education, Division of Extension, see page 332.

Charges to Governmental 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. For the basic courses 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. The uniform which is purchased for each advanced course student under contract becomes his personal possession upon completion of the course. All or nearly all of the cost of this uniform is paid by the federal government.

Other Expenses

In addition to the previously mentioned 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. The cost of these items will vary from semester to semester.

Classification of Students

A student who is a high school graduate, or offers 15 acceptable units of high school work, is classified as a freshman. A student is advanced to a higher classification when he has completed successfully all prerequisite high school courses and has credit hours to meet the requirements as listed below:

<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>	<i>Fifth-year student</i>
25	58	90	120

Classes

By order of the Board of Regents, courses of basic freshman subjects require a minimum enrollment of 15; other classes require a minimum enrollment of 10, except that certain advanced laboratory and advanced technical classes may have a minimum of seven.

Course Description Key

Courses carrying no credit (pre- or non-collegiate in effect) are numbered 0-99; those carrying no prerequisites, generally aimed at non-majors or introductory general educational ideals, 100-199; courses aimed at freshman-sophomore development in a major field, 200-399; courses aimed at junior-senior development in a major field and for graduate students in a minor field, 400-599; courses for advanced undergraduates and graduate students in a major field, 600-799; advanced research and high-level specialized courses for graduate students, 800-999.

Within the parentheses () following 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 first or fall semester; **II**, second semester; and **S**, summer session. **I, II** mean both semesters. **Pr.** indicates "Prerequisite." **Conc.** is the abbreviation for concurrent.

The University's System of Libraries

The Francis David Farrell Library, named for Kansas State University's eighth President, is the main library of the University. It provides seating for 780 students and faculty members at individual carrels, in listening rooms, around seminar tables, in browsing alcoves, and in the Library's film-projection rooms. Branch libraries include the Architecture Library, located in the new addition to Seaton Hall; the Veterinary Medicine Library, housed in Veterinary Hall; the Chemistry Library in Willard Hall; and the Physics Library, located on the main floor of the Physical Science Building. A collection of printed matter, pictures, and three-dimensional models relating to elementary, secondary, and college teaching is contained in the Teaching Materials Center.

The Audio-Visual Department of the Library consists of collections of slides, recordings, magnetic tapes, film, film strips and mounted art work

for the use of students in the Library and faculty members for classroom use. Five listening and projection rooms are equipped with modern listening and viewing equipment. A central audio console allows records and tapes to be played in rooms and over earphones throughout the Library gallery. Extensive collections of materials and equipment catalogs and advice concerning the selection of new materials and equipment are also provided.

The University libraries contain more than 400,000 volumes, and approximately 30,000 carefully selected items are added to this number each year. The Library Courier Service, a cooperative arrangement with other public, private and special libraries within close proximity to Manhattan, affords K. S. U. students ready access to the several million volumes included in collections of the Linda Hall, University of Kansas, Kansas State Historical Society, University of Kansas Medical School, Harry S. Truman, Dwight D. Eisenhower, and the Command and General Staff School Libraries. Scheduled passenger service is available to these facilities.

Publications

University publications include the following:

General Catalog	Financial Report	Engineering Experiment
Student Catalog	Extension Bulletins	Station Bulletins
Summer Catalog	Agricultural Experiment	
Biennial Report	Station Bulletins	

Student publications include:

The Kansas State Collegian—newspaper published five days a week during regular semesters and weekly in summer.

The Royal Purple—yearbook.

The University Directory—published annually.

Ag Student News—published six times during academic year.

The Kansas State Engineer—published monthly during academic year.

Other publications include *The Trumpet* and *The K-Stater*. *The K-Stater* is published quarterly by the University and the Alumni Association. *The Trumpet* is published quarterly by the University and the Endowment Association.

Postal Center

The University operates a Postal Center in Anderson Hall which sells stamps, money orders and other postal supplies; weighs, insures and registers mail; and receives outgoing mail. U. S. mail is delivered directly to University buildings by Manhattan Post Office personnel who also pick up outgoing U. S. mail from the Postal Center.

All mail for students must be addressed to their Manhattan residence.

Assignments

A student is responsible for fulfilling all the requirements of the curriculum in which he is enrolled. He should consult with his adviser or his dean in planning his work. A student should be familiar with the catalog statements about assignments and curriculums, because the catalog is the official source of information.

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 this may be purchased for a small fee.

No student may 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 to courses takes place as shown on the calendar. Later assignments to courses are made during regular office hours by the student's dean or assigner. A student may not enroll later than 10 days after the beginning of a semester or summer session except by permission of his dean.

Students should enroll during the regularly scheduled registration

periods in order to avoid penalty fees. See the calendar and the section on Late Enrollment Fees, page 12.

A student who wants to take work at other than scheduled times must have the written consent of his dean, the head of the department in which the work is to be done, and the dean of the college in which the department belongs.

A student may not enroll for more than 18 hours including correspondence and extension study unless granted permission by his dean. However, if the normal assignment in his 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 apply to his dean for special permission to take additional hours. In no case may the total assignment including correspondence and extension work exceed 21 hours.

A regularly enrolled student must have the permission of his dean to do correspondence or extension study while enrolled, and this is counted as part of his semester load.

Changes in Assignments

Deans will not drop subjects from a student's assignment during the last two weeks of a period covered by final scholarship deficiency reports.

No student may drop a course or change an assignment except by a formal reassignment by his dean.

If an instructor recommends a reassignment, a student should confer with his dean.

A student who drops out of class without a reassignment is reported absent.

The last day for dropping a course without a Wd or F being recorded is the 18th day of classes; however, beginning undergraduate students have nine weeks for this purpose.

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

Withdrawal from the University

A student who withdraws from the University must have an official withdrawal permit from his dean. If a student other than a beginning undergraduate student withdraws from the University not later than the 18th day of classes of the semester, no mark shall be reported to the Registrar. If he withdraws thereafter, a mark of Wd is reported in all courses in which he is passing, and F is reported for courses in which he is not doing satisfactory work. (See the University Calendar.) Beginning undergraduate students have nine weeks for this purpose.

Auditing Classes

An auditor is one who attends 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 non-refundable fee of \$1 a semester hour is charged each auditor except that no auditing fee is charged students who have paid a full incidental fee or full-time University faculty members and employees of the University. Laboratory courses may not be audited.

Grades

The University uses the following grades:

- | | |
|-----------------------|----------|
| A, for excellent work | (94-100) |
| B, for good work | (86-93) |
| C, for fair work | (78-85) |
| D, for poor work | (70-77) |
| F, for failure | |

Cr, for credit in required courses for which no letter grade is given.

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

Report of Grades

As shown on the academic calendar, deficiency reports of unsatisfactory work are sent to deans' offices at the close of the seventh week and to the Registrar at the close of the semester. The Registrar forwards end-of-semester deficiency reports to the deans' offices. The reports of the seventh week are in percentages on a scale of 70 for passing. The reports at the end of the semester are on the letter system.

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 Registrar for record as shown on the calendar.

If a student other than a beginning freshman or a beginning transfer student drops a subject not later than the 18th day of classes, no mark is reported to the Registrar. Beginning freshmen and beginning transfer students have nine weeks for this purpose. An official drop slip from the student's dean constitutes the record of performance.

If a student other than a beginning freshman or a beginning transfer student drops a subject after the 18th day of classes, either a mark of Wd or a full semester grade of failure is reported, depending on whether the student was passing or failing at the time of dropping the subject. No course may be dropped from a 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, on semester grade is reported until the reason for such absence has been learned; the instructor reports to the Registrar a mark of Inc. If the student's absence is not excused by his 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 class books in the proper department when semester grade cards have been made out. The head of the department keeps all grade books as a permanent file of the department.

Points

For each semester hour of work a student gets points, according to the grades he makes, as follows: A, 4; B, 3; C, 2; D, 1; F, 0. (See page 22.)

Scholarship Deficiencies

PROBATION, DISMISSAL AND REINSTATEMENT*

A student's cumulative grade-point average is used to establish probation or dismissal status. An undergraduate student (excluding students of the College of Veterinary Medicine) is placed on probation or is dismissed if his university semester or over-all average falls below the average listed for his classification.

	<i>Probation</i>	<i>Dismissal</i>
10-29 sem. hrs.	1.7	.....
30-59 sem. hrs.	1.7	1.50
60-89 sem. hrs.	2.0	1.75
90 sem. hrs. to graduation level	2.0	1.85
20 sem. hrs. over graduation requirement	2.0	2.00

Students are notified by their academic deans of their status from information supplied to the deans by the Director of Records. The scholastic record of each undergraduate will be evaluated twice yearly, at the end of the fall semester and at the close of the spring semester. Any student who is on probation status is subject to dismissal as determined by the policy set by his individual college. Normally, no student shall be dismissed for scholastic deficiencies unless he has been on probation.

A transfer student's cumulative grade-point average will be based solely upon work taken at K. S. U. The applicable probation and dismissal

levels will be determined by the total number of hours attempted both at K. S. U. and at other collegiate institutions.

A dismissed student may not be readmitted until approved for readmission by the Academic Standards Committee of the particular college from which he was dismissed. Normally a student must wait at least one semester before he may be readmitted to the University. Applications for reinstatement must be directed to the Academic Standards Committee of a particular college of the University.

CREDITS WHILE INELIGIBLE

Credits earned by a student in residence at another university during a period in which he is ineligible to attend Kansas State University or another university will not normally be accepted by Kansas State University.

ABSENCES

Each student is expected to attend all meetings of the classes to which he is assigned. Each instructor shall determine whether a student may or may not be excused from his class and he shall also establish with the student any make-up work required. In case of excessive absences instructors will report the absences to the student's dean. The Student Health Center supplies a weekly statement to the faculty showing the names of students hospitalized and the dates of hospitalization.

ABSENCES FOR ACTIVITIES PARTICIPATION

Each student who will be absent to participate in out-of-town or other University-sponsored activity must submit to his coach or sponsor of the event a complete form for each of his classes (Excuse Absence Notification to Instructor, obtained at the University Postal Center). The coach or sponsor will compile a list of students authorized to make the trip on a separate sheet (Absence Notifications to Deans) and present a copy of it and the Absence Notifications to Instructors to the respective offices of the academic deans concerned at least 24 hours in advance of the departure. The student is required to make up work missed during the excused absences.

EXCESSIVE ABSENCES

A student may be withdrawn from a course by his dean for excessive absences. After due warning to both student and parents, the dean may report persistent absentees to the President with recommendation for suspension from the University.

ABSENCE THE DAY BEFORE OR AFTER A HOLIDAY OR STUDENT RECESS

Excuses will not be granted to students for absences the day before or the day after a student recess except in cases of extreme emergency. All classes must convene as usual.

EXAMINATIONS

A final examination period is scheduled at the end of the fall and spring semester during which no regular classes meet. There is no specially scheduled period for final examinations in the summer session. Candidates for degrees may or may not be required to take examinations, at the option of the instructor and subject to the policies of the department. If required, the examinations are to be given during the scheduled examination period for the first semester, but outside class during the week preceding the final examination week for the second semester. Such examinations may not be given during regular class periods, for candidates for degrees must attend regular class sessions up to the beginning of the scheduled final examination period for other students. Each instructor shall determine the manner in which his students who are candidates for degrees shall complete their work in his course in accordance with policies of the department.

A student whose semester grade in any subject is A may be excused from the final examination in that subject.

Permission for special examination in subjects not taken in class, or for

advanced credit, or to make up failures must be obtained, on recommendation of the head of the department in which the course is given, from the dean of the college in which the student is assigned. Such permission is granted only if the student has prepared for the examination under an approved tutor. The examination must be taken under the immediate supervision of the head of the department in which the course is given. A special examination may be given *only* to an *enrolled* student. The charge for such examination is \$2.50 a credit hour for residents, \$7.50 for non-residents.

Scholastic Honors

Scholastic honors are computed on all undergraduate work completed in residence.

To be eligible for scholastic honors, awarded each semester, a student must receive a grade in a minimum of 15 semester hours of undergraduate work in residence and earn a grade-point average of 3.30 (A = 4, B = 3, C = 2, D = 1, F = 0) or better for that semester's work. Students in the Graduate School are not considered for this recognition.

Bachelor degree candidates who rank in the top 10 per cent of their class and who have completed a minimum of 60 hours of undergraduate work in residence are considered for commencement scholastic honors. Of these, the highest ranked, not to exceed three per cent of the class, may be selected by the Scholastic Honors Committee to receive diplomas inscribed "Magna Cum Laude" or "Summa Cum Laude." Only students with a 3.950 or above academic average are eligible for "Summa Cum Laude." The committee will also designate those who are to receive diplomas inscribed "Cum Laude." Candidates for the degrees Doctor of Veterinary Medicine, Master of Science, and Doctor of Philosophy are not considered for this recognition.

Credits for Extracurricular Work

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

<i>Subject</i>	<i>Semester</i>	<i>Total</i>
Orchestra	1	4
Band	1	4
A Cappella Choir	1	4
University Mixed Chorus	1	4
Debate	2	4
Oratorical Contest	2	4
<i>Kansas State Collegian</i> journalism	1	4
<i>Ag Student News</i> journalism	1	4
<i>Kansas State Engineer</i> journalism	1	4
<i>Royal Purple</i> journalism	1	4

Credits may be counted as electives in the student's curriculum. A student may use not 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 enrolling in one or more of these activities must be enrolled for credit even though the credits exceed the maximum usable for graduation.

The Speech Clinic

Those students who have speech problems may receive attention and aid through the University Speech Clinic, maintained under the direction of the Department of Speech. Trained speech specialists make an examination, give a diagnosis, plan a remedial program, and carry out the re-training. The clinic has the active cooperation of the Student Health Center and the Counseling Center in giving fullest possible aid. Students are urged to make use of this service.

Student Personnel Services

Kansas State University has developed a program of student personnel services in the belief that education involves experiences which supplement classroom training. This philosophy considers the importance of providing the student with a variety of opportunities and services aimed at improving his intellectual development; his vocational interest, aptitudes, and skills; his emotional balance; his social relationships; his moral and religious values; his physical health; and his 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 Dean of Students is responsible for maintaining a close relationship with the academic and administrative staffs in helping to interpret student needs. He has the general responsibility for the administration and coordination of the various divisions of the student personnel program, which follow: Aids and Awards, Housing-Food Service, K-State Union, Counseling Center, Placement Center, Student Health, Foreign Student Advising, Student Religious Activities, and Student Organizations.

The Office of the Associate Dean of Students (Dean of Women) has as its primary responsibility the welfare of women students. Its major goal is to foster on the part of each student a better understanding of herself and others. This is accomplished through varied experiences within the student's living group and through out-of-class activities and associations.

Staff members serve as advisers to such organizations as Social Coordinating Council, Associated Women Students, Panhellenic Council, and Off-Campus Women. They work closely with the University pre-enrollment and orientation programs; assist students in developing effective programs in halls, sororities, and off-campus living units; coordinate workshops for housemothers; and are available for individual and group conferences.

The Associate Dean of Students (Men) serves as adviser to the Interfraternity Council, is responsible for the orientation services for new students, works with the Student Senate, counsels with students concerning disciplinary matters, and helps to coordinate graduate study in guidance and student personnel services.

The Assistant Dean of Students for Residence Halls Programs is responsible for the selection and training of dormitory personnel staff. He also directs the educational and cultural programs in the residence halls.

Orientation for New Students

An orientation program is provided for all new undergraduate students during the first few days of college. This program is designed to ease the change from high school to college or from college to college. All new students are required to participate. New students who pre-enrolled are given a different program of orientation. All students are given the opportunity to become acquainted with the University, to meet faculty members and classmates, to get help from advisers, and to attend social functions. Each entering student receives a program during the summer containing a complete schedule of Orientation Week activities. It is important that all arrive on time, follow the schedule closely and attend all functions.

No one may register as an undergraduate unless he has completed the required physical examination and required aptitude tests.

The opening convocation for freshmen and new students will be held on Sunday afternoon immediately preceding the enrollment period. This convocation is designed especially for all new students and their parents.

UNIVERSITY HOUSING POLICY

Office of Director of Housing and Food Service

Kansas State University considers the housing of students as part of the total educational plan. All unmarried undergraduate minor students

attending the University and not living at home must live in University-approved housing such as residence halls, scholarship houses, fraternities, sororities, rooming houses, and apartments.

All *freshmen women* except those living at home are housed in University-operated residences. Sophomore women not living at home, in sororities, or approved rooming houses must live in campus housing.

Available Housing Facilities

Beginning in the fall of 1967, all freshmen men will be housed in University on-campus housing, scholarship houses or fraternities with the exception of those who are commuting, live in Manhattan, are married, or who can justify a hardship case through the Dean of Students Office.

Kansas State University provides residence hall living for 3,700 students; scholarship housing for 90 men; cooperative housing for 62 women; 576 apartments and 52 mobile home lots for married couples. Sororities provide 600 places for women, and fraternities have accommodations for 1,200 men. Others find privately owned rooms and apartments from University-approved listings.

Student Housing Government on Campus

Learning to manage one's 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 Residence Halls Program Director.

The following service and facilities are furnished in residence halls: sheets and pillow cases—laundered weekly; free laundry facilities—washers and driers and areas for hand laundry; pleasant rooms with beds, mattresses, mattress covers, chests of drawers, closet facilities, study tables, and lamps. The resident furnishes pillow, towels, bedspreads, etc.

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

Food service is provided in dining halls where attractive and nutritious meals are served under the direction of professionally trained dietitians. With the exception of a Sunday evening meal, three meals are served daily. Special dinners and faculty teas add to the variety of the food service program.

Because of rising operational costs, the following rates quoted for residence halls will be increased for the 1967-68 academic year.

The rate for the residence halls, excluding West Stadium Hall (a lower rate hall for men), is \$350.00 a semester for board and room if paid in advance; \$360.00 a semester if paid in three installments of \$100.00, \$150.00, and \$110.00. The West Stadium rate is \$300.00 a semester for board and room if paid in advance; \$310.00 a semester if paid in installments of \$100.00, \$125.00, and \$85.00. All applications require an application fee of \$25.00 each. Rates are subject to change without notice. Contracts are made for the entire nine-month school year.

Applications and further detailed information are available through the Office of the Director of Housing and Food Service, Kansas State University, Manhattan, Kansas.

University Scholarship Housing

There are many students who would profit greatly from a university education, but do not feel they can afford four college years. Kansas

State University offers, in addition to scholarships, two scholarship houses for men.

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. The men in Straube and Smith spend about six hours a week at their house duties. Forty-five men live in each house.

Smurthwaite House for women provides cooperative living for 62 freshmen and upperclass women at low cost. This is a new and contemporary house which has, in part, been supported by donations from Home Demonstration Units of Kansas.

At Smurthwaite, house duties are rotated so that 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 Director of Aids and Awards, Holtz Hall, Kansas State University, Manhattan, Kansas, for applications and information.

Married Student Housing

The married students have not been overlooked in the housing expansion at Kansas State University. Pride can be taken in the one- and two-bedroom apartments at Jardine Terrace. These completely furnished, 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 for the “homeowning” couples.

Because of rising operational costs, the following rates quoted for married student housing will be increased for the 1967-68 academic year.

The apartment rates are \$65.00 for a one-bedroom apartment and \$70.00 for a two-bedroom apartment. The trailer parking lot rental is \$20.00 a month. For the apartments the rental includes utilities such as gas, water, and 140 KWH of electricity. The rental for the trailer parking lot includes sewer, water, and 140 KWH of electricity.

Applications are available at the Office of the Director of Housing and Food Service, Kansas State University, Manhattan, Kansas.

Graduate Student Housing on Campus

Single men and women graduate students are welcome to live in the residence halls. There are no single rooms available, but every effort will be made to accommodate the students in roommate assignments and, if possible, in a general graduate student area within the hall.

Since graduate assistants are classified under faculty, single graduate assistants qualify for Evans Apartments. There are 20 apartments in this building which rent for \$65.00 a month for a one-bedroom and \$70.00 a month for a two-bedroom. These are furnished and all bills are paid up to 140 KWH of electricity. (See source of applications under Married Student Housing.)

There is no problem for the married graduate student, since either Jardine Terrace Apartments or North Campus Trailer Courts are available.

Organized Houses

Fraternal organizations provide excellent living accommodations and social programs for over 1,700 K-Staters. Rush Week immediately precedes the opening of the University in the fall. Men and upperclass women may move directly into their houses, but all freshmen women live in residence halls for a year. Membership in all of these organizations is by invitation.

Fraternities. Any students accepted by the University may attend fraternity Rush Week. House bills range from \$100.00 to \$110.00 a month, including room, board, and dues. For further information, write to the Faculty Adviser to Fraternities, Office of the Dean of Students, Kansas State University, Manhattan, Kansas. The following national fraternities are established at Kansas State:

Acacia, Alpha Gamma Rho, Alpha Kappa Lambda, Alpha Tau Omega, Beta Sigma Psi, Beta Theta Pi, Delta Chi, Delta Sigma Phi, Delta Tau Delta, Delta Upsilon, FarmHouse, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Gamma Delta (Colony), Phi Kappa Tau, Phi Kappa Theta, Pi Kappa Alpha, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon, Triangle.

Sororities. Booklets describing social sororities and setting forth the provisions regulating selection of new members are provided to all prospective students by Panhellenic Council. These may be obtained by writing to the Faculty Adviser to Sororities, Office of the Associate Dean of Students, Kansas State University, Manhattan, Kansas. House bills in sororities range from \$100.00 to \$110.00 a month including room, board, and sorority dues. The following national sororities are established at Kansas State:

Alpha Chi Omega, Alpha Delta Pi, Alpha Xi Delta, Chi Omega, Delta Delta Delta, Delta Zeta, Gamma Phi Beta, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Pi Beta Phi.

Clovvia. Clovia 4-H House provides accommodations for 25 upperclass women 4-H members. Freshman women are required to live in a residence hall their first year. Since Clovia 4-H House provides opportunities for cooperative living, monthly house bills are approximately \$60.00, including social fees. Applications are made through the County extension offices or the State 4-H Department at Kansas State University.

Off-Campus Housing

The Housing Office, Room 212, Anderson Hall, has a card file of rooms and apartments that 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 \$25.00 to \$30.00 a month for one person to a room and \$20.00 to \$25.00 a month per person when two or more reside in a room. Meals at the K-State Union Cafeteria and local cafes will cost \$50.00 to \$60.00 a month. Rates in board-and-room houses usually run \$320.00 a semester. This includes 17 meals per week. Apartments rent from \$50.00 to \$125.00 per 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.

Aids and Awards—Loan Programs

Many Kansas State University students are assisted with student loans through the National Defense Education Act Loan Program, the Alumni Association Loan Program, and various loan units of the Endowment Association. Many other student loans will be provided through the Guaranteed Loan Program under Title IV of the Higher Education Act of 1965.

To qualify for most long-term loans a student, undergraduate or graduate, must show reasonable financial need as well as the ability to meet the scholastic minimums established by the University Loan Committee.

Short-term, interest-free loans are available to assist qualified students in an emergency.

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

Students interested in applying for student loan assistance or information should write or visit the Aids and Awards Office, Holtz Hall, Kansas State University.

Scholarship Programs

More than 700 Kansas State University undergraduate students receive some scholarship assistance each year. Some scholarships are awarded

for a single year, others are renewable for additional years of undergraduate study.

Students desiring scholarship applications or information relative to scholarships should write to the Aids and Awards Office, Holtz Hall, Kansas State University, Manhattan, Kansas. The deadline for submitting completed applications is February 15 prior to the fall semester in which the student intends to enroll.

Part-Time Work

Kansas State University employs more than 2,800 students each year. Many other part-time job opportunities are available in the Manhattan community. Any student who wants assistance in securing a part-time job should visit the Aids and Awards Office, Holtz Hall, immediately after he arrives in Manhattan.

Work-Study Program

This program is part of the Economic Opportunity Act of 1964 to assist students from low-income families by providing jobs on campus or with affiliated organizations. Additional information and applications may be obtained from the Aids and Awards Office, Holtz Hall, Kansas State University.

Foreign Student Adviser

The Assistant Dean of Students serves as Foreign Student Adviser and is responsible for the reception, orientation and personal counseling of foreign students. He aids them to renew their passports, visas and obtain permission to work. He is responsible for the Kansas State University Exchange Visitor Program for students and faculty and for the exchange of students between countries. His office helps promote contacts between foreign students, American student groups, faculty and the community. He is also concerned with providing information to American students about opportunities for studying abroad.

Services for Veterans

The University maintains a Veterans Service Office for the purpose of aiding veterans and children of deceased or disabled veterans in securing educational benefits.

All educational benefits for veterans ceased January 31, 1965, with the exception of those veterans who are disabled during peacetime service.

Children of a deceased or disabled veteran may be entitled to educational benefits, providing the veteran's death or disability was due to active service in World War I, World War II, or the Korean Campaign.

Information may be obtained from your nearest Veterans Administration Office or the Veterans Service Office, Aids and Awards, Holtz Hall, Kansas State University.

State Vocational Rehabilitation Training

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.

Counseling Center

Most students find the services of the Counseling Center to be useful to them. Counselors are available to discuss with students a wide variety of concerns. Often these have to do with decision-making or planning, as in the case of vocationally uncertain students, or those having difficulty in choosing a major. Sometimes students attempt to develop new habits and attitudes through counseling as in the case of those with poor study habits or with attitudes and pressures interfering with successful performance. Other students use the counseling service to try to learn more about themselves and to gain a firmer understanding of themselves in terms of their goals, values, interests, and abilities.

Regardless of the reason for calling upon the Center, the student will find a friendly and interested counselor willing to contribute his professional training and experience to the student's efforts at coming to terms with his situation. Counselors contribute to the student's efforts in several ways—by providing a warm and accepting environment, a completely confidential setting, an understanding view of the situation, or perhaps some relevant objective information. This information may include the result of psychological tests, occupational opportunities, University requirements, effective study techniques, or a variety of other types of information which the student may not have available to him.

Students do find themselves in a better position to handle their situation in a mature and responsible fashion by coming to know and accept more about themselves. This they can do through a counseling experience, primarily by thoroughly exploring their own attitudes, feelings, and motivations, but also by gaining relevant information.

Orientation tests are administered by the Counseling Center to all entering students. New students are encouraged to make an appointment with a counselor to obtain the results of these tests in order to learn more about themselves and to fit this information in with present and future planning. These tests do not accurately describe the "right job" or "right curriculum" for anyone, but do often provide useful information to the student as he studies the decisions he must make.

High school seniors are encouraged to consult with their high school counselor, but are eligible to make use of the Counseling Center's services before they enter college if they so desire. Appointments may be made by writing to the Counseling Center.

University students who want to talk with a counselor can make arrangements to do so by seeing the Center's receptionist in 226 Anderson Hall.

Student Health Center

The University has a modern Student Health Center supported by student health fees.

The Student Health Center is located directly west of the Library in the center of the campus. The clinic is open to students for diagnosis and treatment each week day from 8:00 a. m. until 11:30 a. m. and from 1:00 p. m. until 4:30 p. m. with the exception of Saturday when the clinic closes at 11:30 a. m. The Center is staffed by full-time physicians with adequate medical supporting personnel to care for the students. Treatment may include visits with the physicians, laboratory and X-ray studies as necessary, immunizations, minor surgery, care of injuries, and continuation of treatment such as allergy injections prescribed by home physicians. When necessary, the student is referred to specialists for treatment.

After regular clinic hours an ill or injured student may receive medical care in the Emergency Room. Home calls are not covered by the Student Health program.

The 40-bed hospital is equipped to provide medical care for most illnesses, but major surgery must be done at one of the two local hospitals. If surgery is necessary, the patient has a choice of several very able Manhattan surgeons. Such surgical treatment is at the student's expense. Convalescent care following surgery may be carried out at the student hospital.

Medication, laboratory tests, and X rays are available at the Student Health Center at reduced rates and many services are provided at no cost. Hospitalization for the first 21 days is provided at special rates and thereafter the charge is reasonable and comparable to those of the other Kansas hospitals.

Hospital insurance plans may be used at the Student Health Center. There is a Blue Cross policy available to students only, at a special rate. The plan supplements the coverage provided by the Health Center and has many attractive features. The student may purchase this insurance at the time of enrollment for the regular semester. It is recommended that students carry insurance.

By ruling of the State Board of Regents, a complete medical examination is required of each new student. This examination should be done by the family medical doctor and the completed examination form should be sent to the Student Health Center prior to enrolling. The student must visit the Health Center for an evaluation of his health prior to enrolling or at the time he enrolls.

The purpose of the examination is to evaluate the student's state of health, determine remediable defects, detect infectious or contagious conditions, discuss preventive measures such as immunizations, and to classify the student for Physical Education.

Placement Center

The Placement Center assists Kansas State University prospective freshmen, undergraduates, graduating seniors, graduate students, and alumni with their employment problems. The Center functions in the areas of business and industrial placement, teacher placement, alumni placement, and summer employment. All students are invited to register with this office and make use of these available placement services.

The service provides a centralized placement system for all the colleges and departments of the University and brings together students, faculty members and representatives of organizations seeking college-educated personnel for permanent positions. Employment trends and opportunities in business and industry and in the field of education are recorded, and several thousand employers are contacted both on and off the campus. In the field of education, current information is filed on positions open and the qualifications required in elementary, secondary, and college-level work, including administration.

Information and opportunities for summer employment in camps, resorts, public agencies, agriculture, and industry are made available. Extension information on employment opportunities is available, and qualified staff members help students with employment problems. The Center is designed to promote a wise and responsible choice of a career by the student for his own greatest satisfaction, minimum wasteful turnover, and most fruitful long-term investment of his talents for himself, for his employer, and for society.

K-State Union

The K-State Union is the "campus community center." Here are found extensive facilities for the social, recreational, and cultural life of the campus. The five-level structure includes a cafeteria, a snackbar, a beautiful ballroom, 25 meeting areas, banquet and party rooms, recreation facilities (bowling, billiards, table tennis, etc.), a little theater, and the Activities Center. In addition, there are lounges, a master campus calendar, a browsing library, an information desk, and paperback book and school supplies stores. A new \$900,000 addition completed in 1963 provides for the extension of these facilities.

The 150 student organizations have here comfortable headquarters and qualified staff assistance for carrying on their activities, everything from typing minutes to planning a major All-University event.

The Union Governing Board is responsible for the Union policies and program. There are over 300 students working on Union Committees, which provide an extensive program of interesting activities designed for the cultural and personal growth of students. These activities are coordinated by the Union Program Council. The Union Committees are: Dance, Movies, Sports and Recreation, Hospitality, Art, Campus Entertainment, News and Views, Personnel and Research, Trips and Tours, and Harlequinade. All students are invited to apply for membership on one of these committees.

Religious Life at the University

Religion at Kansas State University finds expression in the many church-sponsored student religious organizations related to the campus, and within the administrative and academic structure of the University itself.

Adjacent to the campus there are six student religious centers, representing a \$2,000,000 investment and an annual budget of \$115,000. These facilities are owned and operated by various faith groups. In them, and in the churches of the city, the usual sectarian activities of religious life are conducted.

On campus there are two memorial chapels—Danforth and All-Faith—which are available for student religious services and private meditation. Also, within the framework of the University is the office of the Director of Student Religious Activities. The functions of the Director are to coordinate religious activities on campus, and to promote religious knowledge by securing scholarly speakers for convocations and lectures and by teaching courses in religion in the Division of Philosophy. Credit courses in religion are offered in the departments of English, History and Philosophy. Non-credit courses are available through the church foundations related to the campus.

RELIGIOUS COUNCIL

The Religious Council is a student organization concerned with the coordination and promotion of religious activities and religious knowledge at Kansas State University. It is composed of elected officers, appointed committee chairmen and representatives from the Islamic Association, the Jewish Hillel Foundation, and each of the Christian foundations. This council is responsible for initiating, directing, coordinating, and evaluating all campus-wide religious programs.

RELIGIOUS ADVISERS COUNCIL

There are 10 clergymen who work as campus ministers. These men plus the faculty advisers for student religious organizations and the Director of Student Religious Affairs constitute the Religious Advisers Council. This council advises on religious policy on campus, and operates closely with the Student Personnel Services of the University to satisfy the religious demands of students in the multi-faith university community.

STUDENT CHRISTIAN FEDERATION

The Student Christian Federation is an organization of several Protestant religious groups. While each retains an individual program at the campus, each also endeavors to work with the others in common programs of social action, common worship, study groups, retreats, non-credit courses in religion. The campus groups affiliated in this organization are: Wesley Foundation, Roger Williams Fellowship, United Student Fellowship, YWCA, Canterbury Association, Lutheran Student Association, and United Campus Christian Fellowship.

STUDENT RELIGIOUS ORGANIZATIONS

The following are religious groups recognized by the University as campus organizations:

American Baptist (Roger Williams Fellowship)	Mennonite Fellowship
Grace Baptist Student Fellowship	Methodist (Wesley Foundation)
Southern Baptist (Baptist Student Union)	Mormon (Latter Day Saints Student Group)
Catholic (Bellarmine Student Center; Newman Club)	Mormon (Reorganized Latter Day Saints; Liahona Fellowship)
Chinese Christian Fellowship	Religious Council
Christian Science Organization	United Campus Christian Fellowship
Episcopal (Canterbury Association)	Affiliating Denominations:
Friends (Quaker)	Christian
Islamic Association	Evangelical United Brethren
Jewish (B'nai B'rith Hillel Foundation)	Presbyterian
Kansas State Christian Fellowship (Inter-Varsity Christian Fellowship)	The United Church of Christ (Congregational and Evangelical and Reformed)
Lutheran, Missouri Synod (Gamma Delta)	Wesleyan Campus Fellowship
Lutheran, National Lutheran Council (Lutheran Student Association)	YWCA

Besides these religious foundations, there are over 30 fine church congregations in the City of Manhattan. Kansas State students are urged to avail themselves of the services of these important institutions.

Operation of Motor Vehicles

All motor vehicles operated on the campus by staff and students must be registered and identified with decals. Possession of cars by students is discouraged. Freshmen and students living in residence halls may not secure parking permits. By authority of Kansas Statutes, Chapter 484, Laws of Kansas, 1957, the University has established a Traffic and Security Office which operates under rules established by a student-faculty Traffic Control Board. Driving and parking of motor vehicles are governed by these regulations.

University Organizations

The University, as any community, has many organizations which complement the academic, cultural, social, and religious lives of the students; provide the means for student government in a number of areas; and provide constructive recreation opportunities.

The All-University governing body is the Student Governing Association. All students enrolled in more than six hours are members of this association, and approximately 400 students participate actively in it. The three branches of government are as follows:

Executive	Legislative	Judicial
President	Senate	Tribunal
Cabinet	College Councils	Chancellor
Appointed Officers	Committees	Justices

Departmental and professional clubs and societies afford many opportunities for students to strengthen their academic work. In these organizations, students may meet with faculty members and other professional persons informally and practice the theories learned in class.

The various honoraries recognize leadership and service as well as superior achievement in specific fields.

Other groups, though often representing academic fields, are open to students in any curriculum and provide for extracurricular activity that is consonant with the objectives of the University.

The Student Governing Association constitution and all student organizations, their presidents and faculty advisers, are in the Kansas State University Directory. Students should read through these pages. Judicious participation in these activities can add an important dimension to their university lives.

Student Organizations

Departmental

Agricultural Association	Industrial Education Club
Agricultural Economics Club	Italian Club
Agricultural Education Club	Kappa Iota Sigma (Sociology)
Agricultural Mechanization Club	Milling Association
Block and Bridle (Animal Husbandry)	Phems (Women's Physical Education)
Chancery Club (Pre-Law)	Philosophy Club
Clinic Club (Pre-Medicine)	Plow and Pen Club (Ag Journalism)
Dairy Science Club	Political Science Club
Entomology Club	Poultry Science Club
Extension Club	Pre-Veterinary Medical Club
French Club	Student Education Association
Geography Club	Wheat State Agronomy Club
German Club	Williston Geology Club
Graduate Students Association	Zoology Club
Horticulture Club	

Student Government

All-College Council	International Coordinating Council
Associated Women Students	Junior Panhellenic Council
Board of Student Publications	KSU Association of Residence Halls
Campus Political Parties	Panhellenic Council
Interfraternity Council	Student Governing Association
Interfraternity Pledge Council	Union Governing Board

Professional

Alpha Chi Sigma (Chem., Chem. Engg., Biochem.)	American Society of Civil Engineers
Alpha Kappa Psi (Business Administration)	American Society of Mechanical Engineers
Alpha Tau Alpha (Agricultural Education)	Bakery Management Club
American Chemical Society	Institute of Electrical and Electronics Engineers
American Guild of Organists	Kappa Alpha Mu (Photo Journalism)
American Institute of Aeronautics and Astronautics	Music Educators National Conference (MENC)
American Institute of Architects	Phi Delta Kappa (Men's Education)
American Institute of Chemical Engineers	Phi Mu Alpha (Men's Music)
American Institute of Industrial Engineers	Phi Upsilon Omicron (Home Economics)
American Institute of Physics	Sigma Delta Chi (Men's Journalism)
American Nuclear Society	Society of American Military Engineers
American Society of Agricultural Engineers	Soil Conservation Society of America
	Steel Ring (Engineering and Architecture)
	Theta Sigma Phi (Women Journalists)

Student Chapters

American Home Economics Association	American Veterinary Medical Association
American Institute of Interior Designers	Wildlife Society
American Society of Landscape Architects	

Honorary

Alpha Mu (Milling)	K-Fraternity (Varsity Letter Winners)
Arnold Air Society (Air Force ROTC Cadets)	Mortar Board (Senior Women)
Blue Key (Senior Men)	Mu Phi Epsilon (Women, Music)
Chi Epsilon (Civil Engineering Honors Committee)	National Collegiate Players
Chimes (Junior Women)	Omicron Delta Epsilon (Economics)
Delta Phi Delta (Art)	Pi Epsilon Delta (Dramatics)
Delta Sigma Rho (Debate)	Scabbard and Blade (Cadet ROTC Officers)
Gamma Sigma Delta (Agriculture)	Sigma Alpha Eta (Speech Therapy)
Kappa Delta Pi (Education)	Sparks (Sophomore Women)

Scholastic Honorary

Alpha Delta Theta (Medical Technology)	Phi Kappa Phi (All-College)
Alpha Epsilon Rho (Radio-TV)	Phi Lambda Upsilon (Chemistry and Chemical Engineering)
Alpha Lambda Delta (Freshman Women)	Pi Mu Epsilon (Mathematics)
Alpha Zeta (Agriculture)	Pi Tau Sigma (Mechanical Engineering)
Delta Mu Delta (Business Administration)	Putnam Scholarship Association
Eta Kappa Nu (Electrical Engineering)	Sigma Delta Pi (Spanish)
Gamma Theta Upsilon (Geography)	Sigma Gamma Epsilon (Geology)
Omicron Nu (Home Economics)	Sigma Tau (Engineering)
Phi Alpha Mu (Arts and Sciences)	Sigma Xi (Faculty, Graduate Student, Science)
Phi Alpha Theta (History)	Tau Sigma Delta (Architecture)
Phi Epsilon Kappa (Men's Physical Education)	
Phi Eta Sigma (Freshman Men)	

Service

Alpha Phi Omega (Scouting)	Circle K
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Interest Groups (Membership Open)

Amateur Radio Club	Judo Club
Arab-American Club	K-State Players (Drama)
Associated Married Students	Latin American Association
Astronomy Club	Masonic Club
Chaparajos Club	Off-Campus Women
Chess Club	Peace Corps
Chinese Student Association	People to People
Collegiate 4-H	Phi Delta Gamma (Graduate Women)
Collegiate Young Democrats	Sports Car Club
Cosmopolitan Club	Sports Parachute Club
Dames Club (Student Wives)	Student Peace Union
Flying Club	University Extension Club
Forensic Union	Women's Pep Club
Graduate Chemistry Wives	Women's Recreation Association
Hoedowners (Square Dance)	Young Americans for Freedom
Intramurals, All Sports	Young Republicans

Interest Groups (Membership Selected)

African Student Association	K-Steppers (Twirlers)
Agricultural Judging Teams	Orchesis (Dance)
Angel Flight	Pakistan Association
Cheerleaders	Pershing Rifles (Military)
Court of Chevaliers	Radio Workshop
Filipino Association	ROTC Band
Frog Club	ROTC Chorus
Future Farmers of America	Soccer Club
India Association	Statesmen (Men's Pep)
International Coordinating Council	Students for Positive Action
Iraqi Students Society	Television Workshop
Korean Student Association	Touchstone (Student Magazine)
K-State Committees	Varsity Rifle Team

Home Economics Interest Groups

Clothing and Textiles
Extension
Family and Child Development
Family Economics
General

Interior Design
Journalism
Nursing
Professional Foods
Teaching

Music Interest Groups

A Cappella Choir
Band
All-Men's Marching
Basketball Pep
Concert
Varsity
Ensembles
Brass, Percussion
String, Woodwind

Jazz Workshop Ensemble
K-State Singers
Madrigal Ensemble
Men's Glee
Apollo
Varsity
Oratorio Choir
Orchestra
Women's Glee

Religious

Religious organizations are listed on page 30.

All-University Honor Societies

Phi Kappa Phi. A national fraternity. Membership is open to honor students in all departments, on the basis of scholarship. The Kansas State chapter was installed in 1915.

Sigma Xi. A national fraternity. Members of the faculty and graduate students are eligible for election to active membership on the basis of achievement in original scientific investigation; seniors who have shown excellence in two departments of science are eligible for election to associate membership. The Kansas State chapter was installed in 1928.

The Summer School

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

The Summer School consists of an eight-week session in which a stu-

dent may earn as many as nine semester hours of credit on a regular assignment. A student may, if he wishes, take a part-time assignment.

Workshops, short courses, and conferences are offered to accommodate those students who find it inconvenient to attend the full eight-week session. The length of these special sessions varies from a single week to four-week lengths.

The Summer School Bulletin gives complete and detailed information on all aspects of 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.

The Graduate School

R. DEAN DRAGSDORF, *Acting Dean*

HISTORY AND ORGANIZATION OF THE GRADUATE SCHOOL

Graduate Study at Kansas State: Its Beginnings 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. Also it was 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 involving original research. (Before that time—the first in 1871—seventeen master's degrees were granted, but a few were for honorary purposes, for recognition of educational growth of the graduate, or for special service to the community.) Industrial arts included agriculture, horticulture, engineering, architecture and design, and domestic economy. The sciences were botany, chemistry, zoology, entomology, and physics. Each candidate was required to present a satisfactory thesis involving original research in his selected field.

Requirements for the master's degree were redressed in 1897, 1900, 1902, and 1912, with these later revisions raising the standards and making more definite the procedures by which master's work could be conducted. From 1909 to 1919 all applications for graduate study were passed upon by the Council of Deans, and specific assignments to students were in charge of the dean of the division (now college) in which the student did his major work. In October, 1919, a Graduate Council, consisting of seven members, was created to administer graduate courses. They represented the divisions of Agriculture, Engineering, General Science (now Arts and Sciences), Home Economics, and Veterinary Medicine. Members and the chairman of the Council were appointed by the president. Also, a Graduate Faculty was created, which consisted of the faculty members who were selected by department heads and approved by the Council because they were qualified to give graduate instruction. In November, 1931, a separate Division of Graduate Study was established under a dean, and with these changes the administration of the graduate work in the University assumed approximately its present form. In 1942 the Division of Graduate Study was renamed the Graduate School. In 1957, the Graduate Council was designated as the Executive Committee of the Graduate Faculty. The Graduate Council now consists of the Dean of the Graduate School and 17 Graduate Faculty members who are elected by the Graduate Faculty to represent each college or school and also the major areas of graduate study.

In 1932 the Board of Regents authorized the College to confer "upon students completing the requirements therefore the degree of Doctor of Philosophy, and to offer in the departments of chemistry, milling industry, bacteriology, and entomology graduate work leading to that degree." Since 1932 the Board has amended this action a number of times so as to authorize additional departments to offer the doctorate.

On March 27, 1959, the name of Kansas State College of Agriculture and Applied Science was changed officially to Kansas State University of Agriculture and Applied Science. Later in the same year authorization to award the Master of Arts in the traditional fields was granted.

The Graduate School Today

Major work leading to the master's degree is offered in 73 departments or fields, and the work leading to the degree Doctor of Philosophy in 31 fields. Much of the original research conducted by graduate students is carried on through or in close cooperation with the Experiment Stations of Agriculture and Engineering and the Bureau of General Research. In addition to the educational value to students themselves, the work has

made significant contributions to scientific knowledge, theoretical and practical, and to the well-being of society.

An annual budget approaching \$5,000,000 and positions for more than 350 scientists, including graduate research assistants, make the Kansas Agricultural Experiment Station a strong ally of the Kansas State University Graduate School. The Agricultural Experiment Station supports research projects in five colleges of the University. Students doing graduate work in any of the station's 28 departments usually work with staff scientists on going research projects that result in journal articles and other publications. Thus the student is directly involved in carrying out primary objectives of the station and of the Graduate School. He is discovering new truths, participating in a teacher-learning process (often on the job), adding to the storehouse of world knowledge through scientific publications, and (when applicable) helping translate his scientific findings for use by agricultural and allied industries.

The major objective of the Engineering Experiment Station is the discovery, tabulation and presentation of new knowledge that is important to engineering and other sciences and to industry. Another important objective is to make available to graduate students the opportunity of doing work on important research and in this way to permit the students to gain an understanding of the techniques of engineering research, to obtain experience in dealing with research problems and to accumulate additional knowledge in their fields of study. Research projects supported by various agencies of the federal government (including the Armed Services) compose approximately half of the research now being undertaken in the Engineering Experiment Station. The list of agencies includes the U. S. Air Force, U. S. Army Research Office, Atomic Energy Commission, Office of Civil and Defense Mobilization, National Science Foundation, National Institutes of Health, and Small Business Administration. Other research is supported by engineering associations and industry, including such groups as the American Society of Heating, Air Conditioning and Refrigeration Engineers.

The Bureau of General Research administers research projects and problems not appropriately handled by the two experiment stations. As a part of its service, the Bureau also aids faculty members, interested in basic research in the social sciences, humanities, physical sciences and biological sciences, in securing research grants and contracts. All departments of the College of Arts and Sciences are members of the Bureau, and departments in other colleges may become members by applying to the Director. Distribution of the Faculty Research Fund is made by the Bureau. The Faculty Research Fund Committee, designated as an advisory committee responsible to the Director of the Bureau of General Research, makes recommendations for the distribution of this fund.

Research is also supported with funds allocated by the Research Coordinating Council, a body composed of the Director of the Bureau of General Research, the Director of the Agricultural Experiment Station, the Director of the Engineering Experiment Station, the Vice President for Academic Affairs and the Dean of the Graduate School, who serves as chairman.

The Graduate School is concerned today, in keeping with the trend in higher education everywhere, with a program designed to aid the student to achieve the maximum possible general 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.

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:

Accounting	Education	Mechanical Engineering
Agricultural Economics	Electrical Engineering	Milling Industry
Agricultural Education	Entomology	Music
Agricultural Engineering	Extension Education	Nuclear Engineering
Agronomy (Crops and Soils)	Family and Child Development	Parasitology
Anatomy	Family Economics	Pathology
Animal Husbandry	Farm Mechanics	Physical Education
Applied Mechanics	Feed Technology	Physical Science Teaching
Bacteriology	Food Science	Physics
Biochemistry	Foods and Nutrition	Physiology
Botany	General Home Economics	Plant Pathology
Business Administration	Genetics	Poultry Science
Chemical Engineering	Geology	Psychology
Chemistry (Analytical, Inorganic, Organic, Physical)	Home Economics Education	Statistics
Civil Engineering	Horticulture	Surgery and Medicine
Clothing and Textiles	Industrial Education	Technical Journalism
Dairy Manufacturing	Industrial Engineering	Zoology
Dairy Production	Institutional Management	
	Mathematics	

Major Fields for Master of Arts

Major work leading to the degree Master of Arts is offered in the following fields:

Art	History	Political Science
Economics	Mathematics	Radio and Television (Speech)
English	Modern Languages	Sociology
General Speech	Music	Speech
Geography	Philosophy	

Major Fields for Master of Architecture

Major work leading to the degree Master of Architecture is offered in the following fields:

Architectural Design	Architectural Structures	Interior Architectural Design
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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 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 College of Architecture and Design.

Major Fields for Doctor of Philosophy

Major work leading to the degree Doctor of Philosophy is offered in the following fields:

Agronomy	Electronics (Electrical Engineering or Physics)	Milling Industry
Animal Breeding	English	Nuclear Engineering
Animal Nutrition	Entomology	Parasitology
Applied Mechanics	Food Science	Pathology
Bacteriology	Foods and Nutrition	Physics
Biochemistry	Genetics	Physiology
Botany	History	Plant Pathology
Chemical Engineering	Horticulture	Psychology
Chemistry	Mathematics	Statistics
Economics (Agricultural)	Mechanical Engineering	Zoology
Economics (Arts and Sciences)		

Minor work for Doctor of Philosophy degree may be chosen in the departments offering major work for the degree and in supporting fields in other departments offering graduate work.

Interdepartmental Degree Programs

The Graduate School recognizes the importance of programs of study that extend into two or more recognized fields of learning in such manner that they cannot easily be assigned to any one department. To facilitate study in these areas, the Graduate School has provided committees, representative of the departments involved, to assist the Graduate School

in planning the students' programs. Coordinating committees have been established for the Doctor of Philosophy in Animal Breeding, in Animal Nutrition, Food Science, and in Genetics, for the Master of Science in Extension Education and in Physical Science Teaching and for the Master of Regional and Community Planning.

Assistantships and Fellowships

To facilitate research work, teaching, and the acquisition of advanced degrees, the University has established *graduate assistantships and/or research assistantships* in most departments. These assistantships may be on the 9-months-a-year or 12-months-a-year basis. They may be of either of two types: (1) Half-time appointments, which demand one-half of the time of the student for laboratory or research assistance or teaching during the employment period, and the remainder of his time is given to advanced study. No half-time assistant may receive more than 10 hours of credit a semester. (2) Two-fifths time appointments, which demand approximately 40 per cent of the student's time for laboratory, research, or teaching work. No two-fifths time assistant may receive more than 12 hours of credit a semester. Assistants on the 12-months basis may receive not more than five hours of credit in a summer session if on half-time basis, nor more than six hours of credit in a summer session if on two-fifths time appointments.

One or more graduate assistantships or research assistantships paying a fixed salary each year are maintained in each of the following fields: Accounting, Agricultural Engineering, Agronomy, Animal Breeding, Animal Husbandry, Animal Nutrition, Applied Mechanics, Architecture, Art, Bacteriology, Bakery Management, Biochemistry, Botany, Business Administration, Cereal Technology, Chemical Engineering, Chemistry, Civil Engineering, Clothing and Textiles, Dairy Science, Economics (including Agricultural Economics), Education, Electrical Engineering, English, Entomology, Family and Child Development, Family Economics, Flour and Feed Milling Industries, Food Science, Foods and Nutrition, Genetics, Geography, Geology, History, Horticulture, Industrial Engineering, Institutional Management, Landscape Architecture, Mathematics, Mechanical Engineering, Modern Languages, Music, Nuclear Engineering, Parasitology, Pathology, Philosophy, Physical Education, Physics, Physiology, Plant Pathology, Political Science, Poultry Science, Psychology, Regional and Community Planning, Sociology, Speech, Statistics, Zoology.

Applications should be made annually before March 15 for the following academic year. Students desiring such appointments may obtain application blanks from the head of the department concerned or the Dean of the Graduate School.

A number of *fellowships* are available each year. The stipends of fellowships vary in amount, and the course load which may be carried by a fellow is established in each individual case.

GENERAL INFORMATION

Admissions

Admission to graduate study does not imply admission to candidacy for an advanced degree. Such candidacy is determined only after the student has demonstrated his ability to do graduate work.

Entrance Requirements. A student desiring graduate credit in any course must be admitted to the Graduate School with a full or provisional standing or as a Special Graduate Student. This includes all those enrolled in Institutes, Short Courses or Evening College.

For admission to graduate study in *full standing*, the applicant must have been graduated from an institution whose requirements for the bachelor's degree are substantially equivalent to those of Kansas State University and must have an undergraduate average of B or better in the junior and senior years. Moreover, undergraduate training in closely related or supporting subjects must also be adequate to sustain advanced work in the field of the applicant's choice.

The applicant who does not meet all the requirements for admission to full

standing in the Graduate School may be admitted to *provisional standing* and will be advised of any deficiencies or other conditions to be met to attain full standing. The student admitted to provisional standing will be admitted to full standing upon completion of at least nine hours of work for graduate credit with a grade of B or better in three-fourths of such graduate work, and upon the removal of any course or subject-matter deficiencies which were specified at the time of his admission to provisional standing in the School.

Correspondence regarding admission to the Graduate School should be addressed to the head of the department concerned. The department will supply the required application blanks and such supplementary information as may be indicated. Two copies of a transcript from each institution attended must be sent directly to the appropriate department head. The application and transcripts should be filed with the department at least three months before the time the student expects to enroll.

Students who do not plan to work for an advanced degree may be admitted to the Graduate School as Special Graduate Students. Applications for admission should be sent to the Dean of the Graduate School. Only one copy of the official transcript is required from the institution which granted the undergraduate degree. Should the Special Student change his plans and wish to work toward an advanced degree, he must first obtain the permission of the department concerned. Up to 16 semester hours earned as a Special Student may be transferred into a regular degree program.

International Students. Orientation and advising of new International Students will take place one week prior to the date of registration.

Registration and Assignment. Students who have been admitted to the Graduate School register and pay their fees during the regular registration periods. At the time of registration, it is necessary that the student present an enrollment permit signed by the adviser.

All new graduate students, except international students, enrolling for seven or more credit hours are required to take a physical examination given by their family physician prior to their initial enrollment. This examination is to be recorded on forms furnished by the University. International students report to the Student Health Center during enrollment for a physical examination.

Not more than 16 hours, including those obtained from 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. (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.

No student may drop a course or change his assignment except by formal reassignment, and for this he must have the permission of his adviser and the Dean of the Graduate School.

Fees. See page 14.

Graduate Study by Seniors. A senior who has completed so much of his work for the bachelor's degree that his program for the year is not full, may be assigned one or more courses for graduate credit. In no case may such combination of courses exceed 17 hours during a semester or nine hours during a summer session. A student may accumulate graduate credit not to exceed 12 semester hours, within a time period of two enrollments, before he receives his bachelor's degree.

Requirements for Degrees

Graduate Credit. Courses numbered 800 to 999 in this *Bulletin* are for graduate credit only. Courses numbered 600 to 799 are for graduate students in a major field and for advanced undergraduates. Courses numbered 400 to 599 are for graduate students in a minor field and for

junior-senior development in a major field. For graduate credit in all courses carrying numbers 400 to 799, the student shall be required to do work of graduate character. The nature and amount of such graduate work shall be determined by the instructor.

Graduate credit may not be earned by taking a special examination or by correspondence. However, previously matriculated graduate students may be enrolled, on an hourly basis, for a limited amount of research or problem work *in absentia* on the recommendation of the head of the department and with the approval of the Dean of the Graduate School. The fee is \$3.00 a semester hour. Resident faculty members and students are eligible to pursue work *in absentia* only between the close of the summer session and the beginning of the fall semester. One, two, or three semester hours of graduate credit in problem or research work may be earned between the close of the summer school and the beginning of the fall semester, provided permission is secured in advance from the major instructor and from the Dean of the Graduate School.

Students who enroll in short sessions (in which credit is earned at the rate of one hour per week) scheduled concurrently with the eight-week summer session, may not enroll for courses in the eight-week summer session other than in problems and in research. No combination of short session and eight-week summer session credit may be in excess of nine credit hours. Full information concerning the course offered is contained in the Summer School number of the Kansas State University Bulletin, which may be obtained upon application to the Admissions and Records Office of the University.

Grades. Graduate students' work is graded in seven classes: A, B, C, D, Incomplete, F, and Withdrawn. A candidate for an advanced degree must make a grade of B or better in three-fourths of the credit hours taken for the degree (excluding research) regardless of the total number of hours. For graduate credit the grade in a course must be C or better. A graduate student's status will be redetermined after he has completed a minimum of 10 hours of graduate work at Kansas State University. To be in good standing a graduate student must make at least a 2.65 grade-point average in all graduate work in which a letter grade has been assigned. Those failing to meet the above requirement will be placed on probation.

Validation of Credits. All credits, whether from Kansas State University or transferred, which have been acquired more than six years prior to the time the candidate receives his degree in the case of a master's, and nine years in the case of a Ph. D., require *validation* either by repeating the course or passing an advanced course based on the lapsed credit course, or by a validation examination. Questions and answers are to be filed in the Graduate Office, as a part of the record of the candidate, until graduation. The method of the validation is to be determined by the department concerned, and the validation is to be completed at least two weeks before the oral examination. A grade of "B" or better is necessary for restoration of lapsed credits.

English and Speech Proficiency. The following requirements for graduate students relative to oral and written English usage have been adopted by the Graduate Faculty and the Faculty Senate: (1) All entering graduate students are required to take an examination to demonstrate proficiency in written English. Students who fail to pass this examination will be required to enroll in an appropriate review course immediately. No student shall be permitted to begin writing the master's thesis or report until he has passed the proficiency examination in English. No student will be admitted to candidacy for the Ph. D. until he has passed this examination; (2) all international students entering Graduate School will be required to take an examination to demonstrate proficiency in oral English immediately. Students who fail to pass this examination will be required to enroll in the English-as-a-Foreign-Language laboratory or an appropriate course in the Department of Speech.

Major and Minor Subjects. Major and minor subjects are listed on a previous page in this catalog. For master candidates, the nature and

distribution of courses in the program of study are approved by the Dean of the Graduate School upon the recommendation of the major instructor, head of the department and one other adviser. The inclusion of supporting courses, not directly included as major courses, shall be at the option of the advisory committee. The word "subject" is used to designate a recognized field of study and is not defined by the limits of a department. For doctor candidates, the approval of courses is made by the Dean upon recommendation of the supervisory committee.

Master's Degree. Candidates for the master's degree are required to spend one academic year in residence, except under special conditions, when the residence may be reduced to one and one-half semesters, or three summer sessions of full graduate study. Subject to the approval of the major department, the candidate may choose either of the following two plans: (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 32 semester hours of graduate credit without a master's thesis but *including a written master's report* either of research or of problem work on a topic in the major field. For this report two semester hours of credit are given. Candidates for the Master of Regional and Community Planning degree must satisfactorily complete 60 hours of graduate work, but substantial experience or training may be substituted for 15 hours of this requirement.

A program of study must be approved and submitted to the Graduate School prior to the end of the second term the candidate is enrolled at Kansas State University. If the program is submitted at a later date, all courses taken or being taken for graduate credit must appear on the candidate's program of study. The program of study can be modified on recommendation of the advisory committee and the approval of the Dean. However, no course when completed can be removed from the program of study, and the addition of courses to the approved programs is discouraged.

The subject of the master's thesis or report must be approved by the major instructor, the head of the department, and the Dean of the Graduate School. The completed thesis or report is submitted in triplicate to the major instructor for his approval and for that of the head of the major department and the Dean of the Graduate School. All 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 the student must deposit with his report or thesis a money order made out to an approved bindery. The University Library will forward manuscripts to the bindery for the candidate. If the student desires to publish all or part of his thesis before the master's degree is conferred he must obtain permission from the Dean of the Graduate School.

A three-man advisory committee is selected, with the major instructor as chairman. This committee is expected to approve the master's program of study and function as the oral examination committee along with a fourth member. All master's degree candidates are subject to an oral examination covering a thesis or report and the course work presented for the degree.

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, including 50 or more hours of course work and a doctor's dissertation, are required of candidates for the degree Doctor of Philosophy (Ph. D.). At least a year of this time must be spent in residence at the University. The candidate must demonstrate to an authorized representative of the Department of Modern Languages a reading proficiency in one or two foreign languages in the literature of his special field. The choice of the language or languages must be approved by the candidate's supervisory committee and by the Graduate Council. The language requirement(s) must be satisfied before preliminary examinations are taken.

For each student who plans to work toward the degree Doctor of Philosophy, a supervisory committee is selected by the student and the

major instructor with the approval of the head of the department and the Dean of the Graduate School. This committee will consist of at least four members representing the student's fields of study. This committee aids the student in the preparation of his program of study (which must be approved by the Dean of the Graduate School) and has charge of all examinations except those on the language requirements. Before preliminary examinations are arranged, the student must have on file in the office of the Dean of the Graduate School a program of study signed by the supervisory committee.

Ordinarily, at the close of the second year of graduate study and at least seven months before the date on which the student expects to receive his degree, he must pass *written examinations*. An oral examination may be required by a department in addition to the written examination. When the student has passed these examinations, he is recommended by the supervisory committee to the Graduate Council for admission to candidacy for the degree Doctor of Philosophy. On completion of three years of graduate study as prescribed in the program of study and on submission of a dissertation to the Dean of the Graduate School, the candidate is given a *final examination*.

Early in the graduate work a *dissertation* subject is chosen in the major field and approved by the supervisory committee. The dissertation must constitute a contribution to knowledge, either presenting conclusions from new material or reinterpreting previous knowledge, and be worthy of acceptance in a professional publication. All dissertations will be bound in cloth in accordance with specification for Class A binding of the Library Binding Institute. To cover the cost of binding, the student must deposit with his dissertation a money order made out to an approved bindery. The University Library will forward manuscripts to the bindery for the candidate.

All dissertations are microfilmed by a private firm and the abstracts are published in Dissertation Abstracts. The cost to the student is \$20.00.

If publication of the dissertation, in whole or in part, is made before the degree is conferred, permission must first be obtained from the Dean of the Graduate School. When it is published, wholly or in part, either before or after the degree is conferred, the first page must carry as a footnote the appropriate one of the two following statements:

A dissertation presented in partial fulfillment of the requirements for the degree Doctor of Philosophy in _____ at Kansas State University.

or

Portion of a dissertation presented in partial fulfillment of the requirements for the degree Doctor of Philosophy in _____ at Kansas State University.

Student Organizations

See pages 31-33.

Graduate Student Housing

See page 25.

Graduate Loans

See page 26.

INFORMATION ON INTERDEPARTMENTAL DEGREE PROGRAMS

Animal Breeding

Major work leading to the degree Doctor of Philosophy in Animal Breeding is offered in the departments of Animal Husbandry and Dairy and Poultry Science. For courses, see departmental sections in this catalog.

To enter graduate study in animal breeding, the student should have preparation in (1) elementary genetics, (2) college algebra, (3) physics, (4) general and organic chemistry, (5) general botany, (6) general zoology, and (7) at least six additional credit hours of advanced biological sciences. In addition, a student must have at least six credit hours of undergraduate livestock production or management courses. When necessary background courses are lacking, the student will be required to take such undergraduate courses.

Degree candidates are expected to acquire training in genetics, animal breeding, statistics, biochemistry, physiology, and zoology. Additional courses may be selected from other fields of biological and physical sciences.

Facilities for advanced work in animal breeding include large and small experimental animals, well-equipped laboratories and adequate library facilities. The facilities of the Department of Statistics and of the Computing Center are also available.

The following faculty members serve as the coordinating committee for the Doctor of Philosophy degree in Animal Breeding: G. B. Marion, Chairman; James V. Craig, Earl Farmer, H. T. Gier, Keith Huston, Walter H. Smith, Harold G. Spies, and John Wheat.

Animal Nutrition

Major work leading to the degree Doctor of Philosophy in Animal Nutrition is offered in the Departments of Animal Husbandry, Dairy and Poultry Science, Biochemistry, and Physiology. For courses, see departmental sections in this catalog.

To enter upon graduate study in Animal Nutrition, the student should have preparation in (1) biological sciences, including bacteriology, histology and zoology, (2) chemistry, including qualitative, quantitative and organic, (3) mathematics, (4) physics, and (5) livestock or poultry science. Where necessary background courses are lacking, the student will be required to take additional undergraduate courses.

In the course of preparation for the advanced degree, candidates are expected to acquire training in nutrition, biochemistry, physiology, anatomy and statistics. Additional courses may be selected from other fields of biological and physical sciences. Students desiring such a program should consult the Dean of the Graduate School and the representatives of the appropriate departments.

Facilities for advanced work in Animal Nutrition include large and small experimental animals, well-equipped laboratories and adequate library facilities.

The following faculty members serve as the coordinating committee for the Doctor of Philosophy degree in Animal Nutrition: Draytford Richardson, Animal Husbandry, Chairman; E. E. Bartley, Dairy and Poultry Science; Russell A. Frey, Physiology; D. B. Parrish, Biochemistry; Paul E. Sanford, Dairy and Poultry Science.

Extension Education

The College of Education in cooperation with other parts of the University and the Agricultural Extension Service offers graduate work leading to the degree Master of Science in Extension Education. The program is designed primarily for extension workers who are or expect to be engaged in supervisory, administrative or county extension agent positions and who wish to receive a broad training in the fields of education, communication and social science.

An essential difference from other programs is that the major field of study consists of courses selected in the fields of adult and extension education. For a major in extension education, the student should take Educ. 605, 752, 802 and 816. The remaining work may be selected from the offerings of the various academic departments in which the worker feels the greatest need for subject-matter training.

It is desirable for the student to have had two years of experience in extension work before enrolling in this program. The case of a stu-

dent who lacks experience will be considered on its merits. The thesis or report must be written in the field of extension education, the major field.

The following faculty members serve as a coordinating committee for the Master of Science in Extension Education: Curtis Trent, Extension Service, Chairman; William H. Coffield, Education; and Wilber E. Ringler, Extension Service.

Food Science

Graduate work leading to the degrees Master of Science and Doctor of Philosophy in Food Science is offered in the departments of Animal Husbandry, Bacteriology, Biochemistry, Chemical Engineering, Dairy and Poultry Science, Flour and Feed Milling Industries, Foods and Nutrition, Horticulture and Institutional Management.

Requirements for entering graduate study in Food Science are: (1) mathematics including college algebra, (2) quantitative, analytical and organic chemistry, (3) a course in physics, (4) an introductory course in microbiology, (5) a course in botany, zoology or biology. When the student's advisory committee believes that it is necessary, the student will be required to take additional undergraduate courses to prepare him more completely for his own 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 if these courses are not included in previous preparation. Course requirements will be evaluated by the student's advisory committee. 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 flour milling, baking, dairy products, poultry products, meats and quantity food production. Laboratories are equipped for research involving biochemistry, heat transfer, fluid flow, filtration, evaporation, microbiology, rheology, freeze drying and nutrition.

The following faculty members serve on the Food Science Coordinating Committee: Ross Mickelsen, Dairy and Poultry Science, Chairman; Beth E. Alsup, Foods and Nutrition; L. T. Fan, Chemical Engineering; V. D. Foltz, Bacteriology; William Hurley, Flour and Feed Milling; John A. Johnson, Flour and Feed Milling; J. D. Mitchell, Dairy and Poultry Science; Howard Mitchell, Biochemistry; Harold Tuma, Animal Husbandry.

Genetics

Graduate study leading to the degrees Master of Science and Doctor of Philosophy in the science of genetics is offered in the Departments of Agronomy, Animal Husbandry, Bacteriology, Botany and Plant Pathology, Dairy and Poultry Science, and Statistics. Graduate courses in genetics will be found listed under the above departments in this catalog. Minor work may be conducted in any of the scientific disciplines, or in other academic areas with approval of the Genetics Coordinating Committee.

A listing of prerequisite courses, as well as a listing of available courses in genetics at Kansas State University, can be obtained from the Dean of the Graduate School. In most cases, the course requirements will be evaluated by the Genetics Coordinating Committee and the student's advisory committee.

Facilities for research work in genetics vary with departments. Farm and small experimental animals, crop plants, and microorganisms; laboratory, greenhouse, and farm space as well as a digital computer are available for graduate research.

The following faculty members serve on the Genetics Coordinating Committee: Thad Pittenger, Agronomy, Chairman; James V. Craig, Dairy and Poultry Science; Abraham Eisenstark, Bacteriology; Charles Hall,

Horticulture; Keith Huston, Dairy and Poultry Science; Elizabeth McCracken, Botany; R. F. Nassar, Statistics; John Wheat, Animal Husbandry.

Physical Science Teaching

The departments of Chemistry, Geology, Mathematics, and Physics, and the College of Education jointly offer graduate work leading to the degree Master of Science in the field of physical science teaching. The program is specifically directed towards the needs and interests of present and prospective teachers of physical science in the high schools and junior colleges.

Prerequisite to graduate work in this field is the completion of a four-year undergraduate curriculum including one semester of course work in geology, or acceptable substitute, one year of course work in chemistry, one year of course work in physics, and an adequate background in mathematics. The student must have completed the course work required for a high school teaching certificate.

The purpose of this program is to enable the science teacher to broaden and strengthen his knowledge of his teaching field and his profession rather than to specialize in a single discipline. Programs will be designed to fit the students' needs, and will include thirty hours course work and a two-hour report. Each program must be approved by the coordinating committee.

The following faculty members serve as the coordinating committee for Physical Science Teaching: Henry V. Beck, Geology, Chairman; William G. Schrenk, Chemistry; John M. Marr, Mathematics; and Basil Curnutte, Jr., Physics.

Regional and Community Planning

Major work leading to the two-year degree Master of Regional and Community Planning is offered on an interdepartmental basis. Those entering this field will pursue broad training over several areas of social and physical sciences, including such subjects as planning history, principles and theory, regional economics, industrialization, population, traffic and transportation engineering, housing, subdivision design, urban redevelopment, capital budgeting and finance, and planning and zoning law.

Students with undergraduate degrees in administration, architecture, economics, engineering, geology, geography, government, landscape architecture, law, planning, political science or sociology, who meet the requirements of the Graduate School for admission, are fully acceptable. Students with other backgrounds may be accepted upon approval of the interdepartmental committee and subject to such conditions as they may impose.

The following faculty members serve as the interdepartmental committee for the program in Regional and Community Planning: Vernon P. Deines, Planning, Chairman; Emil C. Fischer, Architecture; Jack Bailey Blackburn, Civil Engineering; Robert L. Smith, Transportation; Robert P. Ealy, Landscape Architecture; Eugene Friedmann, Sociology; Ralph Dakin, Sociology; Wilfred H. Pine, Economics; Jarvin M. Emerson, Economics; William W. Boyer, Political Science; Louis H. Douglas, Political Science.

Agriculture

GLENN H. BECK, *Vice President for Agriculture*

Agriculture at Kansas State University includes instruction, research, extension, and international agricultural programs with county agents, branch experimental stations, experimental fields located at strategic locations in the state, and programs of education and development in foreign countries. Under the vice president for agriculture are four administrators in charge of those four phases of work: the dean of the College of Agriculture, the director of the experiment station, the director of extension, and the director of international agricultural programs.

The College of Agriculture

CARROLL V. HESS, *Dean*

FRANK R. CARPENTER, *Assistant Dean*

The College of Agriculture has two objectives. The first is to help the student develop the qualities of an educated person—a philosophy for constructive living, an understanding of people, and a capacity for leadership. The second is to provide technical education, so the student is equipped to enter and advance in the profession of his choice. Curriculums in the College are designed to provide both “liberal” and “useful” education.

The Profession

Professional agriculture is the application of the basic sciences and/or 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, and related fields. This broad profession includes, therefore, disciplines that range from soil physics to cereal chemistry to land economics. Practitioners in the profession range from industrial researchers to farmers to technical salesmen.

The profession (and academic programs in the College of Agriculture) might be grouped into four areas: (1) Agricultural Production, (2) Agricultural Business, (3) Agricultural Science, and (4) Agricultural Education.

Examples of positions held by recent graduates are:

- | | |
|---|--|
| 1. Superintendent, flour mill | 12. Work Unit Conservationist, SCS, U. S. D. A. |
| 2. District Sales Manager, feed company | 13. Commission Salesman, livestock market |
| 3. Research Director, fertilizer manufacturer | 14. Editor, flower and garden magazine |
| 4. County Agricultural Agent | 15. Assistant Manager, pork department of meat processor |
| 5. Produce Manager, retail food chain | 16. Economist, Foreign Agricultural Service, U. S. D. A. |
| 6. Beef Editor, farm magazine | 17. Farmer |
| 7. Vocational Agriculture Instructor | 18. Owner, city flower shop |
| 8. Ranch Manager | 19. Medical entomologist |
| 9. Graduate Student, for Ph. D. | |
| 10. Fieldman, farm management company | |
| 11. Technical Representative, pesticide company | |

The Faculty

Students who enter professional schools are concerned primarily with quality of the faculty. More than 85 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 are housed and work closely with extension specialists in their fields. Such integration of teaching, research, and extension activities helps to insure that professional courses are current, factual, and realistic.

Facilities

Effective instruction in the application of basic sciences to “going industries” requires expensive and varied equipment. A feed mill, flour

mill, and bakery, completed in 1961, include modern equipment from eight countries. Greenhouses, hotbeds, and field plots provide ample stock for horticulture courses. Well-equipped drafting rooms are used by milling students.

Over 4,000 acres of land are used for experimental work and for support of the teaching program—for work with poultry and livestock of many breeds and of various ages, and with various soil types, field crops, fruits, vegetables, ornamentals, etc.

A Dairy and Poultry building completed in the fall of 1963 and an Animal Industries building finished in 1957 contain the latest equipment for teaching and research in nutrition, genetics, and food processing (meat, milk, eggs). New entomology and biochemistry laboratories are now in use.

Nearly all classrooms and laboratories are in close proximity within the College, near faculty offices. Many students work part time in these facilities, on specific research projects, adding greatly to their understanding of the disciplines and to their familiarity with the equipment.

Academic Programs

The curriculum structure in the College of Agriculture permits sufficient flexibility for the student and his adviser to take maximum advantage of courses available on the campus in designing the most effective program.

Requirements on the following pages have been established by the faculty of the College. Each student, during the freshman year or early in the sophomore year, will, with his adviser, develop an *individual* program within the guidelines of the stated requirements. This individual program, when signed by the *student*, his *adviser*, his *department head*, and the dean, becomes the student's degree requirement. For all students entering after September 1, 1966, the minimum credits for the B. S. degree will be 132. Those entering earlier must complete 136.

Curriculums and Majors in Agriculture

<i>Majors in the Curriculum in Agriculture</i>		<i>Other Curriculums in the College of Agriculture</i>	
	<i>Options</i>		<i>Options</i>
Agricultural Economics	Bus. and Industries Science Production	Agricultural Education	
Agricultural Journalism		Bakery Science and Management	Administration Chemistry Operations
Agricultural Mechanization	Bus. and Industries Science Production	Biochemistry	
Agronomy (crops and soils)	Bus. and Industries Science Production	Dairy Foods Processing	Administration Science Food Processing
Animal Husbandry	Bus. and Industries Science Production	Feed Milling Science and Management	Administration Chemistry Operations
Dairy Production	Bus. and Industries Science Production	Flour Milling Science and Management	Administration Chemistry Operations
Entomology	Bus. and Industries Science	Natural Resources Conservation and Use	Soil and Water Conservation Economics of Conservation Conservation of Recreation Areas
General Agriculture			
Pre-Forestry (2-year program)			
Horticulture	Bus. and Industries Science Production		
Plant Pathology	Science		
Poultry Science	Bus. and Industries Science Production		

Note that most curriculums and majors primarily are aligned with commodities: Agronomy with crops and soils, animal husbandry with livestock and livestock products, milling technology with flour, etc. 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 his adviser in developing an academic program *most* effective and valuable for him. One who wants to write for a flower and garden magazine might major in agricultural journalism and minor in horticulture, or vice versa, depending on the primary interest. Other examples of flexibility and adaptability could be given.

The "Agriculture" curriculum includes those majors which have a relatively large number of courses in common. Note that a student may enroll in Agriculture—General, if he wants to enter some part of professional agriculture but is not yet ready to identify a particular branch. Separate curriculums are available for students whose professional interests dictate a unique program of course work. These curriculums are Agricultural Education, Bakery Science and Management, Biochemistry, Dairy Foods Processing, Feed Milling Science and Management, and Flour Milling Science and Management. He can take basic courses during his freshman year that will be useful in *any* curriculum or major, and/or he may take courses in several branches of agriculture to determine which best fits his interests and abilities.

A majority of students identify a curriculum (or specific major in the Agriculture curriculum) at the time they enter. They are provided an academic adviser in their major field. Those who enter in Agriculture—General are provided an academic adviser who is a representative of the dean's office. These students are urged to choose a specific major before the close of the freshman year.

A student may change his curriculum or major at almost any time and with relative ease, though a change after the sophomore year may delay graduation.

Preparing for Agricultural Business

About 25 per cent of the 1960-64 graduates of the College of Agriculture (excluding those in military service) are now employed in industry as salesmen, plant superintendents, buyers, writers, etc. This implies that many students should plan strong "minors" or groups of supporting courses to prepare themselves to compete in industry. Likely courses are accounting, labor relations, corporation law, sales psychology, journalism, and others.

Preparation for Agricultural Science—Research and Graduate Study

Nearly 25 per cent of recent graduates are now in graduate school, aiming for Master of Science or Doctor of Philosophy degrees in their respective majors. The proportion is increasing. Students aiming for graduate school will do best if their undergraduate programs are sufficiently strong in the basic sciences—mathematics, botany, zoology, physics, chemistry, statistics, economics, and in communications.

Preparation for Agricultural Production

Those who plan to farm or ranch in the Midwest (another 25 per cent of recent graduates) should consider their future community responsibilities and the changing characteristics of farming as they develop their individual academic programs. They will want to understand state and local government, principles of taxation, corporation law as applied to farms, etc., in addition to the technology of crop and livestock production.

Preparation for Agricultural Education

Most students who plan to teach vocational agriculture major in the Agricultural Education curriculum. Those who plan to enter county extension work may prepare in this curriculum or in other majors within the Curriculum in Agriculture.

Other Agriculturally Related Professions

In some cases college-bound students want to prepare for specific professions that are considered a part of agriculture or are closely related to agriculture, but are not identified here as curriculums or majors. Range management, food technology, pest control, conservation, and wildlife management are examples. Careful study of majors and curriculums that do exist in the College of Agriculture and other Colleges of the University, and review of course offerings in the General Catalog, usually reveal that the desired program exists or can be developed.

The Freshman Year

Because entering students vary considerably in their academic backgrounds and their capacity to pursue college work rapidly, academic advisers work individually with new students in planning credit loads and lists of courses to be taken the first year.

Courses that *might be taken* by freshmen in the Agriculture curriculum follow. These are only *examples*; other combinations may be developed by the student and his adviser. The principle also applies to other curriculums in the College of Agriculture.

Example I:

FALL SEMESTER		SPRING SEMESTER	
English Composition I	3	English Composition II	3
Agriculture in Our Society	2	General Botany	4
Animal Sciences	4	Chemistry I	5
College Algebra	3	Plane Trigonometry	3
Economics I	3	Physical Education	0
Physical Education	0		
Total	15	Total	15

Example II:

FALL SEMESTER		SPRING SEMESTER	
English Composition I	3	English Composition II	3
Agriculture in Our Society	2	Plant Science	4
Chemistry I and II ¹	8	Elements of Organic Chemistry	3
College Algebra	3	Elements of Statistics	3
General Botany	4	Soils	4
Physical Education	0	Physical Education	0
Total	20	Total	17

Example III:

FALL SEMESTER		SPRING SEMESTER	
General Psychology	3	General Botany	4
Agriculture in Our Society	2	English Composition I	3
Animal Sciences	4	College Algebra	3
General Geology	3	Dairy Science	2
Intermediate Algebra	3	Physical Education	0
Physical Education	0		
Total	15	Total	12

1. Planned for students with one year of good high school chemistry. Requires class time equivalent to about 5 credits, though 8 credits are earned.

Following are "suggested" or "typical" programs for each of the majors within the Agriculture curriculum.

Curriculum in Agriculture

B. S. in Agriculture

Courses that are common for students in the majors within this curriculum are listed below:

FRESHMAN YEAR COURSES		ADDITIONAL REQUIREMENTS	
English Composition I	3	Humanities (See list, page 253)	6
English Composition II	3	Communications	2 or 3
Oral Communication	2	Chemistry II or Behavioral Science	3
Agriculture in Our Society	2	or a Physical Science	3
College Algebra	3		
Economics I	3		
Chemistry I	5		
Physical Education I	0		
Physical Education II	0		

In addition, each student will complete courses prescribed by his major department, some of which are listed on the following pages. The remainder of his planned program will strengthen his training toward the sciences, business and industries, or production, and will be guided by requirements listed on page 52.

Agricultural Economics

MAJOR COURSES		NON-MAJOR COURSES	
Principles of Agricultural Economics	4	Economics II	3
Agricultural Economics Summary	2	Principles of Accounting	3
Selected others, see page 52		Money and Banking	3

Agricultural Journalism

TECHNICAL JOURNALISM COURSES		PROFESSIONAL AGRICULTURE COURSES	
Graphic Arts Survey	2	A minimum of 12 hours must be taken in one of the following departments:	
Typography Lab	1		1. Agricultural Economics
Reporting II	3		2. Agronomy
Editing	2		3. Animal Husbandry
News Photography	2		4. Dairy and Poultry Science
Principles of Advertising	3		5. Entomology
Magazine Article Writing	2		6. Flour & Feed Milling Industries
Public Information Methods	2		7. Horticulture
Radio & TV News	2		
Ag Student Journalism	4		
Journalism Electives	4		

Agricultural Mechanization

MAJOR COURSES		PROFESSIONAL AGRICULTURE COURSES	
Farm Power	3	A minimum of 12 hours must be taken in one of the following fields:	
Agricultural Machinery	3		1. Agricultural Economics
Farm Buildings Construction	3		2. Agronomy
Electricity in Agriculture	3		3. Animal, Dairy, and Poultry Science
Drainage & Erosion Control	3		4. Entomology
Irrigation Practices	3		5. Horticulture
Functional Requirements of			6. Agricultural Journalism
Agricultural Structures	3		
NON-MAJOR COURSES			
Plane Surveying	3		
Engineering Graphics	2		
General Physics I	4		
Plane Trigonometry	3		

Agronomy

MAJOR COURSES		NON-MAJOR COURSES	
Plant Science	4	Chemistry II and Lab.	5
Soils	4	General Organic Chemistry	3
Other courses listed on page 52	12 or more	Elements of Statistics	3
		General Botany	4
		General Zoology	4
		Three of the following:	
		Plant Physiology	4
		Genetics	3
		Microbiology	4
		Economic Entomology	3
		Plant Pathology	2

Students may specialize in agricultural chemical sales, soil science, crop science, range management, soil conservation, or irrigation.

Animal Husbandry

MAJOR COURSES		NON-MAJOR COURSES	
Principles of Animal Sciences	2	Anatomy and Physiology	4
Animal Husbandry	2	Elementary Organic Chemistry	3
Principles of Feeding	3		
Animal Nutrition	3		
Principles of Livestock Selection	3		
Elements of Meat Processing	3		
Beef Cattle Production	3		
Swine Production	3		
Sheep Production	3		
Animal Breeding	3		

Students may specialize in animal nutrition, animal breeding and genetics, meat science, or livestock management.

Dairy Production

MAJOR COURSES		NON-MAJOR COURSES	
Principles of Animal Sciences	2	To be chosen in consultation with adviser.	
Dairy Science	2		
Fundamentals of Nutrition	3		
Genetics	3		
Dairy Cattle Nutrition	3		
Dairy Cattle Management	3		
Genetics Dairy Cattle and Poultry	4		
Dairy Cattle Judging	2		
Milk Secretion	3		
Artificial Breeding of Farm Animals	3		
Market Milk & Dairy Inspection	4		
Dairy Seminar	1		

Entomology

MAJOR COURSES		NON-MAJOR COURSES	
General or Economic Entomology	3	General Zoology	4
External Insect Morphology	3	Chemistry II and Lab.	5
Taxonomy of Insects I	2	General Organic Chemistry	5
Selected others, see page 52.		General Botany	4
		Plant Pathology	2
		Genetics	3
		Bacteriology or General Microbiology	4 or 5
		Elements of Statistics	3

Pre-Forestry (2-year)

MAJOR COURSES		NON-MAJOR COURSES	
Forestry Practices	3	General Botany	4
Horticulture Seminar	0	General Zoology	4
Forest Conservation	3	Chemistry II	3
		Plane Trigonometry	3
		General Physics I	4
		General Geology	3
		Taxonomic Botany	3
		Scientific Report Writing	2
		Plane Surveying	3
		Engineering Graphics I	2
		Economic Entomology	3
		Soils	4
		Organic Chemistry	3

Satisfactory completion of this two-year program, administered by the Department of Horticulture, qualifies a student to enter a university offering a professional forestry degree.

Horticulture

MAJOR COURSES		NON-MAJOR COURSES	
Home Horticulture	2	General Botany	4
Horticulture Seminar	0	Soils	4
Plant Science	4	Chemistry II	3
Landscape Horticulture	3		
Principles of Fruit and Nut Growing I	3		
Vegetable Crops I	3		
Principles of Floriculture	3		

Students may specialize in floriculture, fruits, ornamental horticulture, turf management, or vegetables.

Additional departmental requirements vary with the option selected.

Plant Pathology

MAJOR COURSES		NON-MAJOR COURSES	
General Botany	4	Soils	4
Plant Science	4	General Zoology	4
Plant Pathology	2	Genetics	3
Botanical Science	3	Chemistry II and Lab.	5
Introductory Mycology	4	General Organic Chemistry	5
		Economic Entomology	3
		Bacteriology	5
		General Physics I	4
		General Plant Biochemistry	4
		Descriptive Meteorology	3

Poultry Science

MAJOR COURSES		NON-MAJOR COURSES	
Principles of Animal Science	2	To be developed in consultation with adviser.	
Poultry Science	2		
Nutrition of the Fowl	3		
Poultry and Dairy Cattle Genetics	4		
Avian Metabolism	3		
Poultry Products Technology	3		
Poultry Management	3		

Each student in majors listed on the preceding pages will include in his program a group of courses selected to strengthen his abilities for agricultural science, agricultural businesses and industries, or agricultural production. Minimal requirements for each purpose are listed below. Some of these minimal requirements may have been met by courses listed as major or non-major courses on preceding pages.

Additional Requirements for Majors Listed on Pages 50, 51, 52.

AGRICULTURE		Science	Business and Industries	Production
Soils	4	Two of the courses listed (Ent. and Pl. Path. majors exempt)	Prin. of Agr. Econ. plus second course in Agr. Econ., plus 8 credits in other departments	Two of the courses listed plus 6 credits in animal sciences (except for Hort. majors) and 6 credits in plant sciences
Plant Science	4			
Animal Sciences	4			
Prin. of Agr. Econ.	4			
Engg. in Agr.	4			
BIOLOGICAL SCIENCES		Four of the courses listed (only 2 for Ag. Econ. majors)	6 credits	Four of the courses listed
General Botany	4			
General Zoology	4			
Genetics	3			
General Microbiology	4			
Economic Entomology	3			
Plant Pathology	2			
Ani. Anat., Physiol., or Path.	3			
MATHEMATICS AND STATISTICS		3 credits (courses not specified)	3 credits (courses not specified)	
Elements of Statistics	3			
Plane Trigonometry	3			
El. Digital Computing Tech.	2			
PHYSICAL SCIENCES		6 credits (Agr. Econ. may sub. human behavioral sciences)	(3 credits can replace 3 of the 12 credits listed under social sciences)	6 credits
Organic Chemistry	3 or 5			
General Physics	4			
Descriptive Physics	4			
General Geology	3			
Biochemistry	3 or 5			
Quantitative Analysis	4			
Chem. Equilibria and Qual. Anal.	4			
Social Sciences (or human behavioral sciences)		3 credits	9 credits	9 credits
Accounting and Bus. Admin.		12 credits		

Curriculum in Agricultural Education

B. S. in Agriculture

The curriculum in Agricultural Education is for those who are interested in becoming teachers of vocational agriculture in high schools of Kansas and other nearby states, teachers of agriculture in area vocational schools, or entering other educational work in some branch of the agricultural profession, such as county extension work. Students who complete the curriculum qualify for a state certificate to teach vocational agriculture in Kansas public schools.

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	035 100	Agr. in Our Society	2	Engl.	229 120	Engl. Comp. II	3
Engl.	229 100	Engl. Comp. I	3	Psych.	273 110	Gen. Psychology	3
Math.	245 100	College Algebra	3	Chem.	217 210	Chemistry I	5
Bot.	217 200	Gen. Botany	4	Agron.	015		
		Elective Agr. Sci.	4	Hort.	040 200	Plant Science	4
Ph. Ed.	261 011	Physical Education	0	Ph. Ed.	261 011	Physical Education	0
						Elective	1
Total			16	Total			16

SOPHOMORE

Chem.	217 190	Organic Chem.	3	Agron.	015 270	Soils	4
Zool.	293 200	Gen. Zool.	4	Ag. Ec.	010 200	Prin. Agr. Econ.	4
Ag. E.	510 210	Farm Mechanics	2	Spch.	281 105	Oral Comm. I	3
Educ.	405 202	Educ. Psych. I	3			Elective Agr. Science ..	2
Ec. So.	221 110	Economics I	3	Ag. E.	510 220	Farm Power	3
		Elective	1				
Total			16	Total			16

JUNIOR

Educ.	405 400	Educ. Psych. II	3	Educ.	405 201	Prin. Sec. Educ.	3
Ag. E.	510 415	Agr. Engg. Aplic.	2	Journ.	289 350	Agr. Journalism	3
Engl.	229 090	English Proficiency	0			Elective Agr. Science ..	6
		Literature or Language ..	3			Elective	2
		Elective Agr. Science ..	6			Elec. Social Science	3
		Elective Social Science ..	3				
Total			17	Total			17

SENIOR

Educ.	405 702	Voc. Educ.	3	Ag. E.	510 215	Farm Mach. Repair	3
Educ.	405 500	Meth. Tchg. Agr.	3			Elec.—Basic Science ..	3
Educ.	405 477	Tchg. Partic. Sec. Sch. ..	5			Elective	3
Ag. E.	510 405	Farm Mech. Meth.	3			Elective—Agr. Science ..	8
Ag. E.	510 410	Farm Bldgs. Constr. ..	3				
Total			17	Total			17

Seven weeks during the first 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 he has no other academic responsibilities while teaching. When student teaching is taken in the spring semester, fall semester courses are moved to spring semester, except that Farm Machinery Repair is taken instead of Farm Buildings Construction.

Curriculums in Bakery Science and Management, Feed Milling Science and Management and Flour Milling Science and Management

These curriculums have options in (a) Administration, (b) Chemistry and (c) Operations. The freshman year is essentially the same for all curriculums. Students in each curriculum must indicate their option after the first semester of the sophomore year. The Administration options prepare students for careers in sales, purchasing, personnel, and so forth; the Chemistry options train individuals for quality control or research positions; the Operations option provides training in the technical engineering aspects of the respective industries. The baking, feed milling and flour milling industries provide graduates with unusually fine opportunities for employment and advancement.

Bakery Science and Management

B. S. in Bakery Science and Management

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Millg.	045 011	Freshman Assembly	0	Millg.	045 011	Freshman Assembly	0
Gn. Ag.	035 100	Agr. in Our Society	2	Millg.	045 100	Prin. of Milling	3
Engl.	229 100	Engl. Comp. I	3	Spch.	281 105	Oral Comm. I	2
Math.	245 100	College Algebra	3	Engl.	229 120	Engl. Comp. II	3
Chem.	221 210	Chemistry I	5	Math.	245 150	Plane Trig.	3
M. E.	580 213	Graphical Comm. I	3	Chem.	221 230	Chemistry II	3
				Chem.	221 250	Chemistry II Lab.	2
Ph. Ed.	261 011	Physical Education	0	Ph. Ed.	261 011	Physical Education	0
Total			16	Total			16

SOPHOMORE

Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Ec. So.	225 110	Economics I	3	Bact.	213 220	Gen. Micro.	4
Bot.	217 121	Biology I	4			Option A, B, or C	12
		Option A, B, or C	9				
Total			16	Total			16

JUNIOR

Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Engl.	229 090	English Proficiency	0	Millg.	045 631	Exp. Baking II	4
Millg.	045 630	Exp. Baking I	4	Millg.	045 650	Qualities Wheat and	
Bact.	213 645	Microbiology of Foods ..	5			Flour	3
		Option A, B, or C	8			Option A, B, or C	10
Total			17	Total			17

SENIOR

Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Hist.	241 111	West. Civilization	3	Hist.	241 112	West. Civilization II ..	3
Ec. So.	225 620	Labor Economics	3	Entom.	030 100	Milling Entomology	4
		Option A, B, or C	11			Option A, B, or C	10
Total			17	Total			17

OPTION A (Administration)

B. A.	305 273	Prin. of Accounting	2	B. A.	305 410	Business Finance	3
B. A.	305 302	Data Processing	2	B. A.	305 440	Marketing	3
B. A.	305 305	Managerial Accounting ..	3	B. A.	305 542	Sales Management	3
B. A.	305 325	Business Law I	3	Biochem.	020 410	Plant Biochemistry	4
Chem.	221 300	Gen. Quant. Analysis ..	4	Chem.	221 350	General Organic Chem. ..	3
Ec. So.	225 120	Economics II	3	Chem.	221 351	Gen. Org. Chem. Lab. ..	2
Phys.	265 211	Gen. Physics I	4	Millg.	045 610	Flour & Feed Anal. ..	4
Stat.	285 320	Elements of Statistics ..	3	Stat.	285 510	Stat. Qual. Control	3
						Electives	10

OPTION B (Chemistry)

Chem.	221 300	Gen. Quant. Analysis .	4	Biochem.	020 655	Biochemistry I	3
Chem.	221 511	Organic Chem. I	3	Biochem.	020 656	Biochemistry Lab.	2
Chem.	221 512	Organic Chem. I Lab. .	2	Chem.	221 585	Physical Chemistry	5
Chem.	221 516	Organic Chem. II	3	Millg.	045 610	Flour & Feed Anal. ..	4
Chem.	221 517	Organic Chem. II Lab. .	2	Millg.	045 620	Adv. Wht. & Fl. Test. ..	3
Math.	245 220	Anal. Geom. & Calc. I .	4	Millg.	045 632	Bakery Design & Flow ..	2
Math.	245 221	Anal. Geom. & Calc. II	4	Stat.	285 620	Stat. Methods I	3
Math.	245 222	Anal. Geom. & Calc. III	4			Electives	8
Phys.	265 211	Gen. Physics I	4				

OPTION C (Operations)

Ap. M.	520 305	Statics	3	Ap. M.	520 415	Mech. of Materials	2
Chem.	221 350	Gen. Organic Chem.	3	Chem.	221 351	Gen. Org. Chem. Lab. .	2
Math.	245 220	Anal. Geom. & Calc. I .	4	E. E.	550 403	Elec. Cir. & Control	4
Math.	245 221	Anal. Geom. & Calc. II	4	I. E.	570 436	Industrial Management ..	3
Math.	245 222	Anal. Geom. & Calc. III	4	Millg.	045 632	Bakery Design & Flow ..	2
M. E.	580 218	Graph. Comm. II	2	Millg.	045 633	Bakery Technology	3
Phys.	265 310	Engg. Physics I	5			Electives	13
Phys.	265 311	Engg. Physics II	5				

Feed Milling Science and Management*B. S. in Feed Milling Science and Management***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Millg.	045 011	Freshman Assembly	0	Millg.	045 011	Freshman Assembly	0
Gn. Ag.	035 100	Agr. in Our Society	2	Millg.	045 100	Prin. of Milling	3
Engl.	229 100	Engl. Comp. I	3	Spch.	281 105	Oral Comm. I	2
Math.	245 100	College Algebra	3	Engl.	229 120	Engl. Comp. II	3
Chem.	221 210	Chemistry I	5	Math.	245 150	Plane Trig.	3
M. E.	580 213	Graphical Comm. I	3	Chem.	221 230	Chemistry II	3
Ph. Ed.	261 011	Physical Education	0	Chem.	221 250	Chemistry II Lab.	2
				Ph. Ed.	261 011	Physical Education	0
Total			16	Total			16

SOPHOMORE

Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Ec. So.	225 110	Economics I	3	Bot.	213 122	Biology II	4
Bot.	213 121	Biology I	4	Dy. Sc.	025 200	Fund. of Nutr.	3
Millg.	045 210	Flow Sheets	2			Option A, B, or C	9
		Option A, B, or C	7				
Total			16	Total			16

JUNIOR

Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Engl.	229 090	English Proficiency	0	Millg.	045 660	Qual. of Feed Ingrid. 3	
Millg.	045 410	Feed Tech. I	4			Option A, B, or C	14
Ec. So.	225 620	Labor Economics	3				
		Option A, B, or C	10				
Total			17	Total			17

SENIOR

Millg.	045 010	Seminar	0	Millg.	045 010	Seminar	0
Hist.	241 111	West. Civilization I	3	Hist.	241 112	West. Civilization II ..	3
		Option A, B, or C	14	Entom.	030 100	Milling Entomology	4
						Option A, B, or C	10
Total			17	Total			17

OPTION A (Administration)

Ag. Ec.	010 130	Grain Marketing	3	Ec. So.	225 430	Money & Banking	3
B. A.	305 273	Prin. of Accounting	3	Millg.	045 610	Flour & Feed Analysis 4	
B. A.	305 325	Business Law I	3	Millg.	045 680	Feed Tech. II	4
B. A.	305 305	Managerial Acctg.	3	Phys.	265 211	Gen. Physics I	4
B. A.	305 410	Business Finance	3	Phys.	265 212	Gen. Physics II	4
B. A.	305 542	Sales Management	3	Stat.	285 320	Elements of Statistics 3	
Chem.	221 300	Gen. Quant. Analysis ..	4	Stat.	285 510	Stat. Qual. Control	3
Chem.	221 350	Gen. Organic Chem.	3			Electives	9
Chem.	221 351	Gen. Org. Chem. Lab. 2					
Econ.	225 120	Economics II	3				

OPTION B (Chemistry)

Biochem.	020 655	Biochemistry I	3	Math.	245 220	Anal. Geom. & Calc. I .	4
Biochem.	020 656	Biochemistry I Lab.	2	Math.	245 221	Anal. Geom. & Calc. II	4
Chem.	221 300	Gen. Quant. Analysis ..	4	Math.	245 222	Anal. Geom. & Calc. III	4
Chem.	221 511	Organic Chem. I	3	Millg.	045 450	Flour & Feed Analysis 4	
Chem.	221 512	Organic Chem. I Lab. .	2	Phys.	265 211	Gen. Physics I	4
Chem.	221 516	Organic Chem. II	3	Phys.	265 212	Gen. Physics II	4
Chem.	221 517	Organic Chem. II Lab. 2				Electives	16
Chem.	221 585	Physical Chemistry I .	5				

OPTION C (Operations)

Ap. M.	520 305	Statics	3	Math.	245 240	Series & Diff. Equa. ..	4
Ap. M.	520 415	Mech. of Materials	3	M. E.	580 218	Graph. Comm. II	2
Chem.	221 350	Gen. Organic Chem.	3	Millg.	045 720	Adv. Fl. & Feed Tech. 3	
Chem.	221 351	Gen. Organ. Chem. Lab. 2		Millg.	045 730	Fl. & Fd. Mill Constr. 3	
E. E.	550 403	Elec. Cir. & Control ..	4	Millg.	045 680	Feed Tech. II	4
Math.	245 220	Anal. Geom. & Calc. I .	4			Electives	11
Math.	245 221	Anal. Geom. & Calc. II	4				
Math.	245 222	Anal. Geom. & Calc. III	4				

Flour Milling Science and Management*B. S. in Flour Milling Science and Management***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Millg.	045	010 Seminar	0	Millg.	045	010 Seminar	0
Millg.	045	011 Freshman Assembly	0	Millg.	045	011 Freshman Assembly	0
Gn. Ag.	035	100 Agr. in Our Society	2	Millg.	045	100 Prin. of Milling	3
Engl.	229	100 Engl. Comp. I	3	Spch.	281	105 Oral Comm. I	2
Math.	245	100 College Algebra	3	Engl.	229	120 Engl. Comp. II	3
Chem.	221	210 Chemistry I	5	Math.	245	105 Plane Trig.	3
M. E.	580	213 Graphical Comm. I	3	Chem.	221	230 Chemistry II	3
Ph. Ed.	261	011 Physical Education	0	Chem.	221	250 Chemistry II Lab.	2
				Ph. Ed.	261	011 Physical Education	0
Total			16	Total			16

SOPHOMORE

Millg.	045	010 Seminar	0	Millg.	045	010 Seminar	0
Ec. So.	225	110 Economics I	3	Bact.	213	220 Gen. Microbiology	4
Bot.	213	121 Biology I	4	Millg.	045	400 Milling Tech. I	4
Millg.	045	210 Flow Sheets	2			Option A, B, or C	8
		Option A, B, or C	7				
Total			16	Total			16

JUNIOR

Millg.	045	010 Seminar	0	Millg.	045	010 Seminar	0
Engl.	229	090 English Proficiency	0	Ec. So.	225	620 Labor Economics	3
Agron.	015	260 Mkt. Grad. of Cereals 3	3	Millg.	045	650 Qual. Wheat & Flour . 3	3
		Option A, B, or C	14			Option A, B, or C	11
Total			17	Total			17

SENIOR

Millg.	045	010 Seminar	0	Millg.	045	010 Seminar	0
Millg.	045	630 Exp. Baking I	4	Hist.	241	112 West. Civilization II ..	3
Hist.	241	111 West. Civilization I ..	3	Entom.	030	100 Milling Entomology	4
		Option A, B, or C	10			Option A, B, or C	10
Total			17	Total			17

OPTION A (Administration)

Ag. Ec.	010	130 Grain Marketing	3	Ec. So.	225	430 Money & Banking	3
B. A.	305	273 Prin. of Accounting	3	Millg.	045	610 Flour & Feed Anal.	4
B. A.	305	325 Business Law I	3	Phys.	265	211 Gen. Physics I	4
B. A.	305	305 Managerial Acctg.	3	Phys.	265	212 Gen. Physics II	4
B. A.	305	410 Business Finance	3	Stat.	285	320 Elements of Statistics 3	3
B. A.	305	542 Sales Management	3	Stat.	285	510 Stat. Qual. Control	3
Chem.	221	300 Gen. Quant. Analysis .	4			Electives	9
Chem.	221	350 Gen. Organic Chem. ..	3				
Chem.	221	351 Gen. Org. Chem. Lab. 2	2				
Econ.	225	120 Economics II	3				

OPTION B (Chemistry)

Biochem.	020	655 Biochemistry I	3	Math.	245	220 Anal. Geom. & Calc. I .	4
Biochem.	020	656 Biochemistry I Lab.	2	Math.	245	221 Anal. Geom. & Calc. II	4
Chem.	221	300 Gen. Quant. Anal.	4	Math.	245	222 Anal. Geom. & Calc. III	4
Chem.	221	511 Organic Chem. I	3	Millg.	045	450 Flour & Feed Analysis 4	4
Chem.	221	512 Organic Chem. I Lab. ..	2	Millg.	045	620 Adv. Wht. & Fl. Test. 3	3
Chem.	221	516 Organic Chem. II	3	Phys.	265	211 Gen. Physics I	4
Chem.	221	517 Organic Chem. II Lab. 2	2	Phys.	265	212 Gen. Physics II	4
Chem.	221	585 Physical Chemistry I ..	5			Electives	9

OPTION C (Operations)

Ap. M.	520	305 Statics	3	M. E.	580	218 Graphical Comm. II	2
Ap. M.	520	415 Mech. of Materials	3	Millg.	045	720 Adv. Fl. & Feed Tech. 3	3
Chem.	221	350 Gen. Organic Chem.	3	Millg.	045	730 Fl. & Feed Mill Constr. 3	3
Chem.	221	351 Gen. Organ. Chem. Lab. 2	2	Millg.	045	670 Milling Tech. II	4
E. E.	550	403 Elec. Cir. & Control	4	Phys.	265	310 Engg. Phys. I	5
Math.	245	220 Anal. Geom. & Calc. I .	4	Phys.	265	311 Engg. Phys. II	5
Math.	245	221 Anal. Geom. & Calc. II	4			Electives	11
Math.	245	222 Anal. Geom. & Calc. III	4				

Curriculum in Biochemistry

B. S. in Biochemistry

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	035 100	Agri. in Our Society	2	Chem.	217 230	Chemistry II	3
Chem.	217 210	Chemistry I	5	Chem.	217 271	Chem. Equilibria & Qual. Anal.	4
Math.	245 100	College Algebra	3	Math.	245 150	Plane Trigonometry	3
Engl.	229 100	Engl. Comp. I	3	Engl.	229 120	Engl. Comp. II	3
Spch.	281 105	Oral Communication	2	Bot.	217 200	General Botany	4
		Air or Military Science	1			Air or Military Science	1
Ph. Ed.	261 011	Physical Education	0	Ph. Ed.	261 011	Physical Education	0
Total			16	Total			18

SOPHOMORE

Stat.	285 320	Elements of Statistics	3	Chem.	217 444	Quantitative Analysis	5
Math.	245 220	Anal. Geom. & Calc. I	4	Math.	245 221	Anal. Geom. & Calc. II	4
		Social Science Elective	3			Social Science Elec.	3
Zool.	293 200	General Zoology	4			Biological Sci. Elec.	4
		Air or Military Science	1			Air or Military Science	1
		Electives	2				
Total			17	Total			17

JUNIOR

Chem.	217 511	Organic Chem. I Rec. ..	3	Chem.	217 516	Organic Chem. II Rec.	3
Chem.	217 512	Organic Chem. I Lab. ..	2	Chem.	217 517	Organic Chem. II Lab.	2
Math.	245 222	Anal. Geom. & Calc. III	4	Phys.	265 311	Engg. Physics II	5
Phys.	265 310	Engg. Physics I	5			Humanities Elective	3
		Humanities ¹	3			Biological Sci. Elec.	4
				Engl.	229 090	English Proficiency	0
Total			17	Total			17

SENIOR

Chem.	217 585	Physical Chem. I Lec. .	3	Chem.	217 595	Phys. Chem. II Lec.	3
Chem.	217 586	Phys. Chem. I Lab.	2	Chem.	217 598	Phys. Chem. II Lab.	2
Biochem.	020 655	Biochem. I	3	Biochem.	020 665	Biochem. II	3
Biochem.	020 656	Biochem. I Lab.	2	Biochem.	020 666	Biochem. II Lab.	2
Mod. L.	253 105	Technical German	3	Mod. L.	253 111	Technical German	3
		Elective	4	Chem.	217 666	Instrumental Analysis	4
Total			17	Total			17

1. See list, page 253.

Curriculum in Dairy Foods Processing*B. S. in Agriculture***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	035 100	Agr. in Our Society	2	Chem.	217 230	Chemistry II Rec.	3
Chem.	217 210	Chemistry I	5	Chem.	217 250	Chemistry II Lab.	2
Engl.	229 100	Engl. Comp. I	3	Ec. So.	225 110	Economics I	3
Math.	245 100	College Algebra	3	Engl.	229 120	Engl. Comp. II	3
Dy. & Pl.				Math.	245 150	Plane Trigonometry	3
Sci.	025 201	Prin. of An. Sci.	2	Spch.	281 105	Oral Communication I ..	2
Dy. & Pl.				Ph. Ed.	261 011	Physical Education	0
Sci.	025 202	Dairy Sci.	2				
Ph. Ed.	261 011	Physical Examination ..	0				
Total			17	Total			16

SOPHOMORE

Bact.	213 220	General Microbiology ..	4	Dy. & Pl.			
Zool.	293 200	General Zoology	4	Sci.	025 400	Mkt. Milk & Dy. Insp.	4
Chem.	217 350	Gen. Organic Chem.	3	Bact.	213 615	Dairy Bacteriology	4
Chem.	217 351	Gen. Org. Chem. Lab. ..	2	Bot.	217 200	General Botany	4
		Elective	3			Political Science	3
				Dy. & Pl.			
				Sci.	025 220	Dairy Prod. Eval. I	1
Total			16	Total			16

JUNIOR

Dy. & Pl.				Dy. & Pl.			
Sci.	025 510	Dairy Technology	3	Sci.	025 680	Dairy Foods Proc. I	5
Ag. E.	010 455	Dairy Mechanics	3			Humanities ¹	3
Phys.	265 211	General Physics I	4			Option ²	5
Engl.	229 090	English Proficiency	0			Communications Elec. .	3
		Humanities ¹	3				
		Elective	5				
Total			18	Total			16

SENIOR

Dy. & Pl.				Ag. Ec.	010 245	Prin. of Agr. Mktg.	3
Sci.	025 690	Dairy Foods Proc. II ..	5	Dy. & Pl.			
Stat.	285 320	Elements of Statistics ..	3	Sci.	025 500	Dairy Seminar	1
		Option	5	Dy. & Pl.			
		Food Proc. Elective	3	Sci.	025 695	Dairy Plant Mngt.	2
				Dy. & Pl.			
				Sci.	025 670	Quality Control of	
						Dairy Products	3
						Option	8
Total			16	Total			17

1. See List of Humanities Electives, page 253.

2. At least 16 hours of option to be selected from courses listed below.

ADDITIONAL ELECTIVE COURSES**SCIENCE OPTION**

Quantitative Analysis	4	Analytical Geometry & Calculus II	4
Organic Chemistry	5	Microbiology of Foods	5
Biochemistry	5	Sanitary Bacteriology Lab.	2
General Physics II	4	Prin. of Quantitative Microbiology	5
Analytical Geometry & Calculus I	4	Principles of Nutrition	4

ADMINISTRATION OPTION

Economics II	3	Personnel Administration	3
Introductory Accounting	5	Business Finance	3
Business Law I	3	Business Policy	3
Managerial Accounting	3	Administration	3
Sales Management	3	Principles of Accounting	3
Marketing	3	Taxation I	3

FOOD PROCESSING OPTION

Foods II	3	Meat Selection & Utilization H. E.	2
Experimental Baking I	4	Poultry Products Technology	3
Experimental Baking II	4	Meats Processing	1
Quality of Wheat & Flour	3	Dairy Prod. Eval. II	1
Elements of Meats Processing	2		

Curriculum in Natural Resources Conservation and Use*B. S. in Agriculture***FRESHMAN**

FIRST SEMESTER		SECOND SEMESTER	
Agri. in Our Society	2	Engl. Comp. II	3
Chemistry I	5	Plane Trig.	3
Engl. Comp. I	3	Oral Com. I	2
Col. Algebra	3	Gen. Botany	4
Am. Govt.	3	Chem. II Rec.	3
Phys. Ed.	0	Option and Electives	1
	<hr/>	Phys. Ed.	0
	16		<hr/>
			16

SOPHOMORE

Econ. I	3	Soils	4
Gen. Geology	4	Prin. of Ag. Econ.	4
Plant Science	4	Gen. Zoology	4
Gen. Physics I	4	Option and Electives	5
Option and Electives	2		<hr/>
	<hr/>		17
	17		

JUNIOR

Prin. of Animal Sci.	4	Humanities	3
Gen. Psych.	3	Engl. Prof.	0
Math. or Stat.	3 or 4	Animal or Plant Ecol.	3
Humanities	3	Econ. Ent.	3
Option and Electives	3	Option and Electives	7
	<hr/>		<hr/>
	17		16

SENIOR

Pop. & Human Ecol.	3	Gen. Micro.	4
Econ. Geography	3	Option and Electives	13
Option and Electives	10		<hr/>
	<hr/>		17
	16		

OPTION A: SOIL AND WATER CONSERVATION

Chem. II Lab.	2	Gen. Org. Chem.	5
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SELECT COURSES FROM FIVE OF THE FOLLOWING AREAS:

Soil Mgt. and Moist. Cons. or		Soil Physics	3
Mgt. or Irrig. Soils	2 or 3	Calc., Quan. Anal., Physics II,	
Soil Dev. and Classif.	3	or Hydrology	3 or 4
Soil Fert. or Chem. Prop. Soils	3	Electives	18-20
Range Mgt. I, Turf Mgt., or			<hr/>
Forest Practice	3		41

OPTION B: ECONOMICS OF CONSERVATION

Econ. II	3	Agr. Policy	3
Production Econ.	3	Rural Sociology	3
Land Econ.	3	Electives	20
Land and Res. Conser.	3		<hr/>
Farm Mgt.	3		41

OPTION C: CONSERVATION OF RECREATION AREAS

Gen. Org. Chem.	5	Landscape Design	3
Gen. Physics II	4	Community Recr.	3
Forest Conser.	3	Electives	18
Turf Management	2		<hr/>
Arboriculture	3		41

TRANSFER STUDENTS

Some students desire to complete one or two years at a junior college or denominational college prior to attending the College of Agriculture.

The 68 semester hours listed below, with exceptions and variations footnoted, can be transferred to the College of Agriculture, and a degree earned in four semesters by capable students with good academic records, who enter the junior or denominational college prior to September 1, 1968, and the College of Agriculture at Kansas State before September 1, 1970.

<i>Course</i>	<i>Sem. Hrs.</i>	<i>Course</i>	<i>Sem. Hrs.</i>
English I & II	6	Economics I	3 ²
Speech	2	General Physics	5
Other written communications, Journalism, etc.	3 ^{1 2}	Humanities	6
College Algebra	3	Social Sciences	6 ¹
Trigonometry	3	General Botany	5
Calculus	5	General Zoology	5
Inorganic Chemistry	8	Physiology	5
Organic Chemistry	3	Total	68

1. For Bakery Science and Management, Feed Milling Science and Management, or Flour Milling Science and Management, replace with five hours additional inorganic chemistry (including quantitative analysis), two additional hours of organic chemistry and two hours of Engineering Graphics.

2. For Biochemistry, replace with one semester of quantitative analysis and/or a second semester of Organic Chemistry, Physics, or Calculus. Limited offerings at some junior colleges may necessitate five semesters at K-State.

A few courses in the College of Agriculture, especially in Dairy Foods Processing and Horticulture, are offered only once a year or once every other year. Students aiming for these majors should visit the K-State campus or correspond with the department to determine whether courses will be offered in the sequence necessary to permit graduation in minimum time, without missing important courses. Also, time conflicts between or among required courses sometimes exist.

Two semesters of physical education taken at a junior college fulfill our non-credit requirement in that field.

AGRICULTURAL BUSINESS

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 technically trained personnel in increasing numbers. A farm background may or may not be required. 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. or B. A. degree to the Ph. D. degree.

Agricultural businesses have expanded in size and number in Kansas. The College of Commerce and College of Agriculture have identified below several programs that will prepare young people for some of the jobs in this vast complex. See page 221 (College of Commerce) and page 48 (College of Agriculture) for details of these programs and degree requirements. Academic years listed are estimates.

1. A B. S. degree in some discipline within the College of Agriculture (see majors and curriculums on p. 47), followed by a Master's degree in Business Administration (see p. 37). 5½ academic years.
2. A B. S. degree in some discipline with the College of Agriculture, followed by a B. S. degree in Business Administration (see p. 221). 5 academic years.
3. A B. S. 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 221). 4 academic years.
4. A B. S. degree in Business Administration, including in the degree program a group of elective courses in some discipline within Agriculture.

5. A B. S. 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, a student would enroll in the College of Agriculture or the College of Commerce. His 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 his academic adviser (his department head, in the College of Agriculture) and his dean. If he pursues a second B. S. or a master's degree, he would transfer to the second college following receipt of his first degree.

RETAIL FLORICULTURE

(A two-year technical program administered by the Department of Horticulture. This program combines a year of supervised practical training 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 semesters. The second year, the student serves an apprenticeship at a selected retail florist business. Every effort will be made to select a florist in a city of the student's choice. The apprentice will be an employee of the flower shop during this year of training and shall receive a salary sufficient to meet normal living expenses.)

FALL				SUMMER			
Art	209 100	Elementary Design	2	B. A.	405 273	Prin. of Acctg.	3
Engl.	229 100	Engl. Comp. I	3	Art	209 240	Interior Decoration	2
Hort.	040 130	Floral Arrangement ..	3	L. A.	110 100	Landscape Design	3
Bot.	213 200	General Botany	4				8
Hort.	040 150	Home Hort.	2				
B. A.	405 341	Salesmanship	2				
			16				
SPRING				Summary :			
Hort.	040 140	Advanced Floral Arrangement	3	Horticulture		12 credits	
Hort.	040 200	Plant Science	4	Business Admin.		12 credits	
Speh.	281 105	Oral Comm. I	2	Art		4 credits	
B. A.	305 210	Personal Finance	2	Botany		4 credits	
B. A.	305 342	Credits & Collections ..	2	English		3 credits	
B. A.	305 350	Small Business Operation	3	Speech		2 credits	
			16	Landscape Architecture ..		3 credits	
							40

NURSERY AND LANDSCAPE MANAGEMENT

(A two-year technical program administered by the Department of Horticulture. It provides training for young men to serve the growing industry represented by nurseries, garden centers, parks, and similar enterprises. Instruction for three semesters and a summer school in university classes is followed by four months of practical on-the-job training at a selected nursery. The student will be a regular employee of the nursery, receiving valuable experience and a salary sufficient to meet normal living expenses.)

FALL				SPRING			
Bot.	213 210	General Botany	4	Hort.	040 200	Plant Science	4
Hort.	040 260	Plant Materials I	3	Hort.	040 270	Plant Materials II	3
Hort.	040 150	Home Horticulture	2	Hort.	040 600	Landscape Hort.	3
Engl.	229 100	Engl. Comp. I	3	Hort.	040 620	Arboriculture	3
Hort.	040 220	Plant Propagation	3	Speh.	281 105	Oral Comm. I	2
			15	B. A.	405 101	Fund. of Business	2
							17
SUMMER				FALL			
Chem.	221 210	Chemistry I	5	L. A.	110 441	Planting Design	2
L. A.	110 100	Landscape Design	3	Agron.	015 270	Soils	4
			8	Entom.	030 200	Econ. Entomology	3
				Pl. Path.	050 400	Plant Pathology	2
				B. A.	405 341	Salesmanship	2
						Electives	3
							16

AGRICULTURAL ECONOMICS

(The College of Agriculture section of the Department of Economics; see also College of Arts and Sciences.)

JOHN A. NORDIN,* *Head of Department*

Professors Coolidge, Coppersmith, Hoover,* Kelley,* Manuel,* McCoy,* Montgomery,* Nordin,* Pine,* Schruben,* and Whitehair;* Associate Professors Bevins,* Erickson, Knight,* Koudele,* Orazem,* Otto,* Sjo,* Sorenson,* Trieb, and Wilkowske;* Assistant Professors Banks,* Buller,* Frazier, Jackson, McDonald, Skold,* Thomas, Tyrchniewicz, and Walker; Instructor Reed; Emeritus: Dean Call,* President Farrell,* Professor Hodges and Professor Jaccard*

Undergraduate programs of study in agricultural economics are available in each of three areas: agricultural production, agricultural science, and agricultural businesses and industries.

The agricultural production program is designed primarily for students who plan to operate a farm after graduation or to seek a job closely related to farming, e.g., county agricultural agent. The program includes courses in the physical and biological sciences, applied agriculture, and general education, as well as agricultural economics.

The agricultural science program is intended for students who wish to prepare for graduate study or for employment as agricultural economists at the sub-professional level. While including courses in basic physical and biological science, agriculture, and general education, it emphasizes economics, mathematics, and statistics.

The agricultural businesses and industries program is designed for students seeking a career in the off-farm segment of agriculture, particularly with companies and industries that process or handle farm products or supply farmers with goods and services, including credit. Emphasis is on courses in economics, sociology, and business, with a background of biological and physical science, applied agriculture, and general education.

Sufficient flexibility is provided in all three programs to permit students, in consultation with faculty advisers, to select courses to fit individual needs.

Inspection trips and information obtained by research are used to supplement textbooks and reference materials for classroom purposes. Opportunity for capable students to assist with research projects on a part-time basis provides students an additional opportunity to learn principles involved in the various areas of agricultural economics.

Graduate study leading to the degrees Masters of Science and Doctor of Philosophy is offered in the department. Research for theses may be in marketing, farm management, finance, land economics, conservation, prices, production economics, taxation, agricultural policy, international development, agricultural businesses and industries, and 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.

Research projects of the Kansas Agricultural Experiment Station and studies done in cooperation with other states and with federal agencies provide opportunities for graduate students to do research. Facilities available to graduate students include modern electronic computers.

Students planning to work in one of the following fields after graduation are advised to include the indicated courses in their programs of study:

Rural Banking and Finance: Rural Banking, Agricultural Finance, Money and Banking, Land Economics, Monetary Credit and Fiscal Policy, Business Fluctuations and Forecasting, and Business Law I.

Cooperative Management: Principles of Cooperation, Agricultural Policy, Principles of Transportation, Personnel Administration, Business Law I, International Trade, and Money and Banking.

Food Wholesaling and Retailing: Labor Economics, Work Analysis, Introduction to Restaurant Management, Money and Banking, Business Law I, Personnel Administration, and Retailing.

COURSES IN AGRICULTURAL ECONOMICS

FOR UNDERGRADUATE CREDIT

- 010 130. Grain Marketing.** (3) I. Price influences and relationships, buying and selling problems, domestic and export trade; grain trade organization and regulation. Three hours rec. a week. Pr.: Econ. 110.
- 010 150. Livestock Marketing.** (3) II. A study of factors affecting livestock prices, methods of marketing and market agencies; particular emphasis on use of marketing knowledge by producers in farm and ranch management, and problems of livestock marketing and processing firms. Three hours rec. a week. Pr.: Econ. 110.
- 010 200. Principles of Agricultural Economics.** (4) I, II. The application of economic principles to agricultural production and marketing problems; resource and enterprise combination; costs and revenue; the roles of producers and consumers in the establishment of prices. Four hours rec. a week. Pr.: Econ. 110, Math. 100.
- 010 221. Farm Management.** (3) I, II. Organization and management of the farm, with special emphasis on principles and methods of analyzing factors which affect production and marketing decisions. Three hours rec. a week. Pr.: Ag. Ec. 200.
- 010 222. Farm Planning Laboratory.** (1) I. A review of accounting methods used in the keeping of farm records, tax regulations and their effect on farm organization and operation, and the use of the budget in farm planning. Two hours lab. a week. Pr.: Ag. Ec. 200.
- 010 231. Rural Banking.** (4) 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. Four hours rec. a week. Pr.: Ag. Ec. 200 or consent of instructor.
- 010 245. Principles of Agricultural Marketing.** (3) I. Marketing functions, costs, efficiency; market organization and institutions; consumer behavior; food processing and industries; role of government; agricultural price determination. Pr.: Econ. 110.
- 010 300. Agricultural Economics Summary.** (2) I, II. Summarization and correlation of courses pursued in college; problems requiring application of principles and broad understanding of the field; contemporary economic developments. Two hours rec. a week. Pr.: Senior standing.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 010 401. International Agricultural Development.** (3) II. A study of population and agriculture of the world, with emphasis on economic development. Attention is directed toward principles of economic growth and national and international policies that will stimulate development. Individual study is encouraged to meet student interests, i.e., Foreign Agricultural Service, technical assistance, missionary, exchange programs. Three hours rec. a week. Pr.: Econ. 110.
- 010 410. Agricultural Policy.** (3) I, S. A study dealing with the economic problems of agriculture, with emphasis on the influence of private and governmental policies on such problems. Attention will be directed toward analyzing the effects of different types of private and governmental policies on the agricultural industry. Three hours rec. a week. Pr.: Econ. 110.
- 010 411. Consumption Economics in Agriculture.** (3) I. Explanation of consumer demand and factors affecting consumer purchasing patterns. Special emphasis on the relation of producer decisions and market performance to consumer demand. Three hours rec. a week. Pr.: Ag. Ec. 245.
- 010 421. Agricultural Prices and Market Structures.** (3) II. Explanation of forces determining prices for agricultural resources and products; special emphasis on marketing methods and their effects upon farm

prices and products offered; methods of price analysis. Three hours rec. a week. Pr.: Ag. Ec. 245.

010 431. Economic Principles of Agricultural Business Firms. (3) 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 operation of marketing and farm supply firms. Three hours rec. a week. Pr.: Econ. 110.

010 441. Agricultural Economics Seminar. Credit arranged. 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 instructor.

010 450. Land Economics. (3) I. Principles and procedures in acquiring and transferring rights in land resources through ownership, leasing, easements, and other means; social controls over land resources, including regulation, zoning, and taxation; evaluation and marketing of land resources. Three hours rec. a week. Pr.: Ag. Ec. 200.

010 451. Agricultural Finance. (3) II. Financial structure of agriculture; capital requirements for efficient operation of farms and agricultural businesses; sources of capital, with particular consideration given to credit, integration, and business organization. Three hours rec. a week. Pr.: Ag. Ec. 200.

010 470. Principles of Cooperation. (3) I. History and development of cooperatives, especially farmer marketing and purchasing cooperatives; philosophy, principles, and operating techniques essential for successful cooperatives activity; limitations and possibilities for cooperatives in the agricultural economy. Three hour rec. a week. Pr.: Econ. 110.

010 480. Agricultural Economics Statistics. (3) II. Principles and methods involved in the collection, analysis, interpretation, and presentation of statistical materials, with special reference to agricultural economics data. Three hours rec. a week. Pr.: Econ. 110.

FOR UNDERGRADUATE AND GRADUATE CREDIT

010 620. Production Economics. (3) I, S. Economic theory, under conditions of perfect and imperfect knowledge, applied to production problems; resource and output combinations, costs, firm size, and aggregate aspects of production. Three hours rec. a week. Pr.: Ag. Ec. 200 or consent of instructor.

010 650. Agricultural Economics Problems. Credit arranged. I, II, S. Pr.: Consult instructor.

010 670. Land and Resource Conservation. (3) II. Offered on sufficient demand. Economic evaluation of land use and alternative uses by time periods. The economics of conservation is applied in light of known and probable resource needs, including policy and planning, and the individual and society as associated with the major natural resources of the U. S. Three hours rec. a week. Pr.: Econ. 110, junior standing.

FOR GRADUATE CREDIT

010 801. Seminar in International Agricultural Development. (3) II. Reading, study, analysis and group discussion of increasing per capita productivity of traditional agriculture, including contribution of education, development of institutions and other actions to advance the welfare of rural people. Pr.: Consent of instructor.

010 811. Seminar in Agricultural Policy. (3) I, on sufficient demand. 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.

010 820. Price Analysis. (3) Offered on sufficient demand. Theory and analysis of price determination under alternative structure conditions; empirical investigation of price problems. Pr.: Ag. Ec. 421 or consent of instructor.

- 010 821. Advanced Farm Management.** (3) I. A study of management concepts and their application to the farm business. Emphasis will be upon identification and measurement of the managerial input and the effect of management upon the efficient use of resources. Pr.: Ag. Ec. 221 and 620.
- 010 822. Seminar in Agricultural Marketing.** Credit arranged. Offered 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.
- 010 829. Seminar in Land Economics.** (2) Offered on sufficient demand. Comprehensive analysis of problems dealing with the control and use of public and private land resources. Pr.: Ag. Ec. 450 or consent of instructor.
- 010 830. Analysis of Agricultural Resource Use.** (3) Offered on sufficient demand. Formulation and analysis of static and dynamic problems of agricultural resource use by firms and industries. Pr.: Basic courses in economics and statistics and consent of instructor.
- 010 831. Agricultural Marketing Management and Analysis.** (3) I, on sufficient demand. Marketing problems of firms that market or process farm products and handle farm supplies, with special emphasis on decision processes with respect to products, distribution, price, and promotion; development of strategies and appraisal of management functions as they relate to marketing; tools of analysis for solving marketing problems. Pr.: Ag. Ec. 245 and Com. 273 or consent of instructor.
- 010 832. Agricultural Marketing Organization and Institutions.** (3) II, on sufficient demand. 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. 710 or consent of instructor.
- 010 840. Seminar in Agricultural Economics.** (3) Offered on sufficient demand. Problems and current developments in agricultural economics. Pr.: Consent of instructor.
- 010 851. Research in Agricultural Economics.** Credit arranged. I, II, S. Research for thesis or master's report.
- 010 861. Seminar in Economic Research.** (3) II. 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.

AGRONOMY

R. V. OLSON,* *Head of Department*

Professors Anderson, Bidwell,* Bieberly,* Cleavinger,* Ellis,* Heyne,* Hobbs,* Jacobs,* Olson* and Pittenger;* Associate Professors Atkinson, Barnett,* Feltner,* Mader,* Russ,* Wassom* and Withee,* Assistant Professors Edelblute, Harper, Liang,* Lundquist, Moore, Murphy,* Nilson, Overley, Paulsen,* Peterson, Rancy, Sander, Skidmore,* Sloan, R. M. Smith,* Sorensen,* Swallow, Vanderlip,* Walter, Wilkins and Woodruff; Instructors Axelton, Burchett, Dickerson, Gronau and Lyles; Emeritus: Professors Clapp, Davis,* Laude,* Lind and Zahnley**

The farms used by the Department of Agronomy comprise 460 acres of medium rolling upland soil, and 200 acres of irrigated bottom land. The general fields and experimental plots, used for the breeding and testing of farm crops and for conducting experiments in soil fertility and methods of culture, afford the student opportunity for study and investigation.

Laboratories for soil and crop work are maintained for the regular use of students. Material is provided for the study of the grain and forage crops best adapted to different purposes and most suitable for growing in the state. Greenhouse space is provided for problem and research work in crops and soils.

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered in the fields of crop production, crop physiology,

crop ecology, pasture improvement, plant breeding, weed control, plant genetics, soil chemistry, soil fertility, soil physics, dry-land farming, soil management, irrigation, soil classification, and dynamics of wind erosion.

Prerequisite to major work in these fields is the completion of an undergraduate curriculum in general agriculture, or in science for students having an agricultural background and some agricultural training. Students who have not had training in the following fields will be required to enroll in the appropriate undergraduate courses before completing an advanced degree: Farm Crops, Soil Science, Inorganic Chemistry, Organic Chemistry, College Algebra, General Botany, Entomology, College Physics and Trigonometry.

FOR UNDERGRADUATE CREDIT

- 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 three-hour lab. a week. Pr.: Bot. 210. Taught in cooperation with the Department of Horticulture.
- 015 201. Crop Production.** (4) II. Study of the fundamental principles of production management, identification, and grading of the major cereal, forage, oil, and miscellaneous crops. Three lectures and one three-hour lab. a week. Pr.: Agron. 200.
- 015 230. Grain Grading and Seed Analysis.** (2) II. Application of the Federal standards for grading farm crops and judging of grains and other crop products. Six hours lab. a week. Pr.: Agron. 200.
- 015 240. Forage Crops.** (3) I. Adaptation, distribution, production, and utilization of forage crops; studies of species and types of principal forage crops. Two hours rec. and three hours lab. a week. Pr.: Agron. 200.
- 015 250. Grain and Seed Technology.** (2) I. Commercial grading and judging of field crops and identification of principal types and varieties. Six hours lab. a week. Pr.: Agron. 230.
- 015 260. Market Grading of Cereals.** (3) I. Market grades of cereals and factors that influence them. One hour rec. and six hours lab. a week. Pr.: Millg. 100.
- 015 270. Soils.** (4) I, II. Fundamental principles underlying the formation, fertility, and management of soils. Three hours rec. and two hours lab. a week. Pr.: Chem. 210.
- 015 300. Soil Management and Moisture Conservation.** (3) I, II. Principles and practices of soil and water management suited to dry-land and humid areas. Three hours rec. a week. Pr.: Agron. 270.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 015 400. Development and Classification of Soils.** (3) II. Influence of soil-forming agencies on soil characteristics and methods of classifying and mapping soils; field trips. Two hours rec. and three hours lab. a week. Pr.: Gl. Gg. 100, Agron. 270, or consent of instructor.
- 015 410. Range Management I.** (3) II. Establishment, management, and utilization of tame and native pastures. Three hours rec. a week. Pr.: Agron. 200.
- 015 420. Weed Science.** (3) I. Identification, growth habits, and methods of control of weeds. Two hours rec. and three hours lab. a week. Pr.: Agron. 200.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 015 600. Crop Problems.** Credit arranged. I, II, S. Pr.: Dependent on problem. Studies may be chosen in the fields of:
Genetics, Crop Improvement, Pasture Improvement, Ecology, Weed Control, Plant Physiology, Production.
- 015 611. Crop Improvement.** (2) I. Methods of pure seed production and breeding of agricultural crops. Two hours rec. a week. Pr.: Agron. 200, A. H. 400.

- 015 630. Soil Problems.** Credit arranged. I, II, S. Prerequisite depends on the problem assigned. Studies may be chosen in the fields of:
Chemistry, Physics, Conservation, Fertility, Development and Classification.
- 015 640. 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. 270, Gl. Gg. 100.
- 015 650. Soil Fertility.** (3) I, II. Fundamentals of soil fertility. Three hours rec. a week. Pr.: Agron. 270.
- 015 660. Soil Physics.** (3) II. A study of the physical properties of soils, including soil moisture, texture, structure, aeration, temperature, and properties of disperse systems. Two hours rec. and three hours lab. a week. Pr.: Agron. 270, Math. 100, Phys. 211.
- 015 670. Soil Analysis Applications.** (3) I. Offered in 1967-68 and alt. years thereafter. Theories and procedures for the chemical analysis of soils. Applications of analysis in soil fertility evaluations and in research work are discussed. One hour rec. and six hours lab. a week. Pr.: Agron. 270, Chem. 300 or 444.
- 015 680. 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 weeks field course given jointly by Kansas State University and Fort Hays Kansas State College. Pr.: Agron. 410, Bot. 670 and 690 or 730. Suitable field experience may be substituted for these prerequisites with consent of instructor.
- 015 690. Plant Genetics.** (3) I. An advanced course dealing with genetic principles. Three hours rec. a week. Pr.: A. H. 400.
- 015 700. Crop Ecology.** (3) II. Study of climatic factors and their effect on production and geographic distribution of crops in regions and countries. Three hours rec. a week. Pr.: Agron. 200, 270, or consent of instructor.
- 015 710. Identification of Range and Pasture Plants.** (1) II. Offered in 1967-68 and alt. years. Field and laboratory study of range and pasture plants, with special emphasis on grasses and their distinguishing characteristics. Three hours lab. a week. Pr.: Bot. 210.
- 015 720. Management of Irrigated Soils.** (2) II. Principles of soil moisture retention, movement and measurement; reclamation and management of saline and alkali soils; water quality; management. Two hours rec. a week. Pr.: Agron. 200, 270.
- 015 730. Chemical Fertilizers.** (3) I. Offered in 1966-67 and alt. years thereafter. Manufacturing, processing, and using chemical fertilizers; study of the properties and characteristics of chemical fertilizers, including the principles affecting the use of such materials. Three hours rec. a week. Pr.: Chem. 210.
- 015 740. Range Management II.** (3) II. Offered in 1967-68 and alt. years thereafter. 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. 410, Bot. 670, and one of the following (which may be taken conc.): Agron. 710, Bot. 690, 730.
- 015 750. Soil Erosion and Its Control.** (3) I. Offered in 1966-67 and alt. years thereafter. Mechanics of wind and water erosion, methods of predicting quantities of erosion, principles and practices for erosion control. Three hours rec. a week and one field trip. Pr.: Agron. 270, Phys. 211, or consent of instructor.

- 015 751. Soil Erosion Laboratory.** (1) I. Offered in 1966-67 and alt. years thereafter. Three hours lab. a week. One field trip. Pr.: Agron. 270, 750, or conc. enrollment.

FOR GRADUATE CREDIT

- 015 800. Methods of Plant Breeding.** (3) II. Offered in 1967-68 and alt. years thereafter. 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, A. H. 400, Pl. Path. 605.
- 015 810. Agronomy Seminar.** (1) I, II. A discussion of agronomic developments. Pr.: Graduate standing.
- 015 820. Research in Crops.** Credit arranged. I, II, S. Special problems which may extend through the year and furnish data for a master's or doctor's thesis. Pr.: Consult instructor.
- 015 825. Research in Genetics.** Credit arranged. I, II, S. Special problems which may extend throughout the year and furnish data for a master's or doctor's thesis. Pr.: Consent of instructor.
- 015 830. Topics in Plant Breeding.** Credit arranged. I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor.
- 015 840. Advanced Crop Ecology.** (3) I. Offered in 1966-67 and alt. years thereafter. Principles of growth and development of crops in relation to the environment. Three hours rec. a week. Pr.: Agron. 700, or equiv., and Bot. 600.
- 015 850. Topics in Plant Genetics.** Credit arranged. I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor.
- 015 860. Advanced Forage Crops.** (3) I. Offered in 1967-68 and alt. years thereafter. Important forage crop species are studied throughout current literature with regard to growth characteristics, utilization, and breeding procedures. Three hours rec. a week. Pr.: Agron. 240.
- 015 870. Crop Hardiness.** (3) II. Offered in 1967-68 and alt. years thereafter. A study of factors in hardiness of crops to cold, heat, and drought and the production of crops under conditions of adverse temperatures and water deficit. Three hours rec. a week and assigned reading. Pr.: Bot. 600.
- 015 880. Research in Soils.** Credit arranged. I, II, S. Special problems which may extend throughout the year and furnish data for a master's or doctor's thesis. Pr.: Consult instructor.
- 015 890. Soil Physical Chemistry.** (3) I. Offered in 1966-67 and alt. years thereafter. Application of physical chemistry to soils; cation and anion equilibria, cation activities, electrokinetics, sorption and other physicochemical reactions in soils. Two hours rec. and three hours lab. a week. Pr.: Agron. 640, 660, Chem. 596.
- 015 900. Advanced Soil Physics.** (3) I. Offered in 1967-68 and alt. years thereafter. An advanced study of prominent theories concerning the physical behavior of soils. Two hours rec. and three hours lab. a week. Pr.: Agron. 660, Math. 222, Phys. 211.
- 015 920. Soil Genesis.** (2) II. Offered in 1966-67 and alt. years thereafter. Theories of soil formation processes. Two hours rec. a week. Pr.: Agron. 400.
- 015 930. Developmental Genetics.** (3) II. Offered in 1966-67 and alt. years thereafter. Introduction to the relationships between genetic and biochemical systems, with emphasis on the "nature of the gene." Three hours lec. a week. Pr.: Agron. 690 or consent of instructor.

Genetics Seminar. (See A. H. 630.)

ANIMAL HUSBANDRY

DON L. GOOD,* *Head of Department*

Professors Cox, Good,* Koch,* Moyer, Richardson* and E. Smith;* Associate Professors Drake,* Harbers,* Kropf,* Menzies,* W. Smith,* Spies,* Tuma* and Wheat;* Assistant Professors Brent,* McAdams, McKee* and Zoellner; Assistant Professor (Temporary) McCormick; Emeritus: Professors Aicher, Aubel and Mackintosh*

The courses in the Department of Animal Husbandry give the student special undergraduate instruction in the selection, breeding, feeding, management, and marketing of all classes of meat animals.

The animal husbandry farm and pastures consist of approximately 4,000 acres of land which are devoted to the maintenance of herds and flocks of purebred cattle, sheep, hogs, and horses, and to experimental projects with meat animals. All animals maintained by the department are used for class work.

The laboratory of the animal husbandry student is the feed lot, the judging pavilion, and the abattoir (as well as the animal nutrition laboratory, the wool laboratory, the meats laboratory, and the genetics and animal breeding laboratory), where the animal can be studied from the standpoint of the breeder, the feeder, and the packer.

FOR UNDERGRADUATE CREDIT

- 005 101. Basic Animal Husbandry.** (2) I, II. A study of the field of animal husbandry, with special emphasis on the importance of livestock as a major phase of agriculture. Two hours rec. a week.
- 005 111. Basic Animal Husbandry Laboratory.** (1) I, II. A study of market types and classes of livestock, with emphasis on live animal and carcass evaluation. Two hours lab. a week.
- 005 201. Principles of Animal Science.** (2) 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. Two hours rec. a week. Taught in cooperation with the Departments of Dairy Science and Poultry Science. (A. H. 202. Dy. Sc. 202, and Pl. Sc. 202 are companion courses in the respective departments.)
- 005 202. Animal Husbandry.** (2) I, II. Application of basic principles of animal agriculture to animal husbandry with reference to livestock feeding, breeding, management, and marketing. Four hours lab. a week. Pr.: A. H. 201 or conc. enrollment.
- 005 205. Principles of Livestock Selection.** (3) I. Origin, development, characteristics, and adaptation of different breeds of livestock, with special emphasis on the selection of breeding animals. One hour rec. and four hours lab. a week. Pr.: A. H. 101 and 111, or 200 and junior standing.
- 005 210. Judging Farm Animals.** (2) II. Advanced work in the judging of beef cattle, sheep, swine, and horses. Six hours lab. a week. Pr.: A. H. 205 or consent of instructor.
- 005 220. Form and Function in Livestock.** (2) I. A detailed study of animal form and type; influence of type upon function; special training in presenting orally the relative merits of animals of all breeds. Six hours lab. a week. Pr.: A. H. 210.
- 005 230. Principles of Feeding.** (3) I, II. The digestive system and processes of nutrition; origin, chemical analysis, and feeding values of different feeds; nutritive requirements for maintenance, growth, and production of farm animals. Three hours rec. a week. Pr.: Chem. 190 or equiv.
- 005 240. Livestock Feeding.** (3) I. A résumé of digestion and nutrition dealing primarily with practical feeding. Open only to students in the Curriculum in Veterinary Medicine. Three hours rec. a week. Pr.: Chem. 350, Physi. 635.

- 005 250. Elements of Meat Processing.** (2) I, II. Meat consumption, principles of processing, curing, and freezing. Two hours lec. and rec. a week. Pr.: A. H. 101 and 111 or 200.
- 005 260. Meat Processing.** (1) I, II. Killing, dressing, cutting, packing, and freezing meat and meat products; field trip. Three hours lab. a week. Pr.: A. H. 101 and 111 or 200; 250 or conc. assignment.
- 005 270. Principles of Meat Evaluation.** (2) II. Introduction to the subjective and objective standards employed in evaluating beef, veal, lamb, and pork carcasses, and also wholesale cuts. Application of these factors to carcass grade, and yield of edible portion; value and consumer acceptance. One hour lec. and three hours lab. a week. Pr.: A. H. 250, 260, or conc. enrollment, and at least sophomore classification.
- 005 280. Meat Selection and Utilization, H. E.** (2) I. For students in home economics. Selection of meats and cutting meats, carcass grading, prepared meats and meat products, frozen meats and meat preparation. One hour lec. and three hours lab. a week.
- 005 290. Beef Cattle Production.** (3) II. Three hours rec. a week. Pr.: A. H. 230.
- 005 300. Swine Production.** (3) II. Three hours rec. a week. Pr.: A. H. 230.
- 005 310. Sheep Production.** (3) I. Three hours rec. a week. Pr.: A. H. 230.
- 005 320. Horse Production.** (2) I. Two hours rec. a week. Pr.: A. H. 230.
- 005 330. Livestock Production.** (3) Offered on demand. Open only to juniors and seniors not majoring in animal husbandry. Practical insight into the production of beef cattle, horses, swine, and sheep. Three hours rec. a week. Pr.: A. H. 230.
- 005 340. Animal Husbandry Practicums.** (2) II. Open only to students majoring in animal husbandry and to students pursuing the Curriculum in Agricultural Education. Manual phases of livestock management. Six hours lab. a week.
- FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY
- 005 400. Genetics.** (3) I, II, S. Variation, Mendelian inheritance, and related subjects. Three hours lec. a week. Pr.: Zool. 200 or Bot. 200.
- 005 410. Animal Breeding.** (3) II. Physiology of reproduction; present status of livestock improvement; function of purebred livestock; breeding systems and practices; application of principles of genetics to problems of animal breeding. Three hours rec. a week. Pr.: A. H. 400.
- 005 430. Wool Grading and Classification.** (1) I. A study of the factors determining the commercial classes and grades of wool and the desired fleece qualities of the various breeds of sheep; practice in judging, grading and scoring wool. Three hours lab. a week. Pr.: Conc. with or subseq. to A. H. 310.
- 005 440. Advanced Wool Grading and Classification.** (1) I. Advanced work in the grading and classification of commercial and purebred fleeces, with particular emphasis on the grading procedures used by commercial wool marketing agencies. Laboratory exercises designed to acquaint the student with the physical properties of wool as they may affect its grading and classification. Three hours lab. a week. Pr.: A. H. 310, 430.
- 005 450. Classification, Grading and Selection of Meats.** (1) I. Identification and judging 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. H. 250, 260.
- 005 480. Animal Husbandry Seminar.** (1) II. Open only to senior and graduate students majoring in animal husbandry. One hour rec. a week. Pr.: A. H. 230.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 005 600. Animal Nutrition.** (3) I. Study of the nutrients, their function and requirements for livestock, with special attention to recent discoveries in the field of animal nutrition. Pr.: A. H. 230.
- 005 610. Population Genetics.** (3) II. Application of genetic principles to livestock improvement; selection methods, mating systems, heritability estimates. Three hours rec. a week. Pr.: A. H. 400.
- 005 620. Population Genetics Laboratory.** (1) II. Compilation and analyzing of genetic data. Three hours lab. a week. Pr.: A. H. 610 or conc. assignment.
- 005 630. Genetics Seminar.** (1) I. Study and criticism of genetic experiments with animals and plants and of the biological and mathematical methods employed. One hour rec. a week. Pr.: A. H. 400 or Zool. 645.
- 005 650. Animal Husbandry Literature.** (1) I, II. Preparation of abstracts and reports from scientific journals on current research in the field of animal husbandry. Pr.: Graduate standing or permission of instructor. Students may re-enroll in subsequent semesters for a total of two hours credit.
- 005 660. Animal Husbandry Problems.** Credit arranged. I, II, S. Pr.: A. H. 230 and other courses; consult instructor. Work offered in:
Animal Breeding, Animal Nutrition, Beef Cattle Production, Horse Production, Livestock Selection, Meats, Sheep Production, Swine Production.
- 005 670. Institutional Meats.** (2) Spring semester, 1966-67, and alt. years. Particular attention to grades, brands, wholesale cuts, institutional cuts, fabricated meats, serving portions, shrinkage and variety meats; emphasis given to costs and prices as related to menus; field trip required. One hour rec. and three hours lab. a week. Pr.: A. H. 280 and junior standing.
- 005 676. Meat Technology.** (3) II. Muscle and bone anatomy, growth, meat composition and nutritive value, meat processing techniques, microbiology and sanitation, food additives, meat color, packaging and quality control. Two hours lec. and three hours lab. a week. Pr.: A. H. 250 and 260 or consent of instructor; senior or graduate standing.
- 005 690. Meat-Packing Plant Operation.** (2 to 6) S. A minimum of four weeks of supervised study, for each two hours credit, in a commercial meat-packing plant.

FOR GRADUATE CREDIT

- 005 800. The Wool Industry.** (3) II. Supply and demand, production, marketing, manufacturing. Two hours rec. and three hours lab. a week. Pr.: A. H. 310.
- 005 805. Animal Breeding Seminar.** (1) II. Evaluation of animal experimentation as related to reproduction and breeding.
- 005 825. Advanced Meat Animal Production.** (2) S. Continued study of an advanced nature of the fundamentals and practices of beef cattle production, sheep production, and swine production. Maximum of six hours may be applied toward a degree. Pr.: Consent of instructor.
- 005 830. Advanced Meat Science.** (2) II. Offered on sufficient demand. Basic biochemical, physiological, and histological properties of muscle and related tissues; muscle contraction, rigor mortis and muscle hydration; maturation; processing by thermal, dehydration and cold sterilization techniques; meat flavor chemistry; meat research techniques. Two hours rec. a week. Pr.: A. H. 250 and 260, Biochem. 420 or consent of instructor.
- 005 835. Research Techniques in Reproduction.** (3) II. Study of experimental techniques employed in animal reproductive research, with emphasis on current literature. Included will be essays of hormones, ovariectomy, parabiosis, hypothysectomy, vasectomy, superovulation and ova transplantation. Pr.: Background in both anatomy and physiology or consent of instructor.

- 005 840. Research in Animal Husbandry.** Credit arranged. I, II, S. Special problems in genetics and in the production of all kinds of livestock except dairy cattle. Pr.: Consult instructor.
- 005 850. Analytical Techniques in Animal Husbandry.** (3) I. Principles of analytical procedures used in animal husbandry. One hour rec. and six hours lab. a week. Pr.: Consent of instructor.
- 005 860. The American Livestock Industry.** (3) II. The origin, development, and economic significance of the livestock industry of the United States. Assigned readings, reports, conferences, and lectures. Pr.: A. H. 100 and 111 or 200, 230; senior or graduate standing.
- 005 880. The Meat Industry.** (2) I, II, S. Assigned readings, reports, and conferences related to the history, development, and economic significance of the meat industry. Pr.: Consent of instructor.
- 005 890. Graduate Seminar in Animal Husbandry.** (1) I, II. Discussion of technical problems and investigations in animal husbandry. Attendance required of all graduate students in animal husbandry. Maximum of two hours may be applied toward a degree.

BIOCHEMISTRY

HOWARD L. MITCHELL,* *Head of Department*

Professors Burkhard, Clegg,* Mitchell* and Parrish;* Associate Professors Nordin* and Ruliffson;* Assistant Professors Cunningham,* Hedgcoth* and Klopfenstein;* Emeritus: Professor Whitnah*

Biochemistry is a study of the most intricate of all chemical systems—the chemistry of living matter. It attempts to decipher the chemical nature of protoplasm, the basic material of all living matter, and the principles of metabolism. There are two broad divisions of biochemistry, plant biochemistry and animal biochemistry, though they have much in common.

Biochemistry as a profession offers many opportunities in teaching, research, industry, and public service. Biochemistry also is excellent preparation for other areas of basic and applied science, for work in many of these fields depends on biochemical knowledge and methods. Employment in the biochemistry research laboratories while one is an undergraduate offers unusual opportunities to become acquainted with and gain experience in various aspects of biological and agricultural chemistry.

The Department of Biochemistry offers work leading to the degrees Bachelor of Science, Master of Science and Doctor of Philosophy, with a major in biochemistry, and minor or supporting work for majors in other departments. The department participates in interdepartmental programs in animal nutrition leading to the Doctor of Philosophy degree (see Animal Nutrition, page 74) and in Food Science leading to Master of Science and Doctor of Philosophy degrees (see Food Science, page 310).

The graduate program in the Department of Biochemistry is designed to develop scientists with a strong background in chemistry capable of doing independent biochemical research and qualified to train others in biochemistry. To accomplish these objectives, the Department of Biochemistry has many well-equipped laboratories, instruments, animal rooms, and auxiliary facilities for investigations in biochemistry. The department offers a wide range of courses in various areas of biochemistry and nutrition. There is excellent interdepartmental cooperation in graduate programs and research in basic sciences and agriculture.

Students with high scholastic standards and sound training in chemistry are well fitted for graduate study in biochemistry. To undertake major graduate work, one should complete a four-year curriculum at an accredited college or university that includes one year each of inorganic, analytical, organic, and physical chemistry, calculus, physics, and at least a semester of biological science, including a laboratory. If prep-

aration of the entering graduate student is incomplete, additional training in deficient areas should be obtained before undertaking a full graduate schedule. Entering students take evaluation examinations in analytical, organic, physical chemistry and biochemistry, provided these courses were taken prior to admission. Results of these examinations are used in program planning.

COURSES IN BIOCHEMISTRY

FOR UNDERGRADUATE CREDIT

- 020 099. Biochemistry Seminar.** (0) I, II. Required of all biochemistry majors. Lectures, discussions, and activities of biochemical interest.
- 020 120. Introductory Organic and Biological Chemistry.** (5) II. For students in home economics and nursing. Organic chemistry and biochemistry are integrated to provide an understanding of carbohydrates, fats, proteins, and of digestive and other metabolic systems and reactions. Three hours lec. and six hours lab. a week. Pr.: Chem. 110.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 020 410. 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.
- 020 420. General Biochemistry.** (5) I, II, S. A study of the chemical components and biochemical processes of tissues; basic course for students in Veterinary Medicine, Agriculture, Home Economics, and Medical Technology. Three hours lec. and six hours lab. a week. Pr.: Chem. 191 or 351.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 020 655. Biochemistry I.** (3) I. An introduction to carbohydrates, lipids, proteins and nucleic acids, physical biochemistry, enzymes and biological oxidations, glycolysis and Krebs cycle and related topics. Biochem. 655 and 665 are intended as basic courses for biochemistry majors, minors, and those interested in an intensive course covering the biochemistry of cellular constituents and their metabolic interrelations. Pr.: * Quantitative analysis, one year of organic chemistry, differential and integral calculus.
- 020 656. Biochemistry I Laboratory.** (2) I. Basic laboratory course to accompany Biochemistry I. Six hours lab. a week. Pr.: * Biochem. 655 or conc. enrollment.
- 020 665. Biochemistry II.** (3) II. A cont. of Biochemistry I. Additional carbohydrate metabolic schemes; lipid, amino acid, protein and nucleic acid metabolism; hormone and regulatory mechanisms; physiological and comparative aspects of biochemistry. Pr.: * Biochem. 655.
- 020 666. Biochemistry II Laboratory.** (2) II. Basic laboratory course to accompany Biochemistry II. Six hours lab. a week. Pr.: * Biochem. 656 and 665 or conc. enrollment.
- 020 670. 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.
- 020 680. Biochemistry of Toxic Materials.** (2) I. Offered 1967-68 and alt. years. The chemistry of drugs, antimetabolites, metals and agricultural chemicals; their absorption, distribution, mode of action and effect on biochemical systems, metabolism and detoxication. Pr.: * Biochem. 665.
- 020 690. Lipids.** (2) II. Offered 1967-68 and alt. years. Chemistry of plant and animal lipids, their occurrence, metabolism and industrial uses. Pr.: * Biochem. 665.
- 020 705. Vitamins.** (2) II. Offered 1967-68 and alt. years or on demand. A survey of the avitaminoses, chemical properties, biochemical roles,

* Non-majors lacking these prerequisites should obtain consent of instructor before enrollment.

metabolic pathways and methods of assay of the vitamins. Pr.:* Biochem. 665.

020 706. 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.

020 710. 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.

020 715. Nucleic Acids. (2) II. Chemistry, function, metabolism, and biological roles of nucleic acids, purines, pyrimidines, nucleosides, nucleotides, and related compounds. Pr.:* Biochem. 665.

020 725. Advanced Biochemistry Laboratory. (2) II. Specialized laboratory techniques for advanced biochemical investigations. Pr.:* Biochem. 666.

020 745. Hormones. (2) I. Offered 1966-67 and alt. years or on demand. A study of the structure, biosynthesis, biochemical role, metabolism and interrelations of internal secretions. Pr.: Biochem. 665.

020 799. Problems in Biochemistry. Credit arranged. 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.

FOR GRADUATE CREDIT

020 806. Biochemistry Seminar. (0-1) I, II. Seminar for graduate students in biochemistry.

020 812. Proteins. (2) I. Offered 1967-68 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.

020 815. Plant Biochemistry. (3) I. A more advanced treatment of the material of Biochem. 410, with greater emphasis on the chemistry involved. Two hours lec. and three hours lab. a week. Pr.:* Biochem. 655 and 656.

020 816. Chemistry of Carbohydrates. (2) I. Offered 1966-67 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.

020 818. Enzyme Chemistry. (2) II. Offered 1966-67 and alt. years. Lectures and readings on the chemical nature of enzymes, their reactions and assay. Pr.:* Biochem. 665.

020 819. Enzyme Laboratory. (2) II. Offered 1966-67 and alt. years. A laboratory course to accompany Biochem. 818. Pr.:* Biochem. 656 and 818 or conc. enrollment.

020 825. Advanced Animal Nutrition. (3) I. Offered 1966-67 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.

020 890. Theoretical Biochemistry. (2) II. Offered 1966-67 and alt. years. Mathematical treatment of enzyme kinetics, theory of biological oxidation and energy transformations, multiple equilibria, physical chemistry of proteins and membrane phenomena. Pr.:* Biochem. 665.

020 999. Research in Biochemistry. Credit arranged. I, II, S. Research in biochemistry, agricultural chemistry and nutrition, which may be used for preparation of the M. S. and Ph. D. thesis. Pr.:* Sufficient training for research undertaken.

* Non-majors lacking these prerequisites should obtain consent of instructor before enrollment.

DAIRY AND POULTRY SCIENCEC. L. NORTON,* *Head of Department*

Professors Bartley, Claydon,* Craig,* Huston,* Larson,* Marion,* Norton,* Sanford* and Ward;* Associate Professors Basset,* Bonewitz* and Farmer;* Assistant Professors Adams,* Call, Jackson, Mickelsen,* Mitchell* and Morrill;* Instructors Kahrs, Mugler and Roberts; Emeritus: Professors Martin* and Payne**

A wide application of science to the problems of poultry production, milk production and dairy foods processing requires technically trained men. Courses in bacteriology, chemistry, mathematics, accounting, engineering, and business provide excellent background for training in the dairy industry.

Instruction in dairy production includes dairy cattle nutrition, management, breeding, milk secretion and judging. University-owned herds involving four breeds provide animals for class work and for research projects.

The Avery Poultry Research Center, comprising 10 new buildings having a floor space of approximately 33,000 square feet and capable of handling 13,800 birds, provides excellent facilities for the breeding, rearing and management of stock for the classroom and for experimental work. In addition, modern laboratory and teaching facilities are available for both poultry and dairy training in Leland Call Hall, constructed and dedicated in 1964.

Major work leading to the degree Master of Science is offered in the fields of dairy cattle management, physiology, nutrition, and breeding. The Master of Science degree is offered in dairy foods processing that emphasizes chemical and bacteriological aspects of dairy products processing, development, and control. Major work leading to the degree Master of Science is offered in the fields of poultry management, poultry products technology, poultry nutrition, and genetics.

Major work leading to the degree Doctor of Philosophy is offered in the fields of animal nutrition, animal breeding, 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 poultry science, dairy production, or dairy foods processing. 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.

FOR UNDERGRADUATE CREDIT

026 111. Poultry Practicums. (2) II. Especially designed for students in the Curriculum in Agricultural Education. Poultry judging and practical poultry management as applied to vocational education. One hour rec. and three hours lab. a week. Pr.: Dy. and Pl. Sc. 201 and 203.

025 196. Dairy Cattle Judging. (2) II. Six hours lab. a week. Pr.: Dy. and Pl. Sc. 201 and 202.

025 200. Fundamentals of Nutrition. (3) I, II. Elementary principles of comparative nutrition of farm animals. Two hours rec. and three hours lab. a week.

025 201. Principles of Animal Science. (2) 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. Two hours rec. a week. Taught in cooperation with the Department of Animal Husbandry. (A. H. 202, Dy. and Pl. Sc. 202 and 203 are companion courses in the respective departments.)

025 202. Dairy Science. (2) I, II. Application of basic principles of animal agriculture to dairying. Four hours lab. a week. Pr.: Dy. and Pl. Sc. 201 or conc. enrollment.

026 203. Poultry Science. (2) I, II. Application of basic principles of animal agriculture to the poultry industry. Four hours lab. a week. Pr.: Dy. and Pl. Sc. 201 or conc. enrollment. Possible field trip.

- 026 210. Poultry Judging.** (3) I. Production characteristics and evolution of present breeds and types. Judging the standard breeds and varieties by comparison; judging hens for egg and meat production on the basis of certain physical characteristics. One hour rec. and six hours lab. a week. Pr.: Dy. and Pl. Sc. 201 and 203.
- 025 220. Dairy Products Evaluation I.** (1) II. Fundamentals of organoleptic examination of dairy products according to official standards and commercial grades; introduction to sampling techniques, consumer testing and data processing. Three hours lab. a week.
- FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY
- 025 400. Market Milk and Dairy Inspection.** (4) II. A study of the problems of the milk-plant operator, including production, procurement, processing, selling, and quality control; inspection of farms and milk plants. Two hours rec. and six hours lab. a week. Pr.: Bact. 220.
- 025 420. Advanced Dairy Cattle Judging.** (1) I. Three hours lab. a week. Pr.: Dy. and Pl. Sc. 196.
- 025 460. Dairy Products Evaluation II.** (1) I. Advanced judging of dairy products to qualify for intercollegiate contests. Three hours lab. a week. Pr.: Junior standing, Dy. and Pl. Sc. 220, or consent of instructor.
- 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.
- 025 510. Dairy Technology.** (3) I. The relationship of physical and chemical properties of the various components of milk to handling and processing of dairy products. Two hours rec. and three hours lab. a week. Pr.: Chem. 350, 351.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 026 600. Poultry Products Technology.** (3) I. Offered in odd years. Emphasis on the technological problems that exist between producer and consumer in the production and distribution of poultry and eggs. Poultry processing, tenderness, self-life and packaging. Egg grading, preservation, chemical changes, bacterial problems, and egg products. Two hours rec. and three hours lab. a week. Pr.: Dy. and Pl. Sc. 201, 203; Chem. 190, 191; or 350, 351; Bact. 220, or consent of instructor.
- 025 601. Milk Secretion.** (3) II. Anatomy, histology, and evolution of the mammary gland; hormonal control of mammary development and function; theories of milk secretion, modern methods of milking. Two hours rec. and three hours lab. a week. Pr.: Junior standing or consent of instructor.
- 025 605. Artificial Breeding of Farm Animals.** (3) I. Study of the reproductive processes in farm animals, factors affecting reproductive efficiency, and artificial breeding practices. Two hours rec. and three hours lab. a week. Pr.: Consent of instructor.
- 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 three hours lab. a week. Pr.: Dy. and Pl. Sc. 200, or 201 and 202, or consent of instructor.
- 026 612. 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. The feeding and care of chicks on deficient diets for a period of several weeks provide practical application of nutrition problems. Two hours rec. and three hours lab. a week. Pr.: Dy. and Pl. Sc. 201 and 203.
- 026 620. Avian Metabolism.** (3) I. Offered in even years. Special emphasis on the physiological processes in reproduction, digestion, absorption, circulation, respiration, excretion and internal secretions. Three hours rec. a week. Pr.: Dy. and Pl. Sc. 201 and 203, Zool. 205.

- 025 621. Dairy Cattle Management.** (3) II. Offered in even years. Production practices, record keeping, labor-saving equipment, milking systems, stabling methods, dairy farm planning and analysis, field study trip. Two hours lec. and two hours lab. a week. Pr.: Dy. and Pl. Sc. 201 and 202 and junior standing.
- 026 630. Poultry Problems.** (2) I, II. 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. 201 and 203 or consent of instructor.
- 025 635. Genetics of Poultry and Dairy Cattle I.** (4) I. Introduction to the genetics of qualitative and quantitative traits in dairy cattle and poultry; methods and comparison of individual, family and combined individual and family selection in the two classes of animals; systems of mating and their effectiveness. Three hours rec. and three hours lab. a week. Pr.: One semester each of elementary genetics and statistics.
- 026 640. Poultry Management.** (3) II. A detailed study of all phases of farm and commercial flocks, including cost of production. Three hours rec. a week. Pr.: Dy. and Pl. Sc. 201 and 203, senior or graduate standing, or consent of instructor.
- 026 650. Poultry Seminar.** (1) I. Required of all juniors majoring in poultry science and continued into the senior year. Also required of graduate students. One hour rec. or conference a week. Pr.: Dy. and Pl. Sc. 201 and 203.
- 026 660. Poultry Industry Training.** (3) S. Nine weeks of supervised practical experience in an approved commercial poultry plant, hatchery, or farm. The employer and resident instructor will collaborate in arriving at a grade. Open to upperclassmen and graduate students. Pr.: Dy. and Pl. Sc. 201 and 203.
- 025 665. Dairy Production Problems.** Credit arranged. I, II, S. Pr.: Junior standing.
- 025 670. Quality Control of Dairy Products.** (3) II. Offered odd years or on demand. The role of the control laboratory in maintaining standards and quality of dairy foods and ingredients; bacteriological, physical and chemical techniques for evaluating quality and sanitation. One hour rec. and five hours lab. a week. Pr.: Bact. 220 and 520.
- 025 675. Dairy Manufacturing Problems.** Credit arranged. I, II, S. Pr.: Junior standing in dairy manufacturing.
- 025 680. Dairy Foods Processing I.** (5) II. Offered odd years or on demand. The theory and practice of manufacturing concentrated milks, dried milks, ice cream, ice milk, sherbets, ices, and various special products; physical and chemical processes, laboratory procedures and engineering problems. Four hours rec. and three hours lab. a week. Pr.: Bact. 220 and Chem. 230 and 250.
- 025 690. Dairy Foods Processing II.** (5) I. Offered odd years or on demand. Principles and procedures in the manufacture of cheese and butter; chemical, physical and bacteriological factors affecting ripening and quality; the role of bacterial starter cultures; factory operations. Four hours rec. and three hours lab. a week. Pr.: Bact. 220 and 520.
- 025 695. Dairy Plant Management.** (2) II. Offered odd years or on demand. Trends in the dairy industry, types of organizations, location of plants, plant design and construction, selection of equipment, plant operation, plant records, inventory control, production planning, purchase of supplies, sales, profit and loss statements and legal aspects of plant management. Pr.: Consent of instructor.
- 025 710. Dairy Fermentations I.** (3) On demand. Isolation and culture of bacterial species causing desirable and undesirable changes in dairy products; special characteristics of the organisms as evidenced by growth in milk; typical changes produced in other dairy products and conditions affecting development. One hour lec. and six hours lab. a week. Pr.: Bact. 220 and 615.

- 025 735. Genetics of Poultry and Dairy Cattle II.** (4) II. Advanced genetics of qualitative and quantitative traits in dairy cattle and poultry. Methods of utilizing information for maximum rates of improvement in avian and mammalian species. Consideration of experimental breeding results in laboratory and avian species and applicability to domestic animals. Three hours rec. and three hours lab. a week. Pr.: Dy. and Pl. Sc. 635.

FOR GRADUATE CREDIT

- 025 805. Animal Breeding Seminar.** (1) II. Evaluation of animal experimentation as related to reproduction and breeding.
- 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.
- 025 820. Rumen Metabolism.** (3) II. Metabolism, absorption, digestion and passage of nutrients in the rumen of dairy cattle; factors affecting the environment of the rumen; certain aspects of rumen function and dysfunction; techniques used in rumen research. One hour rec. and three hours lab. a week. Pr.: Dy. and Pl. Sc. 200; Biochem. 402 or 655, or consent of instructor.
- 025 830. Mammalian Reproduction.** (3) II. Comparative anatomy, histology, and cytology of mammalian reproductive systems, with emphasis on study of endocrine control and cyclic changes. Two hours rec. and three hours lab. a week. Pr.: Consent of instructor.
- 025 998. Research in Dairy Science.** Credit arranged. I, II, S. Special investigation of dairy production or manufacturing which may be used as a basis for a master's thesis. Credits obtained may also be applied toward the degree Doctor of Philosophy. Pr.: Consent of instructor.
- 026 999. Research in Poultry Science.** Credit arranged. I, II, S. Investigations which may form the basis of a master's or doctor's thesis. Conferences by appointment. Pr.: Dy. and Pl. Sc. 201 and 203; consent of instructor.

Avian Microbiology. (See Bact. 600.)

Avian Anatomy. (See Anat. 801.)

Genetics Seminar. (See A. H. 630.)

ENTOMOLOGY

HERBERT KNUTSON,* *Head of Department*

Professors Knutson, Painter* and Wilbur;* Associate Professors Elzinga,* Gates, Harvey,* Hopkins,* Rettenmeyer* and Thompson;* Assistant Professors Blocker,* DePew, Eshbaugh, Kadoum, Mills,* Pitts* and Wilde;* Instructors Brooks and Kauffeld; Emeritus: Professors Parker* and Smith**

UNDERGRADUATE

Entomology is the study of insects and their near relatives. Applied entomology stresses their relations to plants and animals, including man. The courses fall into two groups: (1) broad, general, cultural courses suitable for any students, such as 200, 211, 600, 630, 660, 670, and (2) professional courses which include most of the remainder. They provide training for research, resident and extension teaching and administration in the services of colleges, experiment stations, health services, other agencies of the states and the federal government, industry, foundations, and private practice, at home and abroad.

Courses listed for alternate years will be given in unscheduled years if a sufficient number of students indicate to the head of the department before the middle of the previous semester the course that they desire. Consult department for prerequisites.

For a minor, 200 or 211 and five or six additional credit hours should be completed.

For a major, in addition to the minor, professional courses and a broad, basic training in agriculture or the biological and physical sciences are needed to provide a satisfactory foundation for graduate work.

GRADUATE

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered. Field facilities for research at Manhattan include four field insectaries; greenhouses; a programmed environmental control laboratory of the walk-in type and several smaller chambers; and land for experimental use at three locations.

The Department has recently moved into portions of Waters Hall and Annex, following major remodeling. Entomology now has nearly four times the previous space plus major improvements in laboratory, office, and graduate student facilities. Facilities include several temperature- and humidity-controlled rooms for rearing and holding insects and other experimental animals and laboratories for use of radioisotopes. Major laboratories are provided for study of insect behavior, toxicology, physiology and biochemistry, and for biology and ecology of insects attacking man and animals and stored products, and isolated laboratories for insecticide testing and for chemical and bioassay determination of insecticide residues. Facilities for investigation of biology and control of insects attacking trees, shrubs and ornamental plants and field crops are also provided.

Facilities are further enhanced by the location at Manhattan of a large branch research laboratory of the United States Department of Agriculture, at which work is conducted on stored-products pests.

There is a department library and a good insect collection. All rooms and laboratories are air conditioned.

The staff is engaged in numerous federal, state, commercial, and special projects including projects sponsored by the National Science Foundation and the U. S. Public Health Service.

Entomologists are stationed at the Fort Hays Branch Agricultural Experiment Station at Hays in north-central Kansas, and at the Garden City Branch Station at Garden City in southwestern Kansas. These entomologists study various insect problems occurring in their respective portions of the state.

Approximately six Ph. D. and six M. S. degrees have been awarded annually during the past few years.

The Kansas State Entomology Club is student-managed and has a membership of about 50, including faculty. The department actively sponsors seminars, symposia, professional meetings and social events, and helps support the Kansas Entomological Society and its publication, the *Journal of the Kansas Entomological Society*.

Several graduate research assistantships, fellowships and one graduate teaching assistantship are available, and other students are employed for work on research projects and teaching by the hour or month.

FOR UNDERGRADUATE CREDIT

030 100. Milling Entomology. (4) II. Elementary structure, life histories, classification, and control of insects and their near relatives; insect and rodent pests of flour mills, elevators, granaries, warehouses and bakeries, and standard methods of mill and granary sanitation. Laboratory provides opportunities for basic studies and practical experience in mill sanitation. Three hours rec. and three hours lab. a week.

030 200. Economic Entomology. (3) I, II. Elementary anatomy, physiology, and classification of insects; the life histories, habits, and control of the more important insect pests. Two hours rec. and three hours lab. a week.

030 211. General Entomology. (3) I, II. A basic study of insects and related arthropods, their classification, behavior, and relations to plants and animals, including man. Two hours rec. and three hours lab. a week.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

030 420. General Bee Culture. (2) Offered on demand. Structure, life history, general behavior, activity, and products of the honeybee; bee diseases and their eradication and control; relation of bees to agricul-

ture and horticulture. Two hours rec. a week. Pr.: Entom. 200 or 211 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 030 600. Advanced General Entomology.** (3) Offered on demand. Broad biological aspects, including geological history and evolution, and the various subdivisions of entomology. Pr.: Entom. 200 or 211 and Zool. 200.
- 030 620. Medical Entomology.** (3) I. Offered 1966-67 and alt. years. Insects and other arthropods as parasites and disseminators of disease; life cycles, biology, and control of insect parasites of man and animals. Two hours rec. and three hours lab. a week. Pr.: Entom. 200 or 211 and Zool. 200.
- 030 630. Insect Ecology.** (3) I. Offered 1966-67 and alt. years. Influence of biotic, physical and edaphic factors of environments on insects. Two hours lec. and four hours lab. a week. Pr.: Entom. 200 or 211 and Zool. 200.
- 030 640. Entomological Methods.** (3) Offered on demand. Methods, materials, and techniques used; population sampling, insect collecting and preserving; planning experimental work; rearing of laboratory insects; recording and use of environmental data; use of constant temperature and humidity equipment. Pr.: Entom. 200 or 211 or equiv.
- 030 650. Insect Control by Host Plant Resistance.** (2) Offered on demand. Resistance of varieties of crop plants to insect attack and their 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. 200 or 211, and a course in either plant or animal genetics.
- 030 656. Properties of Insecticides.** (2) I. Offered 1966-67 and alt. years. Chemical and biological properties of insecticides and acaricides; relation of structure to toxicity; hazards; symptomatology, and treatment of poisoning; formulation and methods of analysis. One lec. and four hours lab. a week. Pr.: Entom. 200 or 211, organic chemistry.
- 030 660. External Insect Morphology.** (3) I. External anatomy of representative insects belonging to a number of orders, structure of the exoskeleton, a basis for taxonomy and hexapod morphology. One hour rec. and six hours lab. a week. Pr.: Entom. 200 or 211.
- 030 670. Internal Insect Morphology.** (3) II. Offered 1966-67 and alt. years, or on demand. Internal anatomy of representative insects; plan and structure of the internal systems. One hour rec. and six hours lab. a week. Pr.: Entom. 660.
- 030 675. Insect Physiology.** (3) I. Offered 1967-68 and alt. years. Insect growth, development, nutrition, metabolism, excretion, integument, respiration, nervous, muscular and reproductive systems. Two hours lec. and four hours lab. a week. Pr.: Entom. 670 or consent of instructor.
- 030 690. Principles of Taxonomy.** (1) II. The methods and principles of systematic entomology and zoology; characterization of taxonomic categories; international rules of zoological nomenclature. Pr.: Entom. 200 or 211, 700, or Zool. 640 or 440 should be taken conc.
- 030 700. Taxonomy of Insects I.** (2) II. Determination of major families of insects, taxonomic literature, use of catalogs. Six hours lab. a week. Pr.: Entom. 660, and conc. registration in Entom. 690 recommended. The student will present at the beginning of the course a correctly prepared collection of insects at least equivalent to that submitted for Entom. 200 or 211, for use in laboratory identification.
- 030 711. Taxonomy of Immature Insects.** (3) II. Offered 1967-68 and alt. years. Classification and bionomics of immature stages of insects;

practice in their identification. Six hours lab. a week. Pr.: Entom. 690 and 700.

030 750. Entomological and Zoological Literature. (2) I. Bibliographies, biological journals, and keys to the literature of all types in the zoological sciences; the preparation and publication of technical papers. Especial emphasis is given to the best time-saving aids and methods for all aspects of library work needed for thesis preparation. Pr.: Entom. 200 or 211, and Zool. 200.

030 770. Advanced Applied Entomology I. (3) I. Offered 1967-68 and alt. years. Includes representative insects from horticultural and forest entomology; host plant resistance to insects; and insecticides; general considerations; methods of evaluation and development; residue problems. Two hours rec. and three hours lab. a week. Pr.: Entom. 200 or 211.

030 780. Advanced Applied Entomology II. (3) II. Offered 1967-68 and alt. years. Includes representative insects of field and forage crops, stored products, livestock and the household; general considerations of insecticides; regulatory and extension entomology. Two hours rec. and three hours lab. a week. Pr.: Entom. 200 or 211; Entom. 770 desirable.

030 795. Entomology Seminar. (1) I, II. Pr.: Consult seminar committee.

030 799. Problems in Entomology. Credit arranged. I, II, S. For non-thesis studies. Work is offered in various fields of entomology. Pr.: Consent of instructor.

FOR GRADUATE CREDIT

030 800. Advanced Economic Entomology. (1 to 3) I, II, S. A specialized study of the biology and control of selected insects of economic importance. Pr.: Consent of instructor.

030 810. Insects of Stored Products. (1 to 3) I, II, S. Taxonomy, ecology, and behavior of stored-products insects and the current practices involved in their control. Pr.: Consent of instructor.

030 820. Advanced Physiology of Insects. (4) II. Offered 1967-68 and alt. years. Physiology of nutrition and metabolism of carbohydrates, lipids, and nitrogen compounds; energy production; homeostatic mechanisms, hormones, morphogenesis. Two hours lec. and six hours lab. a week. Pr.: Biochemistry, Entom. 675.

030 850. Taxonomy of Insects II. (1 to 3) Offered on demand. Intensive study of a selected group of insects. Pr.: Entom. 660, 690, 700, and consent of instructor.

030 856. Action and Metabolism of Insecticides. (2) II. Offered 1966-67 and alt. years. Comparative physiological and biochemical action of insecticides; metabolism and fate in living systems; insect resistance; research techniques. One hour lec. and four hours lab. a week. Pr.: Entom. 656 and biochemistry or consent of instructor.

030 860. Insect Behavior. (3) II. Offered 1967-68 and alt. years. Major types of behavior patterns and methods for analyzing the behavior of insects and other arthropods. Two hours lec. and four hours lab. a week. Pr.: Entom. 630.

030 999. Research in Entomology. Credit arranged. Thesis or dissertation credit. I, II, S. Work is offered in applied entomology, host plant resistance, insect physiology, toxicology, ecology, behavior, medical entomology, pest control technology, insects attacking shade trees and ornamentals, stored products, taxonomy, and morphology. Pr.: At least nine hours of entomology and basic work in zoology, botany, bacteriology, chemistry, mathematics, and consent of department.

GRAIN SCIENCE AND INDUSTRY (Formerly Flour and Feed Milling Industries)

WILLIAM HOOVER,* *Head of Department*

Professors Finney, Hoover, Johnson,* MacMasters,* Pfost,* Pomeranz, Schoeff, Shellenberger* and Wilcox; Associate Professors Deyoe, Farrell* and Ward;* Assistant Professors Headley,* Hurley* and Miller;* Instructors Balding and Hayes*

The Department of Grain Science and Industry offers three curriculums leading to Bachelor of Science degrees in Bakery Science and Management, Feed Milling Science and Management, and Flour Milling Science and Management. In each curriculum an option is selected in Administration, Chemistry, or Operations.

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 flour milling. Prerequisite to major study in these fields is a Bachelor of Science degree from this department or equivalent degree in chemistry, engineering, physics, agriculture, or business administration.

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 flour 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 related activities.

FOR UNDERGRADUATE CREDIT

045 010. Milling Industry Seminar. (0) Required. I, II. Discussions of problems of interest to all students in baking, flour and feed milling industries. One hour lec. each month.

045 011. Freshman Assembly. (0) Required. I, II. Designed to acquaint freshmen in Bakery Management, Feed Technology and Milling Technology with historical background, economic importance and professional opportunities in their field of study. One hour lec. each month.

045 100. Principles of Milling. (3) I, II. Introduction to flour and feed milling processes. Two hours lec. and three hours lab. a week.

045 210. Flow Sheets. (2) I, II. The construction and assembly of a flow sheet. Six hours lab. a week. Pr.: Millg. 100, M. E. 213.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

045 400. Milling Technology I. (4) I, II. Study of the principles of wheat cleaning and conditioning equipment and the operation of a pilot pneumatic flour mill and wheat cleaning house. Two hours lec. and six hours lab. a week. Pr.: Millg. 100 and 210.

045 410. Feed Technology I. (4) I, II. Introduction to the engineering aspects of formula feed manufacture, including principles of conveying, grinding, mixing, pelleting, the formulation of concentrates, pre-mixes, and rations using a digital computer. Three hours lec. and three hours lab. a week. Pr.: Dy. Sc. 200 and Millg. 210.

045 490. Feed Manufacturing Processes. (3) II, S. Selection of plant location, plant design, equipment and flows. Study of the technical phases of formula feed manufacture, including principles of feed formulation, effect of processing and ingredients on nutritional acceptability of feeds, and quality control program. Not open to majors in feed technology. Two hours lec. and three hours lab. a week. Pr.: Math. 100, 150; A. H. 230 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

045 610. Flour and Feed Analysis. (4) II. Methods of analysis and quantitative tests of flour and feed composition. One hour lec. and nine hours lab. a week. Pr.: Chem. 300 and 350 or 511.

- 045 620. Advanced Wheat and Flour Testing.** (3) I. Physical and chemical methods used in testing wheat and flour. One hour lec. and six hours lab. a week. Pr.: Millg. 610.
- 045 630. Experimental Baking I.** (4) I. Practice in laboratory baking tests; comparison of methods, formulas, and flour; interpretation of results. Two hours lec. and six hours lab. a week. Pr.: Chem. 350.
- 045 631. Experimental Baking II.** (4) 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 and ingredients. Two hours lec. and six hours lab. a week. Pr.: Millg. 630.
- 045 632. Bakery Design and Flow.** (2) I. Study of process design and flow, equipment selection, layout and operation for bakeries. Emphasis is placed on the functional requirements of equipment and flow needed to sustain the chemical and biological reactions involved in baking. One hour lec. and three hours lab. a week. Pr.: Millg. 630 or consent of instructor.
- 045 633. Bakery Technology.** (3) II. Physical and engineering principles involved in baking processes. Operation of bakery equipment and control of systems. Study of heat problems, materials handling and sanitation. Laboratory tests of equipment to determine parameters involved in their operation. Two hours lec. and three hours lab. a week. Pr.: Millg. 632 and Phys. 211.
- 045 640. Advanced Flow Sheets.** (2) II. The design of flows for various cereal processing methods. Six hours lab. a week. Pr.: Millg. 210.
- 045 650. The Qualities of Wheat and Flour.** (3) II. The qualities of wheat and flour as affected by growth, storage and physical, chemical and biological factors. Three hours lec. a week. Pr.: Chem. 350.
- 045 660. Qualities of Feed Ingredients.** (3) II. The quality of feed ingredients and processed feeds as affected by origin, processing, storage, and physical and biological factors. Three hours lec. a week. Pr.: Chem. 350.
- 045 670. Milling Technology II.** (4) I. Theory and practice of wheat cleaning, conditioning, breaking, granulation, separation, and purification by unit operations and operation of pilot pneumatic flour mill. Two hours lec. and six hours lab. a week. Pr.: Millg. 400.
- 045 680. Feed Technology II.** (4) I. Advanced study of engineering principles of feed plant production, safety, materials handling, grinding, mixing and pelleting. Three hours lec. and three hours lab. a week. Pr.: Millg. 410, Phys. 212 or 311.
- 045 710. Fundamentals of Grain Storage.** (2) I. Basic science of grain storage, including role of moisture in grain, physical factors which influence deterioration, chemical changes in storage, role of micro-organisms, respiration and heating, influence of insects on storage. Pr.: Millg. 650 or 660 or consent of instructor.
- 045 720. Advanced Flour and Feed Technology.** (3) II. Advanced study of engineering principles used in flour and feed manufacture. Two hours lec. and three hours lab. a week. Pr.: Millg. 670 or 680.
- 045 730. Flour and Feed Mill Construction.** (3) I. The design and layout of flour and feed plants. Eight hours lab. and one hour unassembled lab. a week. Pr.: Millg. 670 or 680 or consent of instructor.
- 045 790. Milling Industry Problems.** Credit arranged. I, II, S. Pr.: Consent of staff.

FOR GRADUATE CREDIT

- 045 800. Graduate Seminar in Milling Industry.** (1) I, II. Discussion of technical problems in the cereal industry. One hour rec. a week. Attendance required of all graduate students in milling industry.
- 045 801. Enzyme Applications.** (2) I. Theories of enzyme action and the function of enzymes; commercial methods of manufacture and

industrial uses of enzymes, with special emphasis on the role of enzymes in the food industries. Two hours lec. a week. Pr.: Chem. 350 and Biochem. 420.

045 810. Research in Milling Industry. Credit arranged. I, II, S. Research may be used as basis for the graduate thesis. Pr.: Consult staff.

GENERAL AGRICULTURE

CARROLL V. HESS, *Dean, College of Agriculture*

FRANK R. CARPENTER, *Assistant Dean*

035 100. Agriculture in Our Society. (2) I. The development of the agricultural industry in the United States. The role of the land-grant colleges and universities in the development of the agricultural industry. The purposes of higher education in agriculture. Career opportunities for graduates in agriculture.

035 398. Honors Colloquium in Agriculture. (1) I, II. Open to students in the Honors Program for the College of Agriculture. Discussion of current topics related to agriculture. Discussion to be led by students, instructors, and invited guests. May be taken for not more than two credits.

HORTICULTURE

R. W. CAMPBELL,* *Head of Department*

Professors Amstein, Campbell, Carpenter,* Gallaher and Keen;* Associate Professors Greig,* Hall,* Morrison and Roberts; Assistant Professors Abmeyer, Biswell, Deutsch, Geyer, Grey, Hadle, Kepler, Miles, Odom* and Winzer; Instructors Atchison, Cadzow, Geisler, Jones, Leuthold, Long, Naughton, Nighswonger, Roth, Shreve, Slusher and Strickler; Emeritus: Professors Filingier* and Pickett* and Assistant Professor Willis*

Horticulture covers a broad spectrum of university training in the areas of scientific and economic plant production and use. It includes fruit and nut science, vegetable science, turf management, ornamental horticulture, and both the growing and retailing phases of floriculture. The departmental staff includes specialists in all areas. A Bachelor of Science degree in Agriculture with a major in Horticulture is granted upon the successful completion of the course of study.

A Pre-Forestry curriculum is available to students interested in this field. Upon its completion at the end of the sophomore year one may transfer to a university offering a professional forestry degree. There is also available work in the area of municipal forestry.

A two-year short course in Retail Floriculture is available for students interested in floral arrangement and retail flower shop management. A two-year short course in Nursery and Landscape Management prepares young people for work in nurseries, garden centers, parks, and similar enterprises.

The department has a variety of facilities for study and research, including the orchards, horticultural farm, nut research farm, turf farm, forestry plots, greenhouses, cold storage units, controlled atmosphere chambers, and research laboratories equipped for anatomical and physiological studies. Most major horticulture courses require student attendance on field trips.

A graduate program leading to the Master of Science and/or Doctor of Philosophy degree is available. A Bachelor of Science degree from a recognized college or university whose undergraduate program is substantially equivalent to the program at this university is prerequisite to admittance to graduate work in this department. Students desiring to enter a graduate program are urged to follow the Agricultural Science option.

FOR UNDERGRADUATE CREDIT

- 040 130. Floral Arrangement.** (3) I, II. Floral arrangement for the home and commercial flower shop. The basic fundamentals of floral design will be emphasized. Two hours rec. and three hours lab. a week. Pr.: Consent of instructor.
- 040 140. Advanced Floral Arrangement.** (3) II. Stylized floral design for the commercial flower shop including corsages, wedding designs, funeral pieces and party and banquet decorations. Two hours rec. and three hours lab. a week. Pr.: Hort. 130.
- 040 150. Home Horticulture.** (2) I, II. An introductory general course covering the various phases of horticultural activity as they relate to modern living.
- 040 160. Horticulture Seminar.** (0) I, II. A discussion of current topics in horticulture and closely related fields by students, faculty and invited speakers. Required of all horticulture majors the first two semesters in attendance. Meets first and third Tuesdays of each month.
- 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 three-hour lab. a week. Pr.: Bot. 210, General Botany. Taught in cooperation with the Department of Agronomy.
- 040 220. Plant Propagation.** (3) I. Offered in the fall of 1965 and alt. years thereafter. Principles and practices of propagating horticultural plants. Two hours rec. and three hours lab. a week. Pr.: Bot. 210, General Botany.
- 040 230. Greenhouse Construction and Management.** (3) II. Offered in the spring of 1967 and alt. years thereafter. Greenhouse construction, heating, air conditioning and crop planning. Two hours rec. and three hours lab. a week.
- 040 260. Plant Materials I.** (3) I. (See L. A. 260.) Perennials, annuals and evergreens for general landscape planting; planting plans. Two hours rec. and three hours lab. a week. Taught in cooperation with Landscape Architecture. Pr.: Bot. 210.
- 040 270. Plant Materials II.** (3) II. (See L. A. 270.) Trees, shrubs, vines for landscape planting. Reports required. Two hours rec. and three hours lab. a week. Taught in cooperation with Landscape Architecture. Pr.: Bot. 210.
- 040 280. Forest Conservation.** (3) I. A study of the development and progress of forest conservation upon private, state and federal lands; defines forestry as public policy, conservation program planning, and describes its role and importance in our economy and for our recreation.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 040 600. Landscape Horticulture.** (3) II. (See L. A. 600.) Fundamental principles of producing, planting and maintaining ornamental plantings of trees, shrubs, perennial and turf in the nursery, home grounds, parks and similar areas. Taught in cooperation with Landscape Architecture. Pr.: Bot. 210.
- 040 610. Turf Management.** (2) I. Offered in the fall of 1966 and alt. years thereafter. Methods and principles of establishing and maintaining special purpose turf. Pr.: Agron. 270.
- 404 620. Arboriculture.** (3) II. Offered in 1966-67 and alt. years thereafter. Principles and practices of caring for shade and street trees; transplanting, pruning, tree surgery, fertilizing, diagnosis of pests. Two hours rec. and three hours lab. a week. Pr.: Bot. 210, Agron. 270, and consent of instructor.
- 040 630. Forestry Practices.** (3) II. Offered in the spring of 1968 and alt. years thereafter. Principles of forest management and harvesting procedures, including regeneration, silviculture, forest ecology, types of

- forest plantings and their relation to Great Plains agriculture. Two hours rec. and three hours lab. a week. Pr.: Hort. 200 or equiv.
- 040 640. Horticultural Problems.** Credit arranged. I, II, S. Problems and reports in floriculture, olericulture, ornamental horticulture and pomology. Pr.: Advanced undergraduate standing and consent of instructor.
- 040 650. Principles of Fruit and Nut Growing I.** (3) I. Offered in the fall of 1967 and alt. years thereafter. Pruning, soil management, marketing, grading and packing of tree and small fruits. Two hours rec. and three hours lab. a week. Pr.: Hort. 200 or equiv.
- 040 660. Principles of Fruit and Nut Growing II.** (3) I. Offered in the fall of 1968 and alt. years thereafter. Moisture relations, nutrition, fruit setting and temperature effects. Two hours rec. and three hours lab. a week. Pr.: Hort. 200 or equiv.
- 040 670. Systematic Olericulture and Pomology.** (3) I. Offered in the fall of 1967 and alt. years thereafter. Technical study of fruits and vegetables, including classification and elements of judging. Two hours rec. and three hours lab. a week. Pr.: Hort. 150.
- 040 675. Storage of Horticultural Products.** (3) I. Offered in the fall of 1968 and alt. years thereafter. Storage structures, harvesting and handling in relation to storage; physiological changes associated with the storage of fresh flowers, fruits, nursery stock, and vegetables. Three hours rec. a week. Pr.: Junior standing and consent of instructor.
- 040 680. Spraying.** (3) II. Offered in the spring of 1968 and alt. years thereafter. Spray equipment and principles of spray application; chemical properties of insecticides, fungicides, fumigants, herbicides, and their influences on physiological activities of plants. Two hours rec. and three hours lab. a week. Pr.: Upperclassmen and graduate students.
- 040 690. Vegetable Crops I.** (3) II. Offered in the spring of 1968 and alt. years thereafter. Study of the fundamental principles involved in the production of vegetable crops. Classification, environmental conditions and physiological responses will be covered. Two hours lec. and three hours lab. a week. Pr.: Hort. 200.
- 040 700. Vegetable Crops II.** (3) II. Offered in the spring of 1967 and alt. years thereafter. Major vegetable crops grown as cash crops with emphasis on: competitive areas, harvesting, grading by U. S. standards, packing and sources of market supplies. Three hours lec. a week. Pr.: Hort. 200.
- 040 710. Principles of Floriculture.** (3) II. Offered in the spring of 1968 and alt. years thereafter. Study of the culture of greenhouse crops. Two hours rec. and three hours lab. a week. Pr.: Hort. 200.
- 040 790. Plant Science Literature.** (2) I. Study of history and literature of the plant sciences, preparation of written reports, and presentation of oral reports. Review all forms of literature summaries. One hour lec. and two hours rec. a week. Pr.: Advanced undergraduate standing and consent of instructor.

FOR GRADUATE CREDIT

- 040 800. Research in Horticulture.** Credit arranged. I, II, S. Investigations in pomology, olericulture, floriculture, and ornamental horticulture. Data collected may form basis for a thesis or dissertation. Pr.: Consult instructor.
- 040 810. Horticultural Crop Breeding.** (1-3) I, II, S. Problems and breeding practices related to fruit, ornamental, or vegetable plants. Pr.: One course in genetics and consent of instructor.
- 040 820. Advanced Vegetable Crops.** (1-3) I, II, S. A specialized study related to the physiological development and handling of selected vegetable crops. Pr.: Hort. 690 or 700 and consent of instructor.

- 040 830. Advanced Pomology.** (1-3) I, II, S. Morphological and physiological changes occurring in fruit plants. Pr.: Hort. 650 and 660 and consent of instructor.
- 040 840. Advanced Floriculture.** (1-3) I, II, S. Production of commercial cut flowers and potted plants, including the relationship of light, temperature, soils and other factors. Pr.: Hort. 710.
- 040 850. Horticulture Graduate Seminar.** (1) I, II. A discussion of investigational works in the various branches of horticulture. Pr.: Hort. 790 and graduate standing.
- 040 860. Advanced Ornamental Horticulture.** (1-3) I, II, S. Intensive study of a special phase of ornamental horticulture. Pr.: Hort. 600, 610 or 620.

PLANT PATHOLOGY

(The College of Agriculture section of the Department of Botany and Plant Pathology; see also College of Arts and Sciences.)

STUART M. PADY,* *Head of Department*

Professors Hansing, King, Pady* and Sill;* Associate Professor Dickerson;* Assistant Professors Browder, Burleigh,* Edmunds,* Stuteville* and Willis; Emeritus: Professors Elmer* and Melchers**

UNDERGRADUATE

Plant pathology deals with plant diseases caused by fungi, bacteria, viruses, nematodes, and other agents. Students majoring in plant pathology should enroll in the Curriculum in Agriculture, Agricultural Science option. (See p. 52.) Courses in botany are offered in the Botany section in the College of Arts and Sciences. (See p. 128.)

For a major in plant pathology students should enroll in the Curriculum in Agriculture, Agricultural Sciences. A suggested program of study is outlined on pages 50 and 52.

GRADUATE

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered in the field of plant pathology.

Prerequisite to graduate work is the completion of a four-year curriculum including undergraduate courses in physical and biological sciences suitable for preparing the student for advanced study in this field.

Facilities for advanced study include teaching and research laboratories. Greenhouses and experimental fields of the Agricultural Experiment Station and the U. S. Department of Agriculture are also available. The department awards annually some assistantships to graduate students and employs others on research projects.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 050 400. Plant Pathology.** (2) I (S on demand). An introductory course on the nature, cause, and control of crop diseases. One hour rec. and two hours lab. a week. Pr.: Bot. 210 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 050 600. General Plant Pathology.** (4) I. A study of the fundamental principles and technics of phytopathology, with critical consideration of crop diseases caused by fungi, bacteria, viruses, and nematodes. Two hours rec. and six hours lab. a week. Pr.: Pl. Path. 400 or consent of instructor.
- 050 610. Fungus Diseases of Plants.** (3) II in even years. Major fungus diseases of cereal, forage, fruit, vegetable, and ornamental crops; their causes, life histories, host-parasite relationships, symptoms, and controls. Two hours rec. and three hours lab. a week. Pr.: Pl. Path. 400 or consent of instructor.
- 050 620. General Nematology.** (3) I. The morphology, taxonomy, biology of and technics used in the study of plant parasitic and soil and fresh-

water free-living nematodes. Six hours of combined rec. and lab. a week. Pr.: Pl. Path. 400 or consent of instructor.

050 630. Principles of Plant Disease Control. (3) II in odd years. Methods of control of fungi, bacteria, viruses, and nematodes. Methods included are cultural, physical, biological, chemical, and host resistance. Two hours rec. and three hours lab. a week. Pr.: Pl. Path. 400 or consent of instructor.

050 730. General Virology. (3) II. (Same as Bact. 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 mammalian cell cultures as the host for virus propagation. Pr.: Twelve hours of biological sciences, including Bact. 220 or equiv. and Biochem. 420 or equiv. Consent of instructor. (Taught in cooperation with the Department of Bacteriology.)

050 781. Virus Diseases of Plants. (3) I in even years. Nature, transmission, symptoms, control, and economic importance of plant virus diseases. Two hours rec. and three hours lab. a week. Pr.: Pl. Path. 400 or consent of instructor.

050 790. Problems in Plant Pathology. Credit arranged. I, II, S. Work is offered in plant pathology, plant virology, and plant nematology. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

050 800. Advanced Nematology. (3) II in even years. Emphasis will be on taxonomy, with discussions on the biology, ecology, and physiology of plant parasitic and associated nematodes. Six hours of combined rec. and lab. a week. Pr.: Pl. Path. 620 or consent of instructor.

050 850. Plant Pathological Technic. (3) II in odd years. Technic in methods of isolation, culture, and inoculation used in studying the causal organisms of plant diseases. One hour rec. and six hours lab. a week. Pr.: Pl. Path. 610 or consent of instructor.

050 970. Seminar in Plant Pathology. (1) I, II. Reports in the field of plant pathology. Pr.: Consent of instructor.

050 990. Research in Plant Pathology. Credit arranged. I, II, S. Work is offered in plant pathology, plant virology, and plant nematology. Pr.: Sufficient training to carry on the line of research undertaken.

The Kansas Agricultural Experiment Station

GLENN H. BECK, *Vice President for Agriculture*

FLOYD W. SMITH, *Director*

LOWELL BRANDNER, *Editor*

GILBERT R. DODGE, *Administrative 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; and the McIntire-Stennis Act of 1962.

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 to 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, Agronomy, Animal Husbandry, Bacteriology, Biochemistry, Botany and Plant Pathology, Chemical Engineering, Chemistry, Economics, Entomology, Dairy and Poultry Science, Flour and Feed Milling Industries, Geology and Geography, Home Economics, Horticulture, Nuclear Engineering, Physics, Political Science, Psychology, Statistics, Sociology and Anthropology, Veterinary Medicine, and Zoology.

Research of the various departments is conducted in eight divisions of the Kansas Agricultural Experiment Station. These eight divisions include Animal Sciences, Food Sciences, Home Economics, Pesticides, Plant Sciences, Social Sciences, Soil and Water Sciences and Veterinary Medicine.

An annual budget of nearly \$5 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 five colleges of the University. Interested graduate students are encouraged to seek graduate research assistantships to supplement their graduate study programs.

More than 400 projects covering practically all phases of agriculture are being pursued by members of the station staff. 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 bearing on the development and improvement of rural homes and rural life; area development; human nutrition and family living.

Farms, branch stations, well-equipped laboratories, and scientific equipment are available for the use of experiment station researchers.

Results of research are published in scientific journals, station bulletins, circulars, pamphlets, leaflets, 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 have his name 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.

BRANCH AGRICULTURAL EXPERIMENT STATIONS

FORT HAYS BRANCH STATION

Land occupied by this station is 3,560 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 confined primarily to problems peculiar to the western half of the state where rainfall is limited. They include beef cattle grazing, feeding, and breeding studies; crop improvement, with special emphasis on wheat, sorghum, and grasses; soil management; studies with yellow streak mosaic in wheat; weed control; insects as related to alfalfa seed production; crop production; and agricultural engineering.

GARDEN CITY BRANCH STATION

In 1906, the county commissioners of Finney County purchased 320 acres $4\frac{1}{2}$ miles from Garden City for agricultural experimentation. The land has been leased for 99 years to the Kansas Agricultural Experiment Station. In 1937 and 1939 the state purchased 235 additional acres adjoining the original tract. In 1958 an 80-acre farm was deeded to the Kansas Agricultural Experiment Station by the Garden City Irrigation Company. Investigations in irrigation, dryland farming, dairying, crop improvement, horticultural and specialty crops, and lamb feeding are conducted at this station.

COLBY BRANCH STATION

The Kansas legislature of 1913 provided for a branch experiment station near Colby. It is located 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

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

The 1949 Kansas legislature established a Mound Valley Branch Station. It has been concerned with soil, crop and dairy nutrition studies. A major objective of the station has been the study of the relationship of soil and soil treatments to the quality of the feed produced as measured by the performances of dairy cows.

By virtue of a lease arrangement with the Parsons State Hospital and Training Center, use of an additional 430 acres of land was begun on June 1, 1965. Agronomic experiments have been established at this site. Beef cattle grazing and feeding trials are being planned.

The 1966 legislature consolidated three separate units as the Southeast Branch Station, effective July 1, 1966. As a result, 282 acres of

land situated near Mound Valley, 430 acres near Parsons, and 51 acres near Columbus (formerly the Columbus Experiment Field) will be used as a total unit. Research will include agronomic, beef cattle and dairy experiments.

EXPERIMENT FIELDS AND IRRIGATION DEVELOPMENT FARMS

The Kansas Agricultural Experiment Station includes experiment fields as follows: Southwestern Kansas (Minneola), East-Central Kansas (Ottawa), Sandyland (St. John), South-Central Kansas (Hutchinson), North-Central Kansas (Belleville and Mankato), Southeast Kansas (Che-topa), Newton, Cornbelt (Powhattan), and Northeast Kansas (Wathena).

THE KANSAS WATER RESOURCES RESEARCH INSTITUTE

HYDE S. JACOBS, *Director*

Cooperating with 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. However, the Regents stipulated that Kansas State University and the University of Kansas were to be full partners in the Institute so that maximum benefit would 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 both 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.

The College of Architecture and Design

EMIL C. FISCHER, *Dean*

RICHARD H. MORSE, *Assistant to Dean*

The College of Architecture and Design provides professional study in Architecture, Architectural Structures, Interior Architectural Design, Landscape Architecture, Building Construction and Urban and Regional Planning. The undergraduate and graduate programs are carefully designed to develop understanding and sensitivity for the needs of man and his physical environment. The Curriculum in Architecture is accredited by the National Architectural Accrediting Board.

Men associated with these professions are responsible for the design of our churches, schools, homes, business and public buildings, recreational areas as well as our cities, and require a well-rounded education to equip them to become responsible leaders in their respective professional areas. An outstanding faculty and excellent studio and library facilities provide a stimulating environment for professional development.

The College of Architecture and Design offers the bachelor's degree in each of the following areas:

Architecture—Curriculum on page 93

Architectural Structures—Curriculum on page 94

Interior Architectural Design—Curriculum on page 95

Landscape Architecture—Curriculum on page 96

Building Construction—Curriculum on page 97

General descriptions of these curriculums, course offerings and graduate programs are presented on pages 99-104.

The College of Architecture and Design offers work at the graduate level in Architecture, Architectural Structures and Interior Design leading to the degree Master of Architecture. The graduate degrees Master of Landscape Architecture and Master of Regional Planning are also offered. Additional information on the graduate programs is included under Graduate School, page 37.

HONORS PROGRAM

The Honors Program in the College of Architecture and Design is integrated with similar programs in other Schools and Colleges of the University and provides the eligible student with an excellent opportunity for interdisciplinary study. Students ranked in the top five per cent of entering freshmen and transfer students with superior academic records are eligible to participate. Final approval is based upon an interview with the Assistant to the Dean of the College of Architecture and Design and acceptance of the program by the student.

Participation in the Honors Program will permit students to enroll in Honors Sections of courses, if offered, and participate in a variety of seminars and stimulating discussions in several fields.

SUMMER SCHOOL

Entering freshmen and transfer students will find that many of the courses may be taken during the summer session. This is especially advantageous for those who wish to remove deficiencies in mathematics, physics, or applied mechanics.

Summer work is also offered in Architectural Design, Landscape Architecture, Theory of Structures, and Regional Planning.

Detailed information on specific courses is contained in the Summer School Catalog which may be obtained from the Director of Admissions of Kansas State University.

Curriculum in Architecture

Bachelor of Architecture

FIRST YEAR

FIRST SEMESTER				SECOND SEMESTER					
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>		
Engl.	229	100	Engl. Comp. I	3	Engl.	229	120	Engl. Comp. II	3
Arch.	105	131	Fund. Design I	2	Spch.	281	105	Oral Comm. I	2
Arch.	105	207	Arch. Graph. I	2	Arch.	105	132	Fund. Design II	2
Math.	245	220	Anal. Geom. & Calc. I	4	Arch.	105	208	Arch. Graph. II	2
L. A.	110	100	Landscape Design	3	Hist.	241	111	West. Civ. I	3
Ph. Ed.	261	010	Physical Education	0	Psych.	273	110	Gen. Psych. or	
Arch.	105	110	Arch. Lecture	0	Soc.	277	211	Intro. to Soc.	3
			Elective	2	Ph. Ed.	261	010	Physical Education	0
					Arch.	105	118	Arch. Assembly	0
Total	.....			16	Total	.....			15

SECOND YEAR

Phys.	265	211	Gen. Phys. I	4	Phys.	265	212	Gen. Phys. II	4
Arch.	105	231	Design Analysis	4	Arch.	105	270	Hist. of Arch. I	2
Phil.	241	150	Elem. Logic	3	Arch.	105	232	Prin. Environ. Design	4
			Elective	3	Ap. M.	520	205	Appl. Mech. A	3
Arch.	105	118	Arch. Assembly	0				Elective	3
					Arch.	105	118	Arch. Assembly	0
Total				14	Total				16

THIRD YEAR

Arch.	105	331	Arch. Design I	5	Arch.	105	332	Arch. Design II	5
M. E.	580	406	Air Cond. A	3	Arch.	105	421	Timber Struc.	2
Ap. M.	520	220	Str. of Materials A	3	Arch.	105	320	Theory of Struc. I	3
Ap. M.	520	224	Str. of Matis. Lab.	1	E. E.	550	406	Illumination A	2
Arch.	105	311	Arch. Constr. I	3	Arch.	105	312	Arch. Constr. II	3
Arch.	105	375	Hist. of Arch. II	2	Arch.	105	378	Hist. of Arch. III	2
Arch.	105	118	Arch. Assembly	0	Arch.	105	118	Arch. Assembly	0
Engl.	229	090	English Prof.	0					
Total				17	Total				17

FOURTH YEAR

Arch.	105	341	Arch. Design III	5	Arch.	105	342	Arch. Design IV	5
Arch.	105	422	Theory of Struc. II	4	Arch.	105	428	Theory of Struc. III	4
Arch.	105	335	Bldg. Equip. I	3	Arch.	105	437	Bldg. Equip. II	3
			Elective	3	Arch.	105	413	Environ. Sem.	2
Arch.	105	379	Hist. of Arch. IV	2				Elective	3
Arch.	105	118	Arch. Assembly	0	Arch.	105	118	Arch. Assembly	0
Total				17	Total				17

FIFTH YEAR

Arch.	105	351	Arch. Design V	5	Arch.	105	352	Arch. Design VI	5
Arch.	105	620	City Plng. Prin.	3	Arch.	105	630	City Plng. or	
Arch.	105	536	Prof. Practice	2	Arch.	105	640	Urban Design	3
			Elective	6				Elective	7
Arch.	105	390	Inspection Trip	0	Arch.	105	118	Arch. Assembly	0
Arch.	105	118	Arch. Assembly	0					
Total				16	Total				15

Number of hours required for graduation, 160.

Only four hours of electives may be taken in Basic Military Science.

Select electives from areas of secondary interest listed on page 105.
These need not be taken in order listed in curriculum.

Option in Architectural Structures

Bachelor of Architecture

FIRST YEAR

FIRST SEMESTER					SECOND SEMESTER				
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>		
Engl.	229	100	Engl. Comp. I	3	Engl.	229	120	Engl. Comp. II	3
Chem.	221	210	Chemistry I	5	Chem.	221	230	Chemistry II	3
Math.	245	220	Anal. Geom. & Cal. I	4	Math.	245	221	Anal. Geom. & Cal. II	4
Arch.	105	207	Arch. Graph. I	2	Arch.	105	208	Arch. Graph. II	2
Arch.	105	131	Fund. Design I	2	Arch.	105	132	Fund. Design II	2
Ph. Ed.	261	010	Physical Education	0	Spch.	281	105	Oral Comm. I	2
Arch.	105	110	Arch. Lecture	0	Ph. Ed.	261	010	Physical Education	0
					Arch.	105	118	Arch. Assembly	0
Total	.....			16	Total	.....			16

SECOND YEAR

Phys.	265	310	Engg. Phys. I	5	Phys.	265	311	Engg. Phys. II	5
Math.	245	222	Anal. Geom. & Cal. III	4	Math.	245	240	Series & Diff. Equa. ..	4
Econ.	225	110	Economics I	3	Ap. M.	520	305	Statics	3
Arch.	105	231	Design Analysis	4	Arch.	105	232	Prin. Environ. Design ..	4
Arch.	105	118	Arch. Assembly	0	Arch.	105	118	Arch. Assembly	0
Total				16	Total				16

THIRD YEAR

Ap. M.	520	415	Mech. of Materials	3	C. E.	530	331	Anal. Stat. Det. Str.	3
Math.	520	418	Mech. of Matls. Lab. ..	1	Arch.	105	421	Timber Struc.	2
Arch.	105	311	Arch. Constr. I	3	Arch.	105	312	Arch. Constr. II	3
Ap. M.	520	412	Dynamics	3	Arch.	105	332	Arch. Design II	5
Arch.	105	331	Arch. Design I	5	G. E.	560	350	Engg. Materials	2
Arch.	105	118	Arch. Assembly	0	G. E.	560	351	Engg. Materials Lab. ..	1
			Elective	2	Arch.	105	118	Arch. Assembly	0
					Engl.	229	090	English Prof.	0
Total				17	Total				16

FOURTH YEAR

C. E.	530	332	Struct. Analysis II	3	Arch.	105	422	Theory of Struc. II	4
C. E.	530	422	Soil Mech. I	3	M. E.	580	406	Air Cond. A	3
Arch.	105	335	Bldg. Equip. I	3	Arch.	105	437	Bldg. Equip. II	3
Arch.	105	301	Apprec. of Arch.	3	C. E.	530	426	Foundations	3
			Elective	3	Arch.	105	413	Envir. Sem.	2
Arch.	105	118	Arch. Assembly	0	Arch.	105	118	Arch. Assembly	0
Total				15	Total				15

FIFTH YEAR

Arch.	105	428	Theory of Struc. III	4	Arch.	105	680	Theory of Struc. IV	4
E. E.	550	406	Illumination A	2	Arch.	105	391	Senior Project	3
Arch.	105	445	Constr. Prob. I	3	Arch.	105	446	Constr. Prob. II	3
Arch.	105	536	Prof. Practice	2				Elective	6
			Elective	6	Arch.	105	118	Arch. Assembly	0
Arch.	105	118	Arch. Assembly	0					
Total				17	Total				16

Number of hours required for graduation, 160.

Only four hours of electives may be taken in Basic Military Science.
 Select electives from areas of secondary interest listed on page 105.
 These need not be taken in order listed in curriculum.

Option in Interior Architectural Design*Bachelor of Architecture***FIRST YEAR**

FIRST SEMESTER				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	229 100	Engl. Comp. I	3	Engl.	229 120	Engl. Comp. II	3
Arch.	105 131	Fund. Design I	2	C. & T.	610 240	Int. Design I	2
Arch.	105 207	Arch. Graph. I	2	Arch.	105 132	Fund. Design II	2
L. A.	110 100	Landscape Design	3	Arch.	105 208	Arch. Graph. II	2
		Elective	3	Hist.	241 111	Western Civ. I	3
Spch.	281 105	Oral Comm. I	2	Psych.	273 110	Gen. Psych. or	
Ph. Ed.	261 010	Physical Education	0	Soc.	277 211	Intro. to Soc.	3
Arch.	105 110	Arch. Lecture	0	Ph. Ed.	261 010	Physical Education	0
				Arch.	105 118	Arch. Assembly	0
Total			15	Total			15

SECOND YEAR

Phys.	265 211	Gen. Phys. I	4	M. L.	253 135	French II	3
M. L.	253 131	French I	3	Arch.	105 270	Hist. of Arch. I	2
Arch.	105 231	Design Analysis	4	Arch.	105 232	Prin. Environ. Des.	4
Phil.	241 150	Elem. Logic	3	Econ.	225 110	Economics I	3
C. & T.	610 340	Int. Design II	3	Phys.	265 212	Gen. Phys. II	4
Arch.	105 118	Arch. Assembly	0	Arch.	105 118	Arch. Assembly	0
Total			17	Total			16

THIRD YEAR

Arch.	105 331	Arch. Design I	5	Arch.	105 332	Arch. Design II	5
C. & T.	610 260	Textiles	3	I. E.	570 212	Woodworking II	2
I. E.	570 212	Woodworking I	2	M. E.	580 406	Air Cond. A	3
Arch.	105 311	Arch. Constr. I	3	Arch.	105 312	Arch. Constr. II	3
Arch.	105 375	Hist. of Arch. II	2	Arch.	105 378	Hist. of Arch. III	2
Engl.	229 090	English Prof.	0			Elective	2
Arch.	105 118	Arch. Assembly	0	Arch.	105 118	Arch. Assembly	0
Total			15	Total			17

FOURTH YEAR

Arch.	105 481	Int. Arch. Des. I	4	Arch.	105 482	Int. Arch. Des. II	4
I. E.	570 312	Finishing	3	B. A.	305 440	Marketing	3
E. E.	550 406	Illumination A	2	Arch.	105 413	Environ. Sem.	2
		Elective	5	C. & T.	610 645	Hist. of Furn. Des.	3
Arch.	105 379	Hist. of Arch. IV	2	Arch.	105 437	Bldg. Equip. II	3
Arch.	105 118	Arch. Assembly	0			Elective	2
				Arch.	105 118	Arch. Assembly	0
Total			16	Total			17

FIFTH YEAR

Arch.	105 581	Int. Arch. Des. III	5	Arch.	105 582	Int. Arch. Des. IV	5
Arch.	105 536	Prof. Practice	2	Arch.	105 583	Contem. Furn. Design ..	4
C. & T.	610 600	Adv. Design	2			Elective	7
		Elective	7	Arch.	105 118	Arch. Assembly	0
Arch.	105 390	Inspection Trip	0				
Arch.	105 118	Arch. Assembly	0				
Total			16	Total			16

Number of hours required for graduation, 160.

Only four hours of electives may be taken in Basic Military Science.
 Select electives from areas of secondary interest listed on page 105.
 These need not be taken in order listed in curriculum.

Curriculum in Landscape Architecture

Bachelor of Landscape Architecture

FIRST YEAR

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
L. A.	110 100	Landscape Design	3	Arch.	105 208	Arch. Graphics II	2
Arch.	105 207	Arch. Graphics I	2	Arch.	105 132	Fund. Design II	2
Arch.	105 131	Fund. Design I	2	Engl.	229 120	Engl. Comp. II	3
Engl.	229 100	Engl. Comp. I	3	Hist.	241 111	Hist. Western Civ.	3
Bot.	217 210	Gen. Botany	4	Math.	245 150	Plane Trigonometry	3
Ph. Ed.	261 010	Physical Education	0	Soc.	277 211	Intro. to Soc.	3
L. A.	110 301	Landscape Sem.	0	Ph. Ed.	261 010	Physical Education	0
		Elective	2	L. A.	110 301	Landscape Sem.	0
Total	.....		16	Total	.....		16

SECOND YEAR

Phys.	265 211	Gen. Phys. I	4	Arch.	105 232	Prin. Environ. Design	4
Arch.	105 231	Design Anal.	4	C. E.	530 213	Plane Survey	3
		Elective	2	Hort.	040 270	Plant Matls. II	3
Hort.	040 260	Plant Matls. I	3	Geog.	234 207	Int. Phys. Geog.	4
Phil.	241 150	Elem. Logic	3	Spch.	281 105	Oral Comm. I	2
L. A.	110 301	Landscape Sem.	0	L. A.	110 301	Landscape Sem.	0
Total	.....		16	Total	.....		16

THIRD YEAR

L. A.	110 471	Land. Constr. I	3	L. A.	110 472	Land. Constr. II	3
L. A.	110 361	Elem. Land. Arch. I ..	4	L. A.	110 362	Elem. Land. Arch. II	4
L. A.	110 381	Hist. & Th. Land. Arch.	3	Arch.	105 312	Arch. Constr. II	3
Arch.	105 311	Arch. Constr. I	3	Hort.	040 600	Landscape Hort.	3
B. A.	105 325	Bus. Law I	3			Elective	2
L. A.	110 301	Landscape Sem.	0	Arch.	105 413	Environ. Sem.	2
Engl.	229 090	English Prof.	0	L. A.	110 301	Landscape Sem.	0
Total	.....		16	Total	.....		17

FOURTH YEAR

L. A.	110 473	Land. Constr. III	3	L. A.	110 462	Elem. Land. Arch. IV	4
L. A.	110 461	Elem. Land. Arch. III	4	L. A.	110 443	Pltg. Design II	3
L. A.	110 442	Pltg. Design I	3	L. A.	110 420	Community Planning ..	3
Soc.	277 531	Urban Soc.	3			Elective	6
		Elective	3	L. A.	110 301	Landscape Sem.	0
L. A.	110 301	Landscape Sem.	0				
Total	.....		16	Total	.....		16

FIFTH YEAR

L. A.	110 561	Land. Arch. Design I	5	L. A.	110 562	Land. Arch. Design II	5
L. A.	110 585	Des. Parks Rec.	3	L. A.	110 599	Sen. Proj. Land. Arch.	3
L. A.	110 444	Pltg. Design III	3	L. A.	110 591	Prof. Practice	2
Arch.	105 620	City Planning Prog.	3			Elective	5
		Elective	2	L. A.	110 301	Landscape Sem.	0
L. A.	110 301	Landscape Sem.	0				
Total	.....		16	Total	.....		15

Number of hours required for graduation, 160.

Only four hours of electives may be taken in Basic Military Science.
 Select electives from areas of secondary interest listed on page 105.
 These need not be taken in order listed in curriculum.

Curriculum in Building Construction

B. S. in Building Construction

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	229 100	Engl. Comp. I	3	Engl.	229 120	Engl. Comp. II	3
Math.	245 220	Anal. Geom. & Calc. I	4	C. E.	530 213	Plane Survey	3
Spch.	281 105	Oral Comm. I	2	Arch.	105 208	Arch. Graph. II	2
Arch.	105 207	Arch. Graph. I	2	Phys.	265 211	Gen. Phys. I	4
		Elective	3	Econ.	225 110	Economics I	3
Ph. Ed.	261 010	Physical Education	0	Ph. Ed.	261 010	Physical Education	0
Arch.	105 110	Arch. Lecture	0	Arch.	105 118	Arch. Assembly	0
						Elective	2
Total			14	Total			17

SOPHOMORE

Phys.	265 212	Gen. Phys. II	4	Arch.	105 312	Arch. Constr. II	3
Arch.	105 311	Arch. Constr. I	3	Ap. M.	520 205	Appl. Mech. A	3
B. A.	405 325	Business Law I	3	B. A.	405 301	Office Management	3
B. A.	405 273	Prin. of Accounting	3	Geol.	234 100	Gen. Geology	3
		Elective	3			Elective	5
Arch.	105 118	Arch. Assembly	0	Arch.	105 118	Arch. Assembly	0
Total			16	Total			17

JUNIOR

Ap. M.	520 220	Str. of Materials A	3	Arch.	105 421	Timber Struc.	2
Ap. M.	520 224	Str. of Matls. A Lab.	1	Arch.	105 320	Theory of Struc. I	3
M. E.	580 406	Air Cond. A	3	E. E.	550 406	Illumination A	2
Arch.	105 301	Apprec. Arch.	3	Arch.	105 437	Bldg. Equip. II	3
Arch.	105 335	Bldg. Equip. I	3	Math.	245 350	Computing Techniques ..	2
Stat.	285 320	El. Statistics	3			Elective	4
Arch.	105 118	Arch. Assembly	0	Arch.	105 118	Arch. Assembly	0
Total			16	Total			16

SENIOR

Arch.	105 422	Theory of Struc. II	4	Arch.	105 413	Environ. Sem.	2
Arch.	105 445	Constr. Prob. I	3	Arch.	105 428	Theory of Struc. III ..	4
Econ.	225 620	Labor Econ.	3	Arch.	105 446	Constr. Prob. II	3
Arch.	105 536	Prof. Practice	2	Arch.	105 391	Senior Project	3
		Elective	5			Elective	5
Arch.	105 118	Arch. Assembly	0	Arch.	105 118	Arch. Asesmby	0
Total			17	Total			17

Number of hours required for gradnation, 130.

Only four hours of electives may be taken in Basic Military Science.

Select electives from areas of secondary interest listed on page 105.
These need not be taken in order listed in curriculum.

ARCHITECTURE

EMIL C. FISCHER,* *Chairman of Curriculum*

Professors Chadwick, Fischer,* Heintzelman,* Helm,* Krider,* Thorson* and Wright;* Associate Professors Blackman, Chang,* Christensen,* Deines,* Durgan* and Miller;* Assistant Professors Cool, Hall,* Lippenberger, McGraw,* Melaragno,* Morse,* Sanner,* Slack* and Weisenburger; Instructors Butke, Claycamp, Lay, Rowland and Wendt; Adjunct Professor Shaver; Emeritus: Professor Weigel*

For Curriculums, see pages 93-97

The Curriculum in Architecture prepares students to design all types of buildings. Design problems include residences, governmental and business buildings, schools and churches. A carefully integrated sequence of courses and individual guidance in the design laboratories encourage students to develop creative solutions for these problems. Instruction stresses not only aesthetic considerations but also the proper integration of structure and mechanical equipment.

The curriculum includes courses that develop a student's facility to prepare sketches, contractors' drawings, specifications and structural designs in wood, steel, and concrete.

The Architectural Structures option is offered for the student particularly interested in the design and integration of the mechanical, electrical, and structural systems and equipment in buildings. After thorough instruction in basic mathematics and science, the student applies these principles to structural problems, related equipment, and service problems found in buildings.

Advanced students in Architectural Structures maintain close cooperation with students in the Architectural Curriculum to develop the proper team approach and assure the integration of all the elements necessary for the development of a proper physical environment.

Students in the Interior Architectural Design option are concerned with problems of design related directly to this specialization. After a thorough introduction in basic design, students develop studio exercises involving the design and detailing of interior spaces. The sequence of courses includes problems integrating acoustical considerations, illumination, and mechanical equipment with materials and spatial design. This curriculum is offered for those desiring to specialize in this particular aspect of design.

All student drawings and designs may be retained by the College of Architecture and Design at the discretion of the faculty.

These undergraduate curriculums terminate with the Bachelor of Architecture degree. Graduates enter the architectural profession and practice their various specialties in private practice, public service, or in association with large contractors, engineers, or manufacturers of building products.

The Building Construction Curriculum is designed to prepare graduates for one of the many phases of the construction industry. Instruction includes an introduction to the preparation of architects' drawings, a thorough grounding in structures, business practices and techniques related directly to building. Courses in office management, material storage and procurement, layout, forming and scaffolding, estimating and organization techniques prepare the student for positions as construction superintendents, office managers, estimators and related positions with large contractors. This curriculum terminates with the degree Bachelor of Science in Building Construction.

Students are encouraged to secure practical experience, during the summer vacation, either on construction projects or in the offices of architects, engineers, or contractors.

Within each curriculum, there are several hours reserved for "electives." Each student is encouraged to include a block of courses in one of several related areas of study. These areas of secondary interest are listed on page 105.

Graduate Work:

The degree Master of Architecture is offered in Architectural Design,

Architectural Structures and Interior Architectural Design and is available to students holding a bachelor's degree from a recognized college or university with an undergraduate program substantially equivalent to that at this University.

Facilities for graduate work include a well-equipped library of architectural reference material, a large slide collection, exhibition gallery, and well-lighted design studios.

COURSES IN ARCHITECTURE

FOR UNDERGRADUATE CREDIT

- 105 110. Architectural Lectures.** (0) I. Presentation and discussion of the professions of Architecture, Architectural Engineering, Landscape Architecture and Regional Planning. One hour lec. a month. The dean, members of the faculty, and representatives of the above professions will present the lectures.
- 105 118. Architectural Assembly.** (0) I, II. Presentation of professional problems and practices by students, faculty, architects, and various organizations associated with the building industry. One hour lec. a month.
- 105 131. Fundamentals of Design I.** (2) I, II. Exercises in three-dimensional visualization and expression related to spatial organization in Architecture and Landscape Architecture. Six hours lab. a week.
- 105 132. Fundamentals of Design II.** (2) I, II. Cont. of Arch. 131. Experiments and exercises related to the effect of color on spatial design in Architecture and Landscape Architecture. Six hours lab. a week. Pr.: Arch. 131.
- 105 205. Domestic Architecture.** (2) I, II. A study of the design and planning problems of the small home. Two hours rec. a week. An elective course intended for students not enrolled in the College of Architecture and Design.
- 105 207. Architectural Graphics I.** (2) I, II. Introduction to architectural drawing; preparation for visualizing and graphically presenting subsequent drawing and design problems; emphasis placed on proper use of instruments, lettering, analyzing, and recording architectural ideas accurately. Six hours lab. a week. Pr.: Plane Geometry.
- 105 208. Architectural Graphics II.** (2) I, II. Introduction of third dimensional aspect in drawing—perspective, shades, and shadows. Six hours lab. a week. Pr.: Arch. 207 or equiv.
- 105 231. Design Analysis.** (4) I, II. Exercises in the analysis and synthesis of design principles related to three-dimensional spatial concepts. Problems include experiments demonstrating the effect of color, texture, materials and structure on the organization of space in Architecture and Landscape Architecture. Twelve hours lab. a week. Pr.: Arch. 132.
- 105 232. Principles of Environmental Design.** (4) I, II. Exercises emphasizing a creative approach to the design of architectural spaces. Problems involve an analysis of the interaction of man's functional, material and aesthetic needs in Architecture and Landscape Architecture. Twelve hours lab. a week. Pr.: Arch. 231.
- 105 270. History of Architecture I.** (2) II. Pre-classical and classical architecture and allied arts. Two hours rec. a week.
- 105 301. Appreciation of Architecture.** (3) I, II. 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 architectural curriculum.
- 105 311. Architectural Construction I.** (3) I, II. Study of the technology of building materials and their assembly. Nine hours lab. a week.

- 105 312. Architectural Construction II.** (3) I, II. Cont. of Arch. 311 applied to the production of a complete set of working drawings of a building. Nine hours lab. a week. Pr.: Arch. 311.
- 105 320. Theory of Structures I.** (3) I, II. Bar stresses in trusses; solid and framed arches; mathematical and graphical solutions of stresses and deflections in beams under static and moving loads. Three hours rec. a week. Pr.: Ap. M. 224.
- 105 331. Architectural Design I.** (5) I, II. Discussion and analysis of simple building types relating the principles of environmental technology to man's needs. Faculty evaluation of graphical presentations. Fifteen hours lab. a week. Pr.: Arch. 232.
- 105 332. Architectural Design II.** (5) I, II. Cont. of Arch. 331. Fifteen hours lab. a week. Pr.: Arch. 331.
- 105 335. Building Equipment I.** (3) I. Sanitation, hot and cold water supply, plumbing, drainage, venting, sewage disposal, vertical transportation and hardware relating to all types of buildings; design problems. Two hours rec. and three hours lab. a week. Pr.: Five hours Arch. 430; Gen. Phys. 212 or Engg. Phys. 311.
- 105 341. Architectural Design III.** (5) I, II. Cont. of Arch. 332. Discussion and analysis of more complicated building types. Faculty evaluation of graphical presentations. Fifteen hours lab. a week. Pr.: Arch. 320, 332, 421.
- 105 342. Architectural Design IV.** (5) I, II. Cont. of Arch. 341. Fifteen hours lab. a week. Pr.: Arch. 320, 341, 421, 422.
- 105 351. Architectural Design V.** (5) I, II. Discussion and analysis of urban building groups, site planning and integration of all facets of environmental technology and structural systems. Fifteen hours lab. a week. Pr.: Arch. 320, 342, 421, 422, 428.
- 105 352. Architectural Design VI.** (5) I, II. Thesis—programming, development and presentation of a complete building including the mechanical, acoustical and structural problems that influence the design. Fifteen hours lab. a week. Pr.: Arch. 351.
- 105 366. Problems in Architectural Design.** Credit arranged. S. Study of specific design problems under the direct supervision of a member of the architectural faculty. Pr.: Approval of instructor.
- 105 375. History of Architecture II.** (2) I. Medieval architecture and allied arts. Two hours rec. a week.
- 105 378. History of Architecture III.** (2) II. Renaissance architecture and allied arts. Two hours rec. a week.
- 105 379. History of Architecture IV.** (2) I. Cont. of Arch. 278 through modern architecture and allied arts. Two hours rec. a week. Pr.: Arch. 378.
- 105 390. Inspection Trip.** (0) Required. I. An inspection trip is made to one of the larger cities of the Middle West by the senior students in architectural engineering and the fourth-year students in architecture. The inspection party is under the charge of one or more faculty members of the College of Architecture and Design. Time allotted to the trip is from three days to one week.
- 105 391. Senior Project.** (3) II. Student working individually with laboratory support will prepare and present a thesis of appropriate scope and complexity and be required to defend the thesis before a selected jury. Nine hours lab. a week. Pr.: Terminal sem.
- 105 399. Honors Seminar in Architecture.** Credit arranged. On sufficient demand. Selected topics in architecture and engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 105 413. Environmental Seminar.** (2) II. A discussion of the influence of Environmental Technology upon design concepts. Two hours rec. a week. Pr.: Approval of instructor.

- 105 421. Timber Structures.** (2) I, II. Analysis and design of timber structures using solid and laminated materials. Two hours rec. a week. Pr.: Ap. M. 224 or 415. Pr. or conc.: Arch. 320 or C. E. 330.
- 105 422. Theory of Structures II.** (4) I, II. Analysis and design of metal structures; emphasis on buildings. Two hours rec. and six hours lab. a week. Pr.: Arch. 320, 421.
- 105 428. 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. Two hours rec. and six hours lab. a week. Pr.: Ap. M. 224.
- 105 437. Building Equipment II.** (3) II. Fundamentals of architectural acoustics, transmission loss, auditorium acoustics, noise control; design problems. Two hours rec. and three hours lab. a week. Pr.: Five hours Arch. 430; Gen. Phys. 212 or Engg. Phys. 311.
- 105 445. Construction Problems I.** (3) I. The solution of practical problems normally encountered in the erection of buildings, layouts, design of form work and scaffolding; material storage and handling; job organization demonstrations, research and drawings. Nine hours lab. a week. Pr.: Arch. 311.
- 105 446. Construction Problems II.** (3) II. Construction methods and estimating; material quantities, estimating, builder's organization and procedure, job records, builder's liability, labor relations and safety. Nine hours lab. a week. Pr.: Arch. 312, 445.
- 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. Six hours lab. a week. Pr.: Arch. 202 and 222, or approval of instructor.
- 105 475. Problems in Architectural Presentation.** Credit arranged. 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.
- 105 481. Interior Architectural Design I.** (5) I. Discussion and analysis of spaces of various simple building types; emphasis on selection and application of materials for specific uses; graphical presentation of their spatial relationship. Fifteen hours lab. a week. Pr.: Arch. 332.
- 105 482. Interior Architectural Design II.** (5) II. Cont. of Arch. 481. Discussion and analysis of more complicated spaces; relation of interior-exterior and vertical-horizontal spaces; graphical presentation of these problems. Fifteen hours lab. a week. Pr.: Arch. 481.
- 105 536. Professional Practice.** (2) I, II. The preparation of building documents; interpretation of building codes and analysis of A. I. A. documents; office organization, client and contractor relationships. Two hours rec. a week. Pr.: Arch. 312 and senior classification.
- 105 581. Interior Architectural Design III.** (5) I. Discussion and analysis of spaces from the 15th century to the present; the characteristics of period design as related to the need and technological development of the time; graphical presentation of historical examples. Fifteen hours lab. a week. Pr.: Arch. 482.
- 105 582. Interior Architectural Design IV.** (5) II. Analysis, development and presentation of complex spatial organization integrating such factors as sound control, mechanical equipment, and lighting; problems coordinated with Arch. 342. Fifteen hours lab. a week. Pr.: Arch. 581.
- 105 583. Contemporary Furniture Design.** (4) II. Student will develop studies, models and technical drawings of furniture for various building types. Problems will include the coordination of materials, design and structural techniques. Availability of shops will permit the development of full-scale projects. Twelve hours lab. a week. Pr.: Arch. 312, I. E. 212 and 312.

- 105 680. Theory of Structures IV.** (4) I. Cont. of Theory III, with special emphasis being placed on the complete problem of the structure as a whole. Three hours rec. and three hours lab. a week. Pr.: Arch. 428.
- 105 765. Problems in Architecture.** Credit arranged. I, II, S. Under direct supervision of some member of the departmental staff; study of specific architectural problems. Pr.: Approval of instructor.

FOR GRADUATE CREDIT

- 810. Research in Architecture.** Credit arranged. I, II, S. Original investigation or advanced study in architectural design, planning, industrial design, and related fields. Pr.: Approval of instructor.
- 825. Advanced Architectural Design.** Credit arranged. I, II, S. A study of important buildings and groups of buildings. May furnish material for the master's thesis. Pr.: Arch. 352.

LANDSCAPE ARCHITECTURE

ROBERT P. EALY,* *Chairman of Curriculum*

Professor Ealy, Associate Professor Parks,* Assistant Professor Day,* Professor Emeritus Quinlan*

The degree Bachelor of Landscape Architecture is conferred upon those who successfully complete this course of study at Kansas State University. The curriculum is designed to prepare students for the field of professional landscape architecture and is a carefully balanced program drawing from several related areas. Special emphasis is placed upon space organization, land planning, topographical manipulation, landscape planning and construction, and the role of adapted plant materials in the landscape. Field trips may be required of students in all courses numbered 361 and above.

The Curriculum in Landscape Architecture is accredited by the American Society of Landscape Architects.

Graduates may be employed by professional firms of landscape architects, and by municipal, state and national governmental agencies working with housing, parks, highways and other land-planning areas. Many graduates later establish their own professional offices and some enter the teaching field. Others go on to do graduate work in landscape architecture or city and regional planning.

Graduate Work:

The degree Master of Landscape Architecture is available to those holding a bachelor's degree from a recognized college or university with an undergraduate program substantially equivalent to the program in landscape architecture at this University.

COURSES IN LANDSCAPE ARCHITECTURE

FOR UNDERGRADUATE CREDIT

- 110 100. Landscape Design.** (3) I, S. An introductory course in the fundamental principles of landscape design, and an appreciation of man's natural environment. Three hours rec. a week.
- 110 301. Landscape Seminar.** (0-1) I, II. Required of all juniors and seniors. Meets second and fourth Thursday of each month. Discussion of current trends in landscape architecture and related fields by students, faculty, and invited speakers. (May not receive more than one hour total credit.)
- 110 361. Elements of Landscape Architecture I.** (4) I. Graphic expression of landscape architectural site developments; emphasis on site analysis, program analysis and the resultant development of concept as a point of departure in landscape architectural design. Twelve hours lab. a week. Pr.: L. A. 100, Arch. 232.
- 110 362. Elements of Landscape Architecture II.** (4) II. Cont. of L. A. 361. Twelve hours lab. a week. Pr.: L. A. 471.

- 110 381. History and Theory of Landscape Design.** (3) I. Economic and aesthetic theory of landscape design; history and historic styles. Three hours rec. a week. Pr.: L. A. 100.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 110 420. Community Planning.** (3) II. Offered in 1963-64 and alt. years. Growth and development of cities and towns, land subdivision. One hour rec. and six hours lab. a week.
- 110 440. Problems in Landscape Design.** Credit arranged. I, II, S. Assigned problems and reports in the area of landscape architecture. Pr.: Junior classification.
- 110 442. Planting Design I.** (3) I. Use of plants as design elements in landscape architectural developments; preparation of sketches and plans. Nine hours lab. a week. Pr.: Hort. 260 and 270, Arch. 232.
- 110 443. Planting Design II.** (3) II. Cont. of L. A. 442. Nine hours lab. a week. Pr.: L. A. 442.
- 110 444. Planting Design III.** (3) I. Preparation of planting plans and their use as working drawings; specification writing, contractor relationships and maintenance procedures. Nine hours lab. a week. Pr.: L. A. 443.
- 110 461. Elements of Landscape Architecture III.** (4) I. Investigations of more complex site developments, with emphasis on the interrelations among land form, simple structures and man. Twelve hours lab. a week. Pr.: L. A. 362 and 472.
- 110 462. Elements of Landscape Architecture IV.** (4) II. Cont. of L. A. 461. Annual field trip required. Twelve hours lab. a week. Pr.: L. A. 461 and 473.
- 110 471. Landscape Construction I.** (3) I. Field problems in topographic expression; preparation of site and grading plans; earthwork and utilities. Two hours rec. and seven hours lab. a week. Pr.: Arch. 208, C. E. 213, L. A. 100, and Phys. 211.
- 110 472. Landscape Construction II.** (3) II. Cont. of L. A. 471. Two hours rec. and seven hours lab. a week. Pr.: L. A. 471.
- 110 473. Landscape Construction III.** (3) I. Preparation of construction details; estimates and specifications for landscape architectural site developments. Two hours rec. and seven hours lab. a week. Pr.: L. A. 472.
- 110 561. Landscape Architectural Design I.** (5) I. Design and development of large-scale sites, with emphasis on massing studies of all the elements of the landscape and their relation to health, welfare and safety of, and enjoyment by man. Fifteen hours lab. a week. Pr.: L. A. 420, 443, 462 and 473.
- 110 562. Landscape Architectural Design II.** (5) II. Cont. of L. A. 561. Annual field trip required. Fifteen hours lab. a week. Pr.: L. A. 561.
- 110 585. Design of Parks and Recreation Areas.** (3) I, II. Site planning of national, state, municipal and private parks and specialized recreation areas. Pr.: L. A. 462 and 473.
- 110 591. Professional Practice.** (2) II. Ethics, office practice and procedure, contracts and specifications. A professional resume is required. Two hours rec. a week. Pr.: Fifth-year classification.
- 110 599. Senior Project in Landscape Architecture.** (3) I, II, S. Investigation of a landscape architectural problem of regional significance. Designed as a terminal course for landscape architecture majors. Studio time by appointment. Pr.: Fifth-year classification.
- 110 741. Landscape Architecture Problems.** Credit arranged. I, II, S. Specific problems and/or reports in the area of landscape architecture. Pr.: Advanced undergraduate standing or graduate standing.

FOR GRADUATE CREDIT

- 110 870. Advanced Landscape Architecture.** (1-3) I, II, S. Special studies and designs in advanced landscape architecture. Pr.: L. A. 771, eight hours.
- 110 880. Advanced Landscape Construction.** (1-3) I, II, S. Specialized study of large-scale landscape planning involving landscape construction and grading. Pr.: L. A. 721, six hours.
- 110 890. Research in Landscape Architecture.** Credit arranged. 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.

GRADUATE CURRICULUM IN REGIONAL PLANNING

VERNON DEINES, *Chairman of Curriculum*

*Associate Professor Deines; * Assistant Professors McGraw* and Weisenburger; Instructor Rowland*

Regional planning applies intelligent foresight to the development of the physical environment in cities, regions, states, and the nation. This encompasses both the understanding of urban environment, primarily known as city planning, as well as the recognition of economic and social forces of area development. Professional planners prepare plans and policies to guide community and regional growth. The design principles of architecture, landscape architecture, and civil engineering are combined with the analysis techniques of the social sciences, such as sociology, government, and economics. Planners have the overall responsibility for both functional efficiency and aesthetic beauty.

Since 1945, rapidly increasing awareness of the problems of urban growth has created a shortage of professionally trained planners. Some positions have had to be filled by professionals from allied fields. More responsible positions require professional training. Graduate planners serve as staff members or directors of city, regional, metropolitan and state planning agencies, conduct the planning phases of urban renewal, transportation, and economic development studies, practice as planning consultants in these fields, as well as advising private industry in the planning of large-scale projects from urban redevelopment to the construction of entire new communities.

COURSES IN REGIONAL PLANNING

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 105 620. City Planning Principles.** (3) I, II. Basic alternate forms of city growth; standard proportions of land uses; efficient physical patterns of major land uses including industrial, commercial, residential. Planning in stages, use of successively finer scale. Zoning, subdivisions and urban renewal. Metropolitan planning procedures. Pr.: Approval of instructor.
- 105 630. City Planning.** (3) I, S. Investigations of the fundamentals of planned urban growth, change or redevelopment, including the inter-relationships of residential, commercial, industrial, recreational, transportation, governmental, social, political, geographic and other factors involved in short-range and long-range planning. One hour lec. and six hours lab. a week. Pr. or conc.: Arch. 620.
- 105 640. Urban Design.** (3) II. Studio and field investigations in site planning; building complexes; large-scale design of residential, commercial, industrial and public facilities; urban redevelopment; design relationships in city planning. Nine hours lab. a week. Pr. or conc.: Arch. 620.
- 105 650. Subdivisions and Housing.** (3) II. Subdivision control, principles of subdivision layout, development of large-scale housing projects.

Studies of clusters and major groupings. Redesign of renewal areas. One hour rec. and six hours lab. a week. Pr.: Competence in graphical techniques and approval of instructor.

FOR GRADUATE CREDIT

- 105 801. Regional Planning I.** (3) I, II, S. Types of regions; concepts and research methodologies for regional analysis; lectures and lab. exercises in projection of region's economic structure, labor composition and social composition; bill of requirements for physical development, land construction and social overhead. One hour lec. and six hours lab. a week. Pr.: Approval of instructor.
- 105 802. Regional Planning II.** (3) I, II, S. Spatial organization and optimum arrangement; locations of economic activities related to resources, transportation, market, microgeography; lectures and laboratory exercises in the development of optimum locational patterns of economic installations and urbanization related to present centers and infrastructure; program, stages, costs, roles of various governments, industries and communities. One hour lec. and six hours lab. a week. Pr.: Approval of instructor.
- 105 808. Internship in Planning.** (3) I, II, S. Assignment to a planning staff for a period of at least 10 weeks. Supervision by a professional planner. Periodic reports supplemented by reading assignments under direction of faculty. Pr.: Approval of instructor.
- 105 816. Advanced Planning Theory.** (3) I, II. Case study and analysis of concepts and trends in urban and regional planning and development. Theories and administrative practice in housing, urban renewal, planning assistance, capital budgeting, transportation planning, open space preservation, flood damage prevention, and related topics. Pr.: Arch. 620.
- 105 875. Planning Legislation and Regulation.** (3) I, II. Basic state enabling legislation for urban, metropolitan and regional planning, zoning, subdivision regulation, urban renewal and housing codes; federal assistance and planning guides; local interagency relationships. Pr.: Approval of instructor.
- 105 899. Research in Planning.** Credit arranged. I, II, S. Original investigations and report writing under the direction of a staff member in urban and regional planning, housing, or urban renewal. Pr.: Approval of instructor.

Students in Architecture and Design are encouraged to select their electives from one or two of the areas of secondary interest listed below. A complete list of recommended courses in each area is maintained by the college office and each adviser.

Art
Art History
Business Administration
English
Geology and Geography
History
Humanities

Landscape Architecture
Modern Language
Philosophy
Regional Planning
Psychology
Sociology and Anthropology

The College of Arts and Sciences

JOHN CHALMERS, *Dean*

WILLIAM L. STAMEY, *Associate Dean*

ORVAL EBBERTS, *Assistant Dean*

MARJORIE ADAMS, *Assistant Dean*

JOHN P. MURRY, *Assistant to the Dean*

The College of Arts and Sciences through its 20 departments offers programs of study which enable the student to acquire a broad preparation for life in a democratic society, to obtain a sound basis for his professional training, or to receive training in the specific skills required for service in his chosen field of endeavor.

The courses offered in the College of Arts and Sciences provide the student an opportunity to develop his skill in communication with others, to appreciate the heritage of the past, to understand the laws of nature, to participate in the arts, and to maintain a healthy body. Courses in specific subject matter provide the professional training for scientists, research workers, teachers, technicians, and writers.

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 the student in high school and an evaluation of his 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.

The College of Arts and Sciences offers all students an opportunity to undertake independent study and thereby to strengthen their capacity for independent judgment. This program provides for independent reading in areas of general interest. The course is:

199. Arts and Sciences. (2) I. Summer reading of selected important books in natural sciences, social sciences, and humanities, and examination in early fall. Pr.: Pre-registration in May to enroll the following fall.

A student in the College of Arts and Sciences may enroll in any one of the following curriculums:

Biological Science	Music
General	Physical Science
Humanities	Social Science

A list of the areas in which a student may major in each of these curriculums together with the degree received is given in the following table. The specific requirements for a degree in the various curriculums are indicated on pages 108-120.

"In each of the curriculums there are requirements in general education that are to be fulfilled by courses chosen by the student in consultation with his adviser. The aim of these requirements is to provide breadth in the student's program 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 natural sciences, social sciences, and humanities."

CURRICULUMS AND MAJORS

CURRICULUM :	Biological Science B. S. ¹	Physical Science B. S. ¹	Humanities B. A. ¹	Social Science B. A. ¹	General B. A. ¹	Education B. S.	Music B. Music
DEGREE :	Bacteriology Biogeography Botany Entomology Psychology Speech Technical Journalism Wildlife Conservation Zoology <i>Pre-Professional</i> Medical Technology Pre-Dentistry Pre-Veterinary	Chemistry Geography Geology Geophysics Mathematics Physics Statistics Technical Journalism	Art English History Mathematics Modern Languages Music Philosophy Speech Statistics	Anthropology Economics Geography History Political Science Psychology Sociology Speech Technical Journalism <i>Pre-Professional</i> Pre-Law	<i>Area</i> Biological Science Humanities Physical Science Social Science <i>Pre-Professional</i> Physical Therapy Pre-Dentistry Pre-Medicine Pre-Law Pre-Nursing ² Pre-Pharmacy ³	Music Education Physical Education	Applied Music
MAJORS AND PRE- PROFESSIONAL PROGRAMS :							

1. 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. (See page 231.)

2. Requirements for a degree to be completed in a professional school of nursing.

3. Requirements for a degree to be completed in a professional school of pharmacy.

CURRICULUM IN BIOLOGICAL SCIENCE

Bachelor of Science

Hours required for graduation, men and women 128

This curriculum is designed for those who are preparing for professional work in bacteriology, botany, entomology, zoology, or related fields. It provides preparation for graduate study, work in an industrial or government laboratory, or teaching.

The major in speech provides the training for those who wish to enter the field of speech therapy. Students who wish to do technical writing in the field of biological science should major in technical journalism in this curriculum.

Major Fields

Bacteriology (p. 126)	Psychology (p. 191)
Botany (p. 128)	Speech (p. 200)
Entomology (p. 78)	Technical Journalism (p. 211)
Fisheries and Wildlife	Zoology (p. 214)
Biology (p. 214)	

Pre-Professional Majors

Medical Technology ¹	Pre-Dentistry ³
Pre-Veterinary ²	

REQUIREMENTS

I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. Physical Education (two semesters).

III. General Education (see page 230): Social science, eight hours; Humanities, eight hours.

IV. Mathematics: College Algebra, three hours; Trigonometry or Elementary Logic, three hours (Pre-Veterinary students take College Algebra only).

V. Biological and Physical Science:

FOR ALL STUDENTS EXCEPT PRE-VETERINARY

Course	Hours	Course	Hours
Genetics or Heredity and Evolution	2-3	General Zoology	4
General Chemistry or Chemistry I ⁴	5	General Organic Chemistry	5
Botany ⁵	4	General Botany ⁷	4
Microbiology ⁶ or Biology of Bacteria	4-5	General Entomology ⁷	3
General Geology or Geography elective	3	Physics (Introductory courses) ⁴	3-8

1. Medical Technology and Public Health Laboratory Scientists: Fulfillment of the requirements of the Curriculum in Biological Science, including Bact. 220, 610, 670; Chem. 210, 230, 250, 300, 350, 351 and Biochem. 420; geography three hours; Math. 150; Phys. 121; Zool. 425, 626, 627 and 656; and the equivalent of 30 hours credit taken during 12 months study at an approved hospital or laboratory will qualify the individual for a Bachelor of Science degree in four years.

2. Pre-Veterinary: 64 semester hours are required for application to enter the College of Veterinary Medicine. Pre-Veterinary students will fulfill the requirements of the Curriculum in Biological Science, except for the mathematics requirement (Category IV), in which they complete College Algebra only, and for the General Education requirement (Category III) in which they complete 6 hours of social sciences and 6 hours of humanities. Students will substitute for the biological and physical science requirements of that curriculum (Category V) the following courses: Chem. 210, 230, 250, 350, 351; Zool. 200; A. H. 400 or Zool. 646; Phys. 112 or 211 and 212. The Agricultural course requirement may be satisfied by completing A. H. 101 and 111, Dy. Sc. 180 and 190, Pl. Sc. 100 and 101 or by completing A. H. 201 and 202, Dy. Sc. 202, and Pl. Sc. 202. The number of electives allowed will depend on the selection of other courses and may vary from 1 to 8. Upon the satisfactory completion of these courses and those of two years in Veterinary Medicine, the student will be eligible for a Bachelor of Science degree in the College of Arts and Sciences.

3. Pre-Dentistry: Students who choose to enter dental school at the end of the junior year must use the Curriculum in Biological Science leading to the B. S. degree. In addition to fulfilling the requirements of this curriculum, 19-21 hours of course work consisting of Psych. 110; Chem. 230 and 250; Zool. 410 or 425; Engl. 270; and one year's work at an approved dental school must be completed. *Students wishing to qualify for the B. A. degree* must use the four-year General Curriculum, fulfilling all four group requirements (Category VI) and taking 26 semester hours of recommended courses in the physical and biological sciences.

VI. Remaining Hours in Major, Additional Tool and Related Courses, and Free Electives. For these requirements see catalog for appropriate department on the pages indicated above.

Requirements common for both fisheries and wildlife majors are: Stat. 320 and 400, Engl. 416 or Journ. 350, Bot. 690, Agr. 270, Zool. 430 and 660. In addition, Fisheries Biology option; Zool. 630, 671, 691, 693, 694 or Wildlife Biology option; Zool. 610, 675, 685, and Bot. 670. Both options also require 10 hours from a list of electives.

Students in the first year of this curriculum may plan their courses as follows:

ALL STUDENTS EXCEPT PRE-VETERINARY

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Chemistry I	5	Organic Chemistry	5
College Algebra	3	Geology or Geography	3
Social Science	4	Social Science	4
Physical Education	0	Physical Education	0
Total	15	Total	15

PRE-VETERINARY

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	Chemistry II Rec.	3
Chemistry I	5	Chemistry II Lab.	2
Oral Communication I	2	English Composition II	3
College Algebra	3	General Zoology	4
Physical Education	0	Physical Education	0
Social Science elective	3	Social Science elective	3
Total	16	Total	15

-
4. Choice to be specified by department of major.
 5. Psychology and speech majors only.
 6. Not required of psychology or fisheries and wildlife biology majors.
 7. Not required of medical technology, psychology, and speech majors.

CURRICULUM IN EDUCATION*Bachelor of Science**Bachelor of Science in Music Education**Bachelor of Science in Physical Education*

Hours required for graduation, men and women 126*

This curriculum provides the following major fields: art education, pre-elementary education, secondary education, music education, physical education. Special curriculums exist in Agricultural Education, page 53, and Home Economics Teaching, page 291.

The major in secondary education, which includes a departmental major in the teaching field, meets the requirements for a Secondary Three-Year Certificate as established by the State Board of Education.

The theoretical and practical instruction given in this curriculum, with a major in physical education for men or physical education for women, prepares the student for teaching physical and health education and for coaching athletic games. By proper selection of electives, the student may qualify to teach one or more subjects outside the field of specialization.

The curriculum in education offers a major in music education with two options: voice or instrumental music. The student who completes this curriculum with a major in music education is eligible to receive a special state certificate to teach music and by proper choice of subjects may qualify for certification in a subject matter field.

Students in other curriculums may qualify for teacher certification by meeting the requirements included in the curriculum in education.

Pre-Education Majors

Freshman and sophomore students desiring the Bachelor of Science Degree in Elementary Education or the Bachelor of Science Degree in Secondary Education are enrolled in the Pre-Education Curriculum in the College of Arts and Sciences. Pre-Secondary Education students are advised by an Arts and Sciences adviser in their major teaching field and by a College of Education adviser. Pre-Elementary Education students are advised by a College of Education adviser. The College of Education adviser for Pre-Education advisees is in the Dean's Office of the College of Arts and Sciences. All Pre-Education students must make application for admission to Teacher Education during their sophomore year. (See page 232.) Acceptance into Teacher Education is required of those students who wish to enroll in the College of Education at the beginning of the junior year.

Major Fields

Pre-Elementary Education¹
 Music Education
 Secondary Education²

Physical Education
 Men
 Women

REQUIREMENTS

I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. General Education (see page 230):

1. Social science (including history), 12 hours.
2. Humanities (literature, language), six hours.
3. Natural science, 16 hours, including at least one course in biology and one course in physical science, but not including more than four hours of mathematics.²

* Except for Music Education, which requires 128 hours for men and women.

1. For elementary education majors sixteen (16) hours of natural science including eight (8) hours of biological science and eight (8) hours of physical science. Must include one laboratory course. In addition three (3) hours of mathematics are required. Three (3) hours of personal and community health are also required.

2. Certification requirements may also be met by completing a major in any department plus 20 hours of professional education courses (Section III below) as electives.

For students in Music Education: Natural science, 10 hours, with one course in each of physical science and biological science.

4. Each student, except those in Music Education, must include a scientific laboratory in his program of study.³

5. Electives in Areas 1, 2, and 3: General Psychology, three hours. Electives (may include five semester hours of basic courses in history and appreciation of music and art), six hours.

III. Professional Education:

1. Educational Psychology I and II, six hours.

2. Principles of Elementary Education or Principles of Secondary Education and Educational Psychology, six hours.

3. A minimum of six semester hours in directed teaching and a minimum of two semester hours in methods for secondary majors.

IV. Physical Education, two semesters.

V. Remaining Hours in Major, Additional Tool and Related Courses, and Free Electives. The requirements for a major in a particular field follow. In certain cases, some of the major requirements may be substituted for some of the General Education requirements (II).

Elementary Education: Ph. Ed. 356; Art 170; Music 205; Engl. 470; Educ. 470, 471, 472, 473. The selection of electives must be planned so that there will be at least 15 hours of elective and required courses in one of the following fields: art or music, biological science, English and speech, home economics, physical science and mathematics, social science. Courses in one of these fields may not be used as a part of the 54-hour state department general education requirement.

Music Education: Music 201, 202, 231, 250, 304, 305, 401, 402, 412, 413, 421, 422, 501, 502, 505 and 516 and 517; Educ. 416 (six hours); and Phys. 125. Majors with an instrument option must also include Music 630 (for instrumental majors only). Each student must take 20 hours of Applied Music, of which eight hours must be in the major instrument or voice; eight hours of other applied music courses, chosen in consultation with a departmental adviser. Recital attendance and participation in a music organization are required each semester.

Physical Education: For Women, Ph. Ed. 158, 206, 290, 306, 320, 331, 351, 356, 366, 380, 481, 486, 506 or 560, 515, 526, 531, 555, 566, 575, 580.

Physical Education: For Men, Ph. Ed. 206, 225, 230, 235, 241, 245, 290, 351, 356, 410, 450, 455, 460, 595. Sports Option (six hours to be chosen from Ph. Ed. 415, 420, 426, 430); and Physical Education Option (two hours to be chosen from Ph. Ed. 111, 116, 481 and course not selected in Sports Option).

Secondary Education: General science requirements may be met in any of the groups biological science, chemistry, geology, geography, physics or physical science.

Art: 100, 190, 195, 196, 200, 205, 210, 222, 224, *235, *246, *265, 270, 290, 496, 600 or *230. *Two depth courses (same subject).

Biological Science: Bact. 220; Bot. 210, 670, or 690; Chem. 110; Entom. 211; Geog. 205; Zool. 205, 425, 610; 12 hours in bacteriology, botany, entomology, and zoology.

Business Administration: B. A. 230, 231, 235, 236, 237, 272, 301, 305, 325, 326, 405, 440; Econ. 110, 120, 430; Math. 110; Hist. 255; P. Sci. 220; Soc. 220.

Chemistry: Bot. 210; Chem. 210, 230, 250, 300, 431, 432, 585; Geol. 100; Math. 100, 150, 220, 221, 222; Phys. 310, 311, 560; Zool. 205.

* Two additional courses in one of the specialized art subjects (oils, prints, ceramics, sculpture).

3. Music Education majors are not required to take Introduction to Humanities I and II. (Communication Skills [eight hours] may be applied toward certification requirements.)

Economics: Econ. 110, 120, 430, 710; Math. 100; B. A. 273; P. Sci. 220; Soc. 211; Stat. 320; six hours of history; three hours of sociology; 12 hours of courses numbered 400 or above in economics, agricultural economics, business administration, of which at least six hours should be in economics, the particular courses to be selected with the advice of the student's adviser.

English: Engl. 350 or 651, 406, 451, 475; three of the surveys (420, 425, 440, 445); the Comprehensive Examination (599); and nine hours of elective courses.

Geography: Econ. 110; Geog. 105, 115, 207, 215, 685; Geol. 100, 110, 685; Phys. 135; P. Sci. 220; three hours of American history and 12 hours of geography.

Earth Science: Bot. 210; Chem. 210, 230, 250; Geog. 207; Geol. 100, 110, 420, 430, 460; Math. 100, 150; Phys. 131, 135, 211, 212; Zool. 205.

History: Hist. 111, 112; P. Sci. 220; three hours each in economics and three hours in geography and sociology, plus 15 hours in history including Hist. 795.

Industrial Arts: A minimum of 30 semester hours, including basic courses to consist of at least six semester hours in three areas to be chosen from drawing, woodworking, metal work, or auto mechanics.

Journalism: Engl. 270; Geog. 125; Hist. 258; Phil. 165; P. Sci. 220; Journ. 050, 105, 300, 306, 310, 316, 330, 345, 405; three hours in English, three hours in American history, nine hours in a modern language or three hours in English and six hours in social science; five hours in technical journalism.

Mathematics: Math. 220, 221, 222, 240; Stat. 320 or 410; and 12 hours of mathematics, including Math. 512 and 475 if possible.

Modern Language: Thirty hours in one language and 18 hours in a second language or a second teaching field (24 hours).

Physical Science: Bot. 210; Chem. 210, 230, 250, 350 and 351; Geol. 100, 430; Math. 220, 221; Phys. 310, 311 or 211, 212, 407, 560; Zool. 210.

Physics: Bot. 210,* Chem. 210, 230, 250, 350; Geol. 100; Math. 220, 221, 222; Phys. 310, 311 or 211, 212, 407, 410,* 432, 472, 473, 500, 501, 560; Zool. 210.*

Political Science: Hist. 111, 112; P. Sci. 220, 444; three hours each in economics and sociology, plus 21 hours in political science.

Psychology: Stat. 320; Psych. 110, 420, 435, 440, and nine additional hours in psychology.

Sociology: Econ. 110; Soc. 211, 410, 620, 710 and two of 430, 440, 450 and 460; three hours of college mathematics, logic or philosophy of science; six hours of social science; six hours in history; 10 hours in sociology.

Speech: Spch. 145, 135 or 210, 360, 608 or 652, 690. The remaining hours to complete the major should be chosen in the Radio-Television, Drama, Linguistics or General Speech areas. Students wishing to concentrate in the area of Speech Pathology should refer to the undergraduate section of the Speech Department in the General Catalog.

Students in the first year of the Pre-Elementary Curriculum may plan their courses as follows:

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
Course	Hours	Course	Hours
English Composition I	3	English Composition II	3
Natural Science	4	Natural Science	4
General Psychology	3	Personal and Community Health	3
Oral Communication	2	Social Science	3
Physical Education	0	Physical Education	0
Social Science	3	Elective	3
Total	15	Total	16

Students in the first year of Pre-Secondary Curriculum may plan their courses as follows:

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Natural Science	4	Natural Science	4
Oral Communication	2	Social Science	3
General Psychology	3	Physical Education	0
Physical Education	0	Electives or Major Course	3
Social Science or Major Course	3		

Students in this curriculum may use the following to plan their first-year courses:

ELEMENTARY EDUCATION

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Natural Science	4	Natural Science	4
General Psychology	3	Art for Elementary Teachers	3
Oral Communication I	2	Personal and Community Health	3
Elective	3	Elective	3
Physical Education	0	Physical Education	0
Total	15	Total	15

SECONDARY EDUCATION

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Physical Science	4	Physical Science	4
Elective and Major	8	General Psychology	3
Physical Education	0	Oral Communication I	2
		Elective and Major	3
		Physical Education	0
Total	15	Total	15

MUSIC EDUCATION

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Science Elective	3	Science Elective	3
Theory of Music I	3	Theory of Music II	3
Music Organization	1	Music Organization	1
Applied Music	2	Applied Music	2
General Psychology	3	Educational Psychology	3
Physical Education	0	Physical Education	0
Total	15	Total	15

PHYSICAL EDUCATION (MEN)

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Oral Communication I	2	Social Science Elective	3
Physical Science Elective	3	History of Physical Education	2
General Psychology	3	Tumbling and Trampolining	1
Introduction to Physical Education	1	General Zoology	4
Games and Combatives	2	Elective	2
Elective	1	Physical Education	0
Physical Education	0		
Total	15	Total	15

* Recommended but not required.

PHYSICAL EDUCATION (WOMEN)
FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
General Psychology	3	Tumbling, Recreational Sports	2
Personal and Community Health	3	General Zoology	4
Physical Science Elective	3 or 4	Social Science Elective	3
Oral Communication I	2	Team Sports I	2
Introduction to Physical Education	1	Physical Education	0
Physical Education	0	Physical Education Lecture	0
Physical Education Lecture	0		
Total	15 or 16	Total	14

GENERAL CURRICULUM*Bachelor of Arts*

Hours required for graduation, men and women 128

This curriculum is designed for the student who wishes to major in the broad areas of biological science, physical science, humanities and social science rather than to concentrate his work in the more specialized area of the individual academic disciplines. In addition to providing a broad basis for a liberal education this curriculum provides the basic training for students who are preparing to enter professional schools of law, medicine, dentistry, pharmacy or nursing. Students who plan to major in physical therapy should enroll in this curriculum.

Major Fields**Area Majors**

Biological Science
Humanities
Physical Science
Social Sciences

Pre-Professional Majors

Physical Therapy¹ Pre-Nursing⁸
Pre-Dentistry² Pre-Pharmacy⁷
Pre-Law³
Pre-Medicine

REQUIREMENTS

I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. Physical Education, two semesters.

III. General Psychology: Civilization I and II, nine hours.

IV. Modern Language:⁴ Each student must attain the degree of proficiency in one language indicated by fulfillment of a 12-hour foreign language requirement. High school and college study may be combined, depending upon the student's proficiency. For example, four units of a single high school language or two units of a single high school language plus six hours of college credit in the same language may fulfill the requirement.

V. College Mathematics, Logic, or Introduction to Philosophy,⁵ three hours.

VI. Three of the following four groups are required.⁶ (Major requirements will be substituted for the fourth group.) A scientific laboratory must be included in each student's program of study.

Area 1: Biological science, 11 hours.

Area 2: Physical science, 11 hours.

Area 3: Humanities, 14 hours.

Area 4: Social science, 14 hours.

VII. Major Requirements: Area Majors (One of the following four groups will be chosen as an Area Major):

1. Biological Science: General Microbiology, General Botany, General Entomology, and General Zoology; in addition, 16 hours in two or more of

1. Plus an equivalent of 30 hours credit taken during 12 months study in an off-campus Certificate Program.

2. Pre-dentistry students who choose to enter dental school at the end of the junior year must use the Curriculum in Biological Science and take the B. S. degree.

3. Pre-law students should take recommended courses in government and accounting.

4. Except for pre-professional majors, for whom the equivalent of nine hours of college courses in one language is required.

5. Pre-medicine and pre-dentistry students must take College Algebra.

6. Except for pre-medicine and pre-dentistry students who must fulfill *all four* group requirements. Physical therapy students will omit Area 1, and pre-law students will omit area of major concentration.

7. Pre-Pharmacy: Recommended courses as suggested by recognized schools of pharmacy: 1-4 Plan (one year at KSU and four years at a school of pharmacy) and 2-3 Plan (two years at KSU and three years at a school of pharmacy).

8. Pre-Nursing: A minimum of 60 semester hours of Liberal Arts and Science courses are required in the two-year pre-nursing curriculum: two courses in English Composition and Literature, General Chemistry, Microbiology or Bacteriology, General Zoology, Sociology or Anthropology, Psychology and the remaining hours free electives.

the following fields: bacteriology, botany, entomology, psychology, and zoology. At least 12 of these 16 hours must be in courses above the introductory level. 33 hours.

2. **Physical Science:** College Algebra must be taken to satisfy the Mathematics, Logic, or Approved Philosophy Course requirement; Chemistry I and II, General Geology, Plane Trigonometry, and General Physics I and II; in addition, 15 hours in two or more of the following fields: chemistry, geology, mathematics, and physics. At least 12 of these 15 hours must be in courses above the introductory level. 37 hours.

3. **Humanities:** Appreciation of Architecture, History of Painting and Sculpture, Introduction to Literature, Shakespeare, and Appreciation of Music; in addition, 21 hours in two or more of the following fields: art, English, history, languages (above the required proficiency), music, philosophy, and speech arts (except Radio Speech). At least 12 of these 21 hours must be in courses above the introductory level. 35 hours.

4. **Social Science:** Economics (three hours), Geography (three hours), Sociology (three hours), U. S. History (three hours), and Political Science (three hours); in addition, 21 hours in two or more of the following fields: economics, geography, political science, history, psychology, and sociology. At least 12 of these 21 hours must be in courses above the introductory level. 35 hours.

Pre-Professional Majors

1. **Physical Therapy:** 21 hours of courses in the biological sciences including: Bact. 200 and 220, Zool. 205 and 425, and Psych. 415 and 435. The last 30 hours of major course work for the B. A. degree will be transferred from the off-campus Certificate Course.

2. **Pre-Medicine and Pre-Dentistry:** 26 hours of courses from the physical and biological sciences.

3. **Pre-Law:** Recommended courses in political science and accounting.

4. **Pre-Pharmacy:** Recommended courses as suggested by recognized schools of pharmacy: 1-4 Plan (one year at KSU and four years at a school of pharmacy) and 2-3 Plan (two years at KSU and three years at a school of pharmacy).

5. **Pre-Nursing:** A minimum of 60 semester hours of Liberal Arts and Science courses are required in the two-year pre-nursing curriculum: two courses in English Composition and Literature, General Chemistry, Microbiology or Bacteriology, General Zoology, Sociology or Anthropology, Psychology and the remaining hours free electives.

VIII. Remaining Hours in Free Electives.

Students in the first year of this curriculum may plan their courses as follows:

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
Course	Hours	Course	Hours
English Composition I	3	English Composition II	3
Civilization I	3	Civilization II	3
Biological or Physical Science	4	Biological or Physical Science	4
Elective or Major	6	Oral Communication I	2
Physical Education	0	Elective or Major	4
		Physical Education	0
Total	16	Total	16

CURRICULUM IN HUMANITIES*Bachelor of Arts*

Hours required for graduation, men and women 120

This curriculum provides the opportunity for students to obtain a broad, liberal education with a major concentration in one of the humanities: art, English, history, mathematics, modern languages, music, philosophy, speech, statistics. Students may prepare for professional careers in any of these areas, for further graduate study, or for the enrichment of their personal lives.

Major Fields

Art (p. 122)	Music (p. 168)
English (p. 138)	Philosophy (p. 175)
History (p. 150)	Speech (p. 200)
Mathematics (p. 156)	Statistics (p. 207)
Modern Languages (p. 162)	

REQUIREMENTS

I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. Foreign Language: Each student must attain the degree of proficiency in one language indicated by fulfillment of a 12-hour foreign language requirement. High school and college study may be combined, depending upon the student's proficiency. For example, four units of a single high school language or two units of a single high school language plus six hours of college credit in the same language may fulfill the requirement.

III. College Mathematics, Logic, or Introduction to Philosophy, three hours.

IV. Physical Education (two semesters).

V. General Education (see page 230): Social science, eight hours; natural science, 16 hours, including at least one course in biological science, one course in physical science but not including more than four hours of mathematics; a scientific laboratory must be included in each student's program of study.

VI. Social Science courses beyond the introductory level, four hours.

VII. History, six hours.

VIII. Literature: English, American, or foreign, six hours.

IX. Remaining Hours in Major, Additional Tool and Related Courses, and Free Electives. For these requirements, except art, see catalog statement for appropriate department on the pages indicated above.

The requirements for a major in art are: 45 semester hours chosen from the following courses: Art 100, 190, 195, 196, 200, 210, 222, 224, 230, 235, 246, 265, 496, or 600, plus 16 hours in field of major concentration.

Students in the first year of this curriculum may plan their courses as follows:

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Foreign language	3	Foreign language	3
Natural Science	4	Natural Science	4
Oral Communication I	2	Elective	2
History	3	History	3
Physical Education	0	Physical Education	0
Total	15	Total	15

CURRICULUM IN APPLIED MUSIC
Bachelor of Music

Hours required for graduation, men and women 128

The student in this curriculum is offered the option of majoring in instrument or voice. These options give the student the opportunity for personalized major instruction in voice, piano, violin, organ, or other instruments and the opportunity to minor in another of these fields. See also page 168.

REQUIREMENTS

I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. Physical Education, two semesters.

III. General Psychology (three hours) and Physics for Musicians (two hours).

IV. General Education (see page 230): Natural science and social science with one course in each area, 11 hours.

V. Modern Language, nine hours.

VI. Remaining Hours in Major, Additional Tool and Related Courses, and Free Electives. For major requirements, see catalog statement for Department of Music, page 168.

Students in the first year of this curriculum may plan their courses as follows:

FRESHMAN			
FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Theory of Music I	3	Theory of Music II	3
Physics for Musicians	2	Appreciation of Music	2
Oral Communication I	2	General Psychology	3
Applied Music	5	Applied Music	5
Physical Education	0	Physical Education	0
Total	15	Total	16

CURRICULUM IN PHYSICAL SCIENCE*Bachelor of Science*

Hours required for graduation, men and women 128

This curriculum provides for the needs of the student who desires major work in the physical sciences. By choosing the proper electives he may prepare himself for graduate, commercial, or government laboratory work, or for secondary teaching. Students who plan to do technical writing in the physical sciences should plan to major in technical journalism.

Major Fields

Chemistry (p. 130)	Mathematics (p. 156)
Geography (p. 148)	Physics (p. 183)
Geology (p. 144)	Option I Physics
Option I Geology	Option II Industrial
Option II Geochemistry	Option III Meteorology
Option III Geophysics	Option IV Astronomy
Option IV Earth Science for Teachers	Option V Biophysics
Geophysics (p. 145)	Statistics (p. 207)
	Technical Journalism (p. 211)

REQUIREMENTS

I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. Analytical Geometry and Calculus I and II, eight hours.

III. Chemistry I and II, Chemistry II Lab. (10 hours).¹

IV. General Geology, three hours.

V. Engineering Physics I and II, 10 hours.²

VI. General Education (see page 230): Biological science, eight hours; social science, eight hours; humanities, eight hours.

VII. Physical Education, two semesters.

VIII. Remaining Hours in Major, Additional Tool and Related Courses, and Free Electives. For these requirements, see catalog statement for appropriate department on the pages indicated above.

Students in the first year of this curriculum should plan their courses as follows:

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Chemistry I	5	Chemistry II	3
College Algebra and	3	General Geology	3
Plane Trigonometry or	3	Analytical Geometry and Calculus I or II	4
Analytical Geometry and Calculus I and ..	4	Elective and Major	3
Elective	2	Physical Education	0
Oral Communication I	2		
Physical Education	0		
Total	16	Total	16

1. Change to Chemistry I and II (8 hours) for students intending to major in mathematics and statistics, or to Chemistry I and II, and Chemical Equilibria and Qualitative Analysis (10 hours) for students intending to major in chemistry.

2. Change to General Physics I and II (eight hours) for students intending to major in geography, geology, mathematics, or statistics.

CURRICULUM IN SOCIAL SCIENCE
Bachelor of Arts

Hours required for graduation, men and women 120

This curriculum is designed for students who plan to major in economics, geography, history, political science, psychology, sociology, speech, or technical journalism. By his choice of electives, a student may prepare himself in his field of specialization for research, graduate study, teaching or employment in business concerns or government agencies, including the Foreign Service. Students who plan to enter law school may enroll in this curriculum and should take recommended courses in political science and accounting.

Major Fields

Anthropology (p. 198)	Psychology (p. 191)
Economics (p. 135)	Sociology (p. 195)
Geography (p. 148)	Speech (p. 200)
History (p. 150)	Technical Journalism (p. 211)
Political Science (p. 187)	

Pre-Professional Major
Pre-Law

REQUIREMENTS

I. Communications: Eight hours. English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.

II. Foreign Languages: Each student must attain the degree of proficiency in one language indicated by fulfillment of a nine-hour foreign language requirement. High school and college study may be combined, depending upon the student's proficiency.

III. College Mathematics, Logic, or Introduction to Philosophy, three hours.

IV. Physical Education, two semesters.

V. General Education (see page 230): Humanities, eight hours; natural science, 16 hours, including at least one course in biological science, one course in physical science but not including more than four hours of mathematics; a scientific laboratory must be included in each student's program of study.

VI. Literature: English, American, or foreign, six hours.

VII. Three hours in each of the following: economics, geography, political science, psychology, and sociology.

VIII. History, six hours.

IX. Social Science Elective (outside major field), six hours.

X. Remaining Hours in Electives and Major. For major requirements, see catalog statement for appropriate department on the pages indicated above.

Students in the first year of this curriculum may plan their courses as follows:

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Foreign language	3	Foreign language	3
Natural Science	4	Natural Science	4
Oral Communication I	2	Social Science	3
Social Science	3	Elective	3
Physical Education	0	Physical Education	0
Total	15	Total	16

AEROSPACE STUDIES

BERTRAM L. RUGGLES, *Head of Department*

Professor Ruggles; Associate Professors Bright, Hightower, Hollingworth and Tarrant; Assistant Professors Passey, Remtinger, Whitman and Zinnecker; Instructors Hine, Holmes, Holt, McClead, McFarland and Shadday

The Air Force Reserve Officers 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 will then:

1. Enter into Air Force-sponsored graduate study at full pay while serving as Air Force officers, or
2. Be 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.

Cadets are in competition while in the Cadet Wing. Those who finish among the top ones are designated Distinguished Graduates and may be offered regular commissions in the Air Force.

AFROTC Cadets taking the Professional Officers Course (POC) must apply for the AFROTC Reserve. If accepted they are not subject to selective service as long as they remain in the Reserve. Cadets in the General Military Course (GMC) may apply for and, on a selective basis, receive draft deferment agreements while they continue in AFROTC.

Any male student, graduate or undergraduate, who is a U. S. citizen and can qualify mentally, scholastically, physically and morally may apply to become a cadet, provided he has time remaining at Kansas State University to complete the program. The physical requirements vary, being higher for cadets desiring to fly than for those desiring management, research or development positions in the Air Force. The duration of the program varies between two and four years, depending upon an applicant's previous experience and the availability of different options.

Common to all options is the Professional Officers Course (POC) which consists of four courses of three credit hours each over a period of four semesters. All cadets in this course who are in the AFROTC Reserve receive \$40.00 a month, a \$100.00 uniform allowance and all necessary AFROTC texts and equipment. Outstanding cadets in the POC and the AFROTC Reserve who are graduates of the GMC may participate in the Financial Assistance Program and receive \$50.00 a month for two years, the \$100.00 uniform allowance, and free tuition, texts, fees, and equipment for all courses taken at Kansas State University.

POC cadets are permitted to practice their leadership and management skills in a Cadet Wing. 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, usually between the second and third term of POC. During training they are paid approximately \$137.00, and receive free travel to and from their training base.

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 leads to a private pilot's license. A one-term one-semester-hour course provides ground instruction in flight theory and practice needed by student pilots. Cadets who have a private pilot's license from another source are not eligible to receive free flight instruction.

Students in the GMC are issued uniforms and all texts and other equipment needed for their AFROTC courses. These articles are the property of the United States government and must be returned at the end of the school year or upon withdrawal from the University. The value of articles not returned is chargeable to the student.

GENERAL MILITARY COURSES

- 205 113. Aerospace Studies 1A.** (1) I. An introductory course dealing with aerospace orientation. Organization of the USAF, and the Air Force as a profession. Two hours a week including leadership training.
- 205 114. Aerospace Studies 1B.** (1) II. An introductory course exploring causes of the present world conflict, and the role and relationship of military power to that conflict. The course discusses the means that nations develop to pursue their objectives and how confrontation develops in the use of these means. The course then outlines individual military systems—with emphasis upon the U. S. Department of Defense and the USAF. Two hours a week including leadership training.
- 205 200. Aerospace Studies 2A.** (1) I. A comparative study of world military forces and issues surrounding existence of these forces. This includes a study of the U. S. Army, U. S. Navy, their doctrines, missions and employment concepts; a study of the military forces of NATO, CENTO, SEATO, and their role in free world security; and an investigation of the military forces of the USSR, Soviet Satellites and Communist China. An analysis of the trends and implications of world military power. Two hours a week including leadership training.
- 205 201. Aerospace Studies 2B.** (1) II. Cont. of A. S. 200, with emphasis on the role of the USAF. Two hours a week including leadership training.

PROFESSIONAL OFFICERS COURSE

- 205 300. Aerospace Studies 3A.** (3) I. A survey course about the nature of war, development of airpower in the U. S., organization of the Department of Defense, and USAF concepts, doctrine and employment. Three hours of class and one hour of leadership training a week.
- 205 301. Aerospace Studies 3B.** (3) II. Military astronautics and space operations, and the future development of aerospace power. Includes the U. S. space programs, vehicles, systems and problems in space exploration. Three hours of class and one hour of leadership training a week.
- 205 380. Weather and Navigation 4A.** (1) I. Introduction to weather and navigation equivalent to that required for a private pilot license. Required of AFROTC cadets enrolled in the Flight Instruction Program.
- 205 381. Briefing for Air Force Commissioned Service 4B.** (1) 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.
- 205 390. The Professional Officer.** (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 and one hour of leadership training a week.
- 205 391. The Professional Officer.** (3) II. Cont. of A. S. 390. Three hours of class and one hour of leadership training a week.
- 205 399. Problems in Aerospace Studies.** Credit arranged. I, II. Work offered in any of the Air Force ROTC general or professional courses for students out of phase for graduation; material covered in a basic or advanced course. Pr.: Consent of department head.

ART

JOHN HANNAH,* *Acting Head of Department*

Professor Garzio; Associate Professors Hannah, Hill,* Larmer* and Tomasch,* Assistant Professors Craigie* and Deibler,* Instructors Newby, O'Shea and Vogt; Emeritus: Professor Barfoot; Associate Professors Harris and Morris; Assistant Professor Geiger*

UNDERGRADUATE

The B. A. degree in art consists of three parts: (1) the general educa-

tion 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, (3) 16 hours concentration of related subjects which should provide a minimal basis for establishing professional competence. Some of the concentration possibilities will be predominantly in one of the following mediums: painting, printmaking, ceramics, sculpture, art history, art education, and various forms of commercial art study. Any student work may be retained at the discretion of the faculty for an indefinite period of time for instructional and exhibition purposes.

GRADUATE

Major work leading to the M. A. degree is offered. The candidate will be encouraged to minor 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 report will consist of a significant creative effort in the candidate's chosen major medium, and must be publicly exhibited.

FOR UNDERGRADUATE CREDIT

- 209 100. Design I.** (2) I, II, S. Introduction to and laboratory practice in the principles and elements of design. Six hours lab.
- 209 170. Art for Elementary Schools.** (3) I, II, S. Art methods, materials, and philosophy of children's art at different grade levels.
- 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. Six hours lab.
- 209 195. Survey of Art History I.** (3) Historical development of art from Pre-History through the Middle Ages.
- 209 196. Survey of Art History II.** (3) Historical development of art from the Renaissance through the nineteenth century.
- 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. Six hours lab. Pr.: Art 100, 190.
- 209 205. Commercial Art Techniques.** (2) I, II, S. Drawing techniques and tools used in various mediums related to commercial art. Six hours lab. Pr.: Art 100, 190.
- 209 210. Drawing II.** (2) I, II, S. Cont. of Drawing I, with strong emphasis on creative expression. Six hours lab. Pr.: Art 100, 190.
- 209 222. Water Color I.** (2) I, II, S. Painting in water color and other water-soluble media; includes both studio and outdoor painting and sketching. Six hours lab. Pr.: Art 100, 190.
- 209 224. Figure Drawing I.** (2) I, II, S. Sustained drawing of the human figure using a variety of media; introduction to human anatomy used by artists. Six hours lab. Pr.: Art 210.
- 209 230. Sculpture I.** (2) I, II, S. An introduction to the problem of sculptural form; fundamental techniques and theory in modeling, casting, assemblage, carving and construction in contemporary and traditional mediums of clay, plaster, metal, wood, stone, plastic. Six hours lab. Pr.: Art 100, 190.
- 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. Six hours lab. Pr.: Art 100, 190.
- 209 246. 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. Six hours lab. Pr.: Art 100, 190.
- 209 260. Design in the Crafts.** (2) I, II, S. Crafts work in various media, with emphasis on contemporary design. Six hours lab. May be taken for credit two semesters. Pr.: Art 100.

- 209 265. Ceramics I.** (2) I, II, S. Introduction to basic hand building techniques in both earthenware and stoneware clays; decoration of both two- and three-dimensional ceramic forms; student participation in stacking and firing in kilns. Six hours lab. Pr.: Art 100 or equiv.
- 209 270. Metalcrafts and Jewelry.** (2) I, II, S. Design and execution of contemporary jewelry in precious metals, including setting of semi-precious and precious stones. Six hours lab. May be taken for credit three semesters. Pr.: Art 100.
- 209 290. Lettering.** (2) I, II. Study of traditional lettering forms, including Roman, Gothic, Text, Script, and some contemporary adaptations of these. Pr.: Art 205 or equiv.
- 209 399. Honors Seminar in Art.** (1) I. Selected topics in art. May be taken for credit more than once. Pr.: For students in the Honors Program only.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 209 406. Problem in Art I.** Credit arranged. Work offered in drawing, painting, sculpture, and commercial art. Pr.: Full sequence of courses related to problem subject matter.
- 209 492. Renaissance Art History.** (3) Study of the art of the High Renaissance, with some attention to its origins and subsequent influence on Baroque art. Pr.: Art 195, 196.
- 209 496. Twentieth Century Art History.** (3) Origins and development of twentieth century art. Pr.: Art 195, 196.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 209 600. Design II.** (2) I, II. Work in three dimensions in sheet metal, plaster, plastics, paper, wire, etc., using the principles and elements of design. Pr.: Art 200 or consent of instructor.
- 209 605. Commercial Illustration.** (3) I, II, S. Problems in layout and finished illustration for newspapers, magazines and general advertising. Recommended for journalism majors. Nine hours lab. May be taken for four semesters. Pr.: Art 205, 290, or consent of instructor.
- 209 610. Figure Drawing II.** (2) I, II, S. Cont. of Figure Drawing I, with emphasis on individual expression. Six hours lab. May be taken for four semester hours. Pr.: Art 224.
- 209 622. Water Color II.** (2) 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 222.
- 209 630. Sculpture II.** (3) I, II, S. Cont. of Sculpture I. Introduction to metallic casting (bronze, iron, aluminum) and welding (gas and electric). Nine hours lab. May not be taken for more than six semesters. Pr.: Art 224, 230.
- 209 635. Printmaking II.** (3) I, II, S. Advanced work in blockprints, serigraphy, or lithography. Nine hours lab. May be taken for four semesters. Pr.: Art 235.
- 209 636. Etching and Drypoint.** (3) I, II. Individual expression in intaglio techniques of printmaking; includes etching, engraving, aquatint, and drypoint. Nine hours lab. May be taken for four semesters. Pr.: Art 235.
- 209 646. Oil Painting II.** (3) I, II, S. Cont. of Painting I. Emphasis on development of personal attitudes in formal structural relationships of line, color, and shape. Nine hours lab. May be taken for six semesters. Pr.: Art 246.
- 209 665. Ceramics II.** (3) I, II, S. Advanced work on potter's wheel, with consideration to study of clay bodies and glaze calculation; consideration of kiln designs and firing procedures. Nine hours lab. May be taken for credit three semesters. Pr.: Art 265.
- 209 666. Ceramics III.** (2) I, II. Individual exploration of ceramic design and glaze technology; kiln design and construction. Six hours lab. May be taken for three semesters. Pr.: Art 665.

- 209 667. Ceramics IV.** (2) I, II, S. History and development of ceramics; study of the development of pottery and other aspects of ceramics from earliest known records to present day. Use of slides and other visual materials. Pr.: Art 265.
- 209 680. Drawing III.** (2) I, II. Cont. of Drawing II, emphasizing exploration in mixed media. Six hours lab. May be taken for two semesters. Pr.: Art 210.
- 209 780. Problems in Design.** Credit arranged. I, II, S. Advanced work in design-related subjects. Pr.: Full sequence of courses related to problem subject matter.
- 209 787. Problems in Teaching Art.** Credit arranged. 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, Educ. 550 or equiv.; 12 credit hours in art.
- 209 790. 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.
- 209 799. Problems in Art History.** Credit arranged. I, II, S. Independent exploration in selected problems in art history. Pr.: Twelve hours art history.

FOR GRADUATE CREDIT

- 209 830. Sculpture III.** Credit arranged. I, II, S. Advanced creative work involving appropriate sculptural media and related techniques. Emphasis placed on content of work. Pr.: Consent of instructor.
- 209 845. Oil Painting III.** Credit arranged. I, II, S. Advanced study, with emphasis on original investigation leading to professional competence in painting. Pr.: Consent of instructor.
- 209 865. Ceramics V.** (3) I, II. Study of glaze materials; advanced work and experimentation in glaze calculation. One hour lec. and six hours lab. May be taken for two semesters. Pr.: Art 666.
- 209 885. Problems in Art II.** Credit arranged. I, II, S. Advanced work offered in drawing, printmaking, painting, sculpture, and commercial art. Pr.: Consent of instructor.
- 209 980. Research in Art.** Credit arranged. I, II, S. Research which may form the basis for the master's thesis or report. Pr.: Graduate standing.

ATHLETICS

HORACE B. LEE, *Head of Department*

Professors Lee and Winter; Assistant Athletic Director Barrett; Assistant Professors Dodds and Knorr; Instructor Morgan; Coach Weaver; Assistant Coaches Dewitz, Dissinger, Guthridge, Hailey, Kadlce, LaRue, Lawrence and Towers; Administrative Assistant Matuszak

Kansas State University is a member in good standing of the Missouri Valley Intercollegiate Athletic Association—otherwise known as the Big Eight Conference. The other members are the University of Colorado, Iowa State University, the University of Kansas, the University of Missouri, the University of Nebraska, the University of Oklahoma, and Oklahoma State University.

Kansas State University, as a member of the Conference, participates with member schools in football, basketball, baseball, track (indoor and outdoor), tennis, golf, gymnastics, swimming, wrestling, and cross country. Intercollegiate competition is open to all men students and is coached by a staff who are specialists in their respective sports.

BACTERIOLOGY

ALFRED F. BORG,* *Head of Department*

Professors Borg, Eisenstark,* Foltz* and Harris;* Associate Professors Consigli,* Erwin,* Fina,* McMahon* and Miller;* Assistant Professor Reiter; Emeritus: Professor Gainey**

UNDERGRADUATE

Students majoring in bacteriology should enroll in the Curriculum in Biological Science. (See p. 108.)

For a major (VI, p. 109), the following courses should be completed: Bact. 400 or equiv., 500, 610, 670, 730, and three additional hours of bacteriology in courses numbered 600 to 799; Chem. 210, 230, 250, 300, 350, 351; Biochem. 420; Phys. 211, 212; A. H. 400; and Math. 100 and 150.

Students planning to do graduate work in bacteriology should consult the undergraduate adviser about selection of alternate or additional courses in biochemistry, mathematics and foreign language.

GRADUATE

The Department of Bacteriology offers work leading to the degrees Master of Science and Doctor of Philosophy. The relatively large and diversified staff provides students with opportunities to carry out research programs in a variety of special areas in microbiology, including virology. Students interested in microbial genetics may elect to obtain an advanced degree in genetics through the Genetics Coordinating Committee. Close liaison is maintained with research activities in biophysics.

To enter graduate work in bacteriology with full standing, students must have completed a four-year curriculum in an accredited institution or the equivalent, in which were included organic chemistry, quantitative analysis, 10 semester hours of biology exclusive of bacteriology, one year of college physics, and 13 semester hours of bacteriology. Students who have not had these specific courses may enroll with provisional status until the necessary work is completed, but any graduate credit obtained in fulfilling entrance requirements cannot be applied toward the advanced degree.

A detailed description of current research activities in the department, as well as information about financial support, may be obtained by writing to the department head.

FOR UNDERGRADUATE CREDIT

213 200. Public Health Bacteriology. (3) II, S. Application of bacteriology to the control of disease in the community, with emphasis on the means of spread of diseases, the impact of disease outbreaks on the functioning of the communal organization, man's fight to reduce disease in his population, and evaluation of known methods of control of disease.

213 220. General Microbiology. (4) I, II. Morphology, physiology, biology, classification, culture and distribution of microorganisms; principles of applied microbiology. A course intended primarily for students not majoring in biological science. Two hours rec. and four hours lab. a week. Pr.: Chem. 110 or 230 and one semester of college biology.

231 398. Junior Honors Colloquium. Credit arranged. I, II. Open only to juniors in the Arts and Sciences Honors Program.

213 399. Honors Seminar in Microbiology. (1) I, II. Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

213 400. The Biology of Bacteria. (5) I. Introduction to microorganisms as living agents. Three hours rec. and four hours lab. a week. Pr.: Chem. 351 and one year of college biology.

213 410. Veterinary Bacteriology. (5) II. Morphology, physiology, and classification of bacteria: detailed study of those bacteria which cause

infectious diseases of domesticated animals. Three hours rec. and four hours lab. a week. For students in the College of Veterinary Medicine.

213 500. Principles of Quantitative Microbiology. (5) II. Examination of microbial processes by means of quantitative chemical and physical methods. Three hours rec. and six hours lab. a week. Pr.: Bact. 400 or equiv., Biochem. 420 or conc. enrollment recommended.

213 510. Veterinary Immunology and Virology. (5) I. Principles of immunology and virology; serodiagnosis of infectious diseases; host-virus interactions. Three hours rec. and four hours lab. a week. For students in the College of Veterinary Medicine. Pr.: Bact. 410.

213 520. Dairy Bacteriology. (4) II. Bacteriology of milk and milk products. Two hours rec. and four hours lab. a week. Pr.: Bact. 220 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

213 600. Avian Microbiology. (3) I. A consideration of the microorganisms encountered in the avian species, with special emphasis on laboratory diagnosis and control of avian diseases. Two hours rec. and three hours lab. a week. Pr.: Bact. 220 or equiv.

213 610. Bacteriology of Human Diseases. (5) I. Pathogenic bacteria and their role in human diseases. Three hours rec. and six hours lab. a week. Pr.: Bact. 220 or equiv.

213 630. Soil Microbiology. (3) I in odd years. Microbial population of the soil and its role in soil fertility. Pr.: Bact. 220 or equiv.; Chem. 351 or equiv.

213 645. Microbiology of Foods. (4) I. Microbial phenomena involved in the bacteriology and sanitation of foods; microscopic and cultural analysis of foods exclusive of dairy products. Two hours rec. and four hours lab. a week. Pr.: Bact. 220 or equiv.

213 670. Immunology. (5) II. Principles of immunology; demonstration of antigen antibody reactions; serodiagnosis of human diseases. Three hours rec. and six hours lab. a week. Pr.: Bact. 610 or equiv.

213 730. General Virology. (3) II. 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 mammalian cell cultures as the host for virus propagation. Pr.: Twelve hours of biological sciences, including Bact. 220 or equiv. and Biochem. 420 or equiv.; consent of instructor.

213 760. Genetics of Microorganisms. (2) I. The structure and function of genes, as revealed by genetic studies with microorganisms; the role of genes in the control of cellular activities. Pr.: Knowledge of genetics and consent of instructor.

213 770. 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. a week. Pr.: Bact. 500, Biochem. 420.

213 790. Bacteriology Seminar. (1) I, II. Pr.: Consent of instructor.

213 799. Problems in Bacteriology. Credit arranged. I, II, S. Work is offered in a variety of special areas in microbiology. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

213 800. Advanced Topics in Microbiology. Variable credit. Offered on sufficient demand. A treatment of special topics of current interest. May be repeated. Pr.: Consent of instructor.

213 825. Microbial Metabolism. (3) II in even years. An advanced treatment of metabolic activities of microorganisms. Pr.: Bact. 500.

213 826. Microbial Metabolism Laboratory. (2) II in even years. Selected laboratory exercises demonstrating the fundamental principles and practices of physiology. One hour rec. and six hours lab. a week. Pr.: Bact. 825 or conc. enrollment.

- 213 830. Advanced Virology.** (4) I. Application of current biochemical, biophysical and biological techniques to the study of viruses. To include bacterial viruses (bacteriophage), animal viruses and plant viruses. Pr.: Bact. 730 and consent of instructor.
- 213 840. Advanced Immunology.** (3) S. Recent advances in theoretical and practical antigen and antibody relationships and the application of this knowledge to human and veterinary immunology. Pr.: Bact. 670 or equiv.
- 213 860. Microbial Genetic Techniques.** (4) II. Experiments in multiplication, recombination, and mutation in bacteria and bacteriophage. Pr.: Bact. 760, Biochem. 420, or equiv. Consent of instructor.
- 213 960. Current Literature in Microbial Genetics.** (1) I. May be repeated to a maximum of three hours credit. Oral presentation by students of research described in current issues of *Genetics*, *Journal of Molecular Biology*, *Virology*, *Journal of Bacteriology*, *Proceedings of National Academy of Science*, and other pertinent journals.
- 213 999. Research in Bacteriology.** Credit arranged. I, II, S. Work is offered in a variety of special areas in microbiology, including virology. Pr.: Sufficient training to carry on the type of research undertaken.

BOTANY AND PLANT PATHOLOGY

STUART M. PADY,* *Head of Department*

Professors Frazier and Pady;* Associate Professors Hulbert,* Kramer, McCracken* and Newcomb;* Assistant Professors Anderson,* Barkley* and Goss;* Emeritus: Professors Bates and Melchers*

Instruction in the department is in two areas. Courses in plant pathology are found in the Plant Pathology section in the College of Agriculture (see p. 87). Courses in botany are offered in the College of Arts and Sciences and are listed below.

UNDERGRADUATE

Students majoring in botany should enroll in the Curriculum in Biological Science (see p. 108). Students majoring in plant pathology enroll in the College of Agriculture (see p. 46).

For a major in botany (see VI, p. 109), the requirements are Bot. 210 and 20 hours of botany and plant pathology courses above the introductory level.

GRADUATE

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered in the fields of plant physiology, taxonomy, ecology, morphology, anatomy, cytology, cytogenetics, and mycology. Graduate degrees are also offered in plant pathology (see p. 35).

Prerequisite to graduate work in these fields is the completion of a four-year curriculum including undergraduate courses in the physical and biological sciences suitable for preparing the student for advanced study in his field.

Facilities for advanced study include laboratories with a variety of specialized equipment, vascular plant herbarium with 175,000 sheets, mycological herbarium with 30,000 collections, and a good research library in botanical publications. Also available are greenhouse and experimental plots of the Agricultural Experiment Station and the United States Department of Agriculture. Nearby are hundreds of thousands of acres of native prairie. The department awards annually teaching assistantships to graduate students and employs others as research assistants in research projects.

FOR UNDERGRADUATE CREDIT

217 121. Biology I. (4) I, S.

217 122. Biology II. (4) II.

In these courses the fundamental relationships between plants and animals are studied, with particular emphasis on structure of representative plants and animals, metabolic processes, principles of classification, heredity, environmental factors, economic aspects, and finally, a detailed study of man himself. Life is interpreted as an integrative process which results in a dynamic whole. Two hours lec. and two hours rec. a week. Not open to students with credit in Bot. 190, 210, or Zool. 205. Bot. 121 is prerequisite to Bot. 122.

- 217 190. Nature and Development of Plants.** (3) I, II. Structure, life processes, identification, classification, evolutionary development, geographical distribution, and economic importance of plants. Not open to students with credit in Bot. 121, 122, or 210.
- 217 210. General Botany.** (4) I, II, S. Plant groups and their evolutionary development; physiology, anatomy, ecology, and identification of seed plants; economic application. Two hours rec. and six hours lab. a week. Not open to students with credit in Bot. 121 or 190.
- 217 399. Honors Seminar.** (1) I, II. Selected topics. Open to non-majors in the Honors Program. Pr.: Consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 217 600. Plant Physiology.** (4) I, S in even years. A survey of the physiological processes of plants. Three hours rec. and three hours lab. a week. Pr.: Bot. 210 and a course in organic chemistry.
- 217 610. Plant Cytology.** (3) I. Structure, development, and functions of the plant cell, with special reference to chromosome behavior and its bearing on genetic results. One hour rec. and six hours lab. a week. Pr.: Bot. 210 or Zool. 205.
- 217 630. Paleobotany.** (3) II. Fossil plants, their taxonomy and use in the recognition of geological strata. Two hours rec. and two hours lab. a week. Pr.: Bot. 210 and Geol. 430.
- 217 640. Introductory Mycology.** (4) I. Emphasis is placed on the comparative morphology, classification, and life cycles of the fungi. Two hours rec. and six hours lab. a week. Pr.: Bot. 210.
- 217 655. Morphology of Nonvascular Plants.** (3) I in odd years. Structure and life histories of nonvascular plants, emphasis on algae and bryophytes; studied as a basis of evolution of higher plants. Two hours rec. and three hours lab. a week. Pr.: Bot. 210 or consent of instructor.
- 217 660. Morphology of Vascular Plants.** (3) II in even years. Structure and life histories of vascular plants, emphasizing recent advances in morphological theory. Two hours rec. and three hours lab. a week. Pr.: Bot. 210 or consent of instructor.
- 217 270. Plant Ecology.** (3) II. Structure and dynamics of vegetation. Two hours rec. and three hours field or lab. work a week. Pr.: Junior standing or consent of instructor.
- 217 690. Taxonomic Botany of the Flowering Plants.** (3) I. Systems of classification, identification of plants in the field and in the laboratory, orders and families of plants. Six hours of combined rec. and lab. work a week. Pr.: Bot. 210.
- 217 700. 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.: Bot. 600 or consent of instructor.
- 217 705. 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.: Bot. 640.
- 217 715. 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.: Bot. 600 or consent of instructor.

- 217 720. Botanical Microtechnic.** (3) II in odd years. Preparation of plant materials for histological or cytological study. One hour rec. and six hours lab. a week. Pr.: Bot. 210 or consent of instructor.
- 217 740. 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.: Bot. 210.
- 217 799. Problems in Botany.** Credit arranged. I, II, S. Work is offered in anatomy, cytogenetics, cytology, ecology, microtechnic, morphology, mycology, physiology, and taxonomy. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 217 800. Mineral Nutrition of Plants.** (2) I. Current interpretations of mineral nutrition of plants, with emphasis on the absorption and transport of the macro and minor elements. Pr.: Bot. 600 or consent of instructor.
- 217 820. Plant Physiological Technique.** (2) II. Methods and techniques used in physiological research. Six hours lab. a week. Pr.: Bot. 600 and a course in biochemistry.
- 217 830. Recent Advances in Cytogenetics.** (3) II. Chromosome structure, mechanics, and behavior; their significance for problems of genetics, evolution, and the origin of species. Two hours rec. and three hours lab. a week. Pr.: Agron. 610 or Bot. 610 or Zool. 605.
- 217 840. Plant Cell Physiology.** (3) II. A study of the living activities of pollen and other plant cells, excluding bacteria. Two hours rec. and three hours lab. a week. Pr.: Bot. 600.
- 217 860. Advanced Plant Ecology.** (4) II in even years. Advanced study of vegetation change and of the relationships of plants and environment at various developmental stages. Eight hours combined rec. and lab. a week. Pr.: Bot. 600 and 670.
- 217 870. Advanced Systematic Botany.** (4) II in odd years. Advanced studies in classification, nomenclature, and taxonomic theory of vascular plants. Two hours rec. and six hours lab. a week. Pr.: Bot. 690.
- 217 980. Graduate Seminar in Botany.** (1) I, II. Reports of investigational work or other matters of interest in the various branches of botany. Pr.: Consent of instructor.
- 217 999. Research in Botany.** Credit arranged. I, II, S. Work is offered in anatomy, cytogenetics, cytology, ecology, microtechnic, morphology, mycology, physiology, and taxonomy. Pr.: Sufficient training to carry on the line of research undertaken.

CHEMISTRY

ADRIAN H. DAANE,* *Head of Department*

Professors Andrews, Daane,* Kiser,* Lambert,* Schrenk* and Silker;* Associate Professors Conrow,* Lanning,* McDonald,* McDowell,* Meloan,* Moser* and Setser;* Assistant Professors Copeland,* Hammaker,* Hawley,* Johnson,* Kotz,* Paukstellis,* Seitz* and van Sicaay;* Emeritus: Professor Lash;* Assistant Professor Harriss; Instructor Crawford*

UNDERGRADUATE

For a major in chemistry, the student should enroll in the Curriculum in Physical Science, Chemistry Major. See p. 119 for the general requirements for this curriculum. In addition to these courses, the Department of Chemistry requires completion of the following courses in order to fulfill the requirements for the Bachelor of Science degree: Math. 222, Engl. 200 or 416; Chem. general 271, 599; analytical 444, 666; inorganic 606; organic 431, 432, 450, 451; physical 585, 586, 595, 598. Each candidate for a degree must also demonstrate a proficiency (reading knowledge) of German. Completion of this curriculum provides certification by the American Chemical Society. Listed prerequisites can be waived upon consent of the instructor.

GRADUATE

Major work leading to the degrees Master of Science and Doctor of Phi-

losophy is offered in the fields of analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry.

Prerequisite to major graduate work in any of these fields is the completion of a four-year curriculum that includes suitable preparatory work in chemistry, mathematics, and physics. The student must show credit in or demonstrate competence in a reading knowledge of scientific German.

COURSES IN GENERAL CHEMISTRY

FOR UNDERGRADUATE CREDIT

221 095. Chemistry Seminar. (0) I, II.

221 110. General Chemistry. (5) I, II. Principal laws and theories of chemistry; important metallic and non-metallic substances. Three hours lec., one hour rec. and three hours lab. a week. Not open to students having credit in any college course in chemistry.

221 210. Chemistry I. (5) I, II, S. Beginning of the study of general chemistry. Three hours lec., one hour rec., and three hours lab. a week. Not open to students who have credit in Chem. 110. Those without high school chemistry should not enroll in this course until the second semester.

221 211. Chemistry I Laboratory. (2) I. Laboratory to accompany the accelerated program in freshman chemistry. Classification in this course restricted to those whose KSU entrance test scores indicated their qualifications for this program. To be taken concurrently with Chem. 231.

221 230. Chemistry II. (3) I, II, S. Completion of the study of general chemistry. Pr.: Chem. 210.

221 231. Chemistry II. (3) I. Accelerated program in freshman chemistry. Classification in this course restricted to those whose KSU entrance test scores indicated their qualifications for this program. To be taken concurrently with Chem. 211.

221 250. Chemistry II Laboratory. (2) I, II, S. Elementary qualitative analysis and additional experimental study of chemical principles. Six hours lab. a week. Pr.: Chem. 230 or conc. enrollment.

221 271. Chemical Equilibria and Qualitative Analysis. (4) II. Provides a basic knowledge of the principles of chemical equilibria and the techniques of separations. Two hours rec. and six hours lab. a week. Pr.: Chem. 230 or conc. enrollment.

221 399. Honors Seminar in Chemistry. (1) I or II.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

221 599. Undergraduate Research. (1, 2, 3) I, II, S. Analytical, Inorganic, Organic or Physical Chemistry.

FOR UNDERGRADUATE AND GRADUATE CREDIT

221 799. Problems in Chemistry. Credit arranged. I, II, S. Problems may include classroom or laboratory work, and are offered in inorganic, analytical, organic, and physical. Not for thesis research. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

221 999. Research in Chemistry. Credit arranged. I, II, S. Work is offered in analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry. Pr.: Sufficient training to carry on the line of research undertaken.

COURSES IN INORGANIC CHEMISTRY

FOR UNDERGRADUATE AND GRADUATE CREDIT

221 606. Inorganic Chemistry. (3) I and alt. S. Facts of chemistry and their present theoretical interpretations; properties of the elements as a basis for methods of classification. Pr.: Chem.¹

1. All chemistry courses numbered 600 or above require the following as minimum prerequisites: Organic Chemistry II (Chem. 450), Organic Chemistry II Lab. (Chem. 451), Physical Chemistry II (Chem. 595), and Physical Chemistry II Lab. (Chem. 598).

221 755. Inorganic Techniques. (2, 3) II. 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.¹

FOR GRADUATE CREDIT

221 802. Graduate Seminar in Inorganic Chemistry. (0-1) I, II, S.

221 826. Chemistry of Non-Metals. (3) II and alt. S. Theory and properties of the non-metallic elements, with emphasis on their individual and group characteristics. Pr.: Chem.¹

221 827. Theoretical Inorganic Chemistry. (3) I and alt. S. A study of modern inorganic chemistry based on the application of theoretical principles and physical techniques; theories of solids and complexes including ligand field theory, the metallic state, and periodic relationships. Pr.: Chem.¹

221 830. Structural Inorganic Chemistry. (3) II. Advanced Inorganic Chemistry, with particular emphasis on the structures of ionic lattices, molecules, and ions. Pr.: Chem. 606.

COURSES IN ANALYTICAL CHEMISTRY

FOR UNDERGRADUATE CREDIT

221 300. General Quantitative Analysis. (4) I, II, S. General procedures of titrimetric, gravimetric, and colorimetric analyses. Two hours rec. and six hours lab. a week. Pr.: Chem. 250 or 271.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

221 442. Chemical Microscopy. (2) On sufficient demand. Use of the microscope in qualitative and quantitative analyses as applied to inorganic substances and to vegetable and animal products. One hour rec. and three hours lab. a week. Pr.: Chem. 300, 350, and 351.

221 444. Quantitative Analysis. (5) II. Basic principles of gravimetric and titrimetric analysis plus modern separation techniques. Three lectures and six hours lab. a week. Pr.: Chem. 431.

FOR UNDERGRADUATE AND GRADUATE CREDIT

221 602. Qualitative Microanalysis. (3) II. Basic theories and techniques of qualitative microanalysis. One hour rec. and six hours lab. a week. Pr.: Chem.¹

221 603. Quantitative Microanalysis. (2) S. Theories and techniques of quantitative microanalysis. Six hours lab. a week. Pr.: Chem.²

221 605. Research Techniques. (3) Principles and application of research techniques employed in agricultural science to include chromatography, spectroscopy, potentiometry, dialysis, electrophoresis and distillation. Two hours rec. and three hours lab. a week. Pr.: Phys. 211, Chem. 350, 351 or consent of instructor. Not applicable for a degree in chemistry.

221 666. Instrumental Analysis. (4) I, II, S. Theory and application of modern instruments in the field of chemistry. Two hours rec. and six hours lab. a week. Pr.: Chem.¹

221 667. 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 rec. and three hours lab. a week. Pr.: Chem. 666 or consent of instructor.

221 750. Systematic Analytical Chemistry. (3) II, S. Theoretical aspects of modern analytical methods, with emphasis on the chemical reactions involved. Pr.: Chem.¹

FOR GRADUATE CREDIT

221 801. Graduate Seminar in Analytical Chemistry. (0-1) I, II.

1. All chemistry courses numbered 600 or above require the following as minimum prerequisites: Organic Chemistry II (Chem. 450), Organic Chemistry II Lab. (Chem. 451), Physical Chemistry II (Chem. 595), and Physical Chemistry II Lab. (Chem. 598).

221 842. Advanced Analytical Chemistry I. (3) I in odd years. Organic functional group and elemental analysis. Non-aqueous titrations, gas analysis, manometric and vacuum technics. Pr.: Chem.¹

221 843. Advanced Analytical Chemistry II. (3) II in even years. Theory of ion exchange, extraction, precipitation, distillation and electrochemical separations. Lesser known analytical technics. Pr.: Chem.¹

COURSES IN ORGANIC CHEMISTRY

FOR 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. Pr.: Chem. 110.

221 191. Elementary Organic Chemistry Laboratory. (2) I, II, S. Pr.: Chem. 190 or conc. enrollment.

221 350. General Organic Chemistry. (3) I, II, S. A survey of types of organic reactions and compounds for students in technical curriculums, particularly in biological science, including pre-veterinary, pre-medical, and certain agriculture and home economics programs. Conc. enrollment in Chem. 351 is urged. Pr.: Chem. 230.

221 351. General Organic Chemistry Laboratory. (2) I, II, S. Pr.: Chem. 350 or conc. enrollment.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

221 431. 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 chemistry curriculum and for entrance to some medical schools. Recommended for others who desire a more thorough course than the preceding ones. Pr.: Chem. 250 or 271. Conc. enrollment in Chem. 432 is recommended.

221 432. Organic Chemistry I Laboratory. (1 or 2) I. Pr.: Chem. 431 or conc. enrollment. (Chemical engineering students only may register for 1 credit.)

221 450. Organic Chemistry II. (3) II. Cont. of Chem. 511, including additional aromatic chemistry, condensation reactions and introduction to some advanced topics, such as dyes, polymers and heterocyclic chemistry. Pr.: Chem. 431 and 432. Conc. enrollment in Chem. 451 is recommended.

221 451. Organic Chemistry II Laboratory. (1 or 2) II. Pr.: Chem. 450 or conc. enrollment. (Chemical engineering students only may register for 1 credit.)

FOR UNDERGRADUATE AND GRADUATE CREDIT

221 651. Qualitative Organic Analysis. (3) S. Characterization of organic compounds and mixtures. Pr.: Chem.¹

221 700. Advanced Organic Chemistry Laboratory. (3) II. One hour rec. and six hours lab. a week. Modern techniques employing specialized equipment and apparatus, such as high pressure reactions, heterogeneous catalysis, vacuum distillation, pyrolysis, etc. Pr.: Chem.¹

221 752. Systematic Organic Chemistry. (3) I. Advanced study of organic compounds and fundamental types of reactions. Pr.: Chem.¹

221 760. Advanced Organic Chemistry. (3) I. Conditions, scope, and applications of reactions useful in synthetic organic chemistry. Pr.: Chem.¹

FOR GRADUATE CREDIT

221 803. Graduate Seminar in Organic Chemistry. (0-1) I, II.

1. All chemistry courses numbered 600 or above require the following as minimum prerequisites: Organic Chemistry II (Chem. 450), Organic Chemistry II Lab. (Chem. 451), Physical Chemistry II (Chem. 595), and Physical Chemistry II Lab. (Chem. 598),

- 221 864. Heterocyclic Compounds.** (2) II in alt. years. Pr.: Chem. 752.
- 221 865. Theoretical Organic Chemistry I.** (3) II. Bond structure, stereochemistry, relation of constitution to physical properties, solvents, and other general topics of a theoretical nature. Pr.: Chem. 651 and 752.
- 221 867. 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. Pr.: Chem. 651 and 752.
- 221 868. Natural Products.** (3) II. Structure proofs and synthetic approaches to important natural products, such as terpenes, alkaloids, and plant pigments. Pr.: Chem. 651 and 752.
- 221 872. Steroids and Polycyclic Compounds.** (2) II in alt. years. Structure proofs and reactions of steroids. Synthesis and properties of polycyclic compounds. Pr.: Chem. 752 or 760.

COURSES IN PHYSICAL CHEMISTRY

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 221 400. Descriptive Physical Chemistry.** (3) Elementary principles of physical chemistry without higher mathematical applications. Not open to students majoring in chemistry. Pr.: Chem. 300, Math. 100.
- 221 535. Radioactive Tracer Techniques.** (3) II. (See Phys. 535.) Chemistry and physics of radioactive substances in field of biological and physical science. Two hours rec. and three hours lab. a week. Taught in cooperation with the Department of Physics. Pr.: Consent of instructors.
- 221 585. Physical Chemistry I.** (3) I. Properties of matter in the gaseous state; kinetic and statistical theory; elementary quantum chemistry; elementary thermodynamics, including the statistical interpretation. Pr.: Chem. 250 or 271, Math. 222 or 232, Phys. 311.
- 221 586. Physical Chemistry I Laboratory.** (2) I. Six hours lab. a week. Pr.: Chem. 300 or 340 and 345 and 585 or conc. enrollment.
- 221 595. Physical Chemistry II.** (3) II. Thermodynamics and chemical equilibrium; reaction kinetics and mechanism; elementary quantum theory of molecular structure and chemical bonding; properties of the solid state. Pr.: Chem. 585.
- 221 598. Physical Chemistry II Laboratory.** (2) II. Six hours lab. a week. Pr.: Chem. 586 and 595 or conc. enrollment.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 221 620. Electrochemistry.** (3) II in even years. Fundamentals of electrochemistry and their applications. Two hours rec. and three hours lab. a week. Pr.: Chem.¹
- 221 625. Colloid Chemistry.** (3) I. Pr.: Chem.¹
- 221 701. Chemical Thermodynamics.** (3) I, S. Pr.: Chem.¹
- 221 702. Chemical Kinetics.** (3) II, S. Pr.: Chem.¹
- 221 754. Molecular Structure.** (3) I. Pr.: Chem.¹
- 221 770. Photo and Radiation Chemistry.** (3) II in alt. years. Principles and current topics involved in chemical reactions induced by light and ionizing radiations. Pr.: Chem.¹

FOR GRADUATE CREDIT

- 221 804. Graduate Seminar in Physical Chemistry.** (0-1) I, II.
- 221 850. Chemical Statistical Thermodynamics.** (3) II. Pr.: Chem. 701, Math. 621.
- 221 895. Theoretical Chemistry I.** (3) II. Pr.: Chem. 754 and Phys. 640.
- 221 896. Theoretical Chemistry II.** (3) I. Pr.: Chem. 895.

1. All chemistry courses numbered 600 or above require the following as minimum prerequisites: Organic Chemistry II (Chem. 450), Organic Chemistry II Lab. (Chem. 451), Physical Chemistry II (Chem. 595), and Physical Chemistry II Lab. (Chem. 598).

ECONOMICS

(The College of Arts and Sciences section of the Department of Economics; see also College of Agriculture.)

JOHN A. NORDIN,* *Head of Department*

Professors Bagley, Chalmers,* Fisher* and Nordin;* Associate Professors DeCou* and Emerson;* Assistant Professors Fan,* Greenwood, Ladin, Nafziger and Narasimham;* Instructors Madden and Reed; Emeritus: President Farrell**

ECONOMICS

(Courses in Agricultural Economics are offered by the College of Agriculture; courses in Accounting and Business Administration are offered by the College of Commerce.)

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, capital—and factors causing business prosperity and depression, economic growth, inflation and deflation. Students may pursue specialized study in the fields of economic theory, money and banking, public finance, labor relations, international trade, economic development, and business fluctuations.

A major in economics will help prepare a student for a career in business, in government, or in education. The study of economics will also 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 in either of two curriculums, the Social Science curriculum or the Secondary Education curriculum. The Social Science curriculum leads to a Bachelor of Arts degree and the Secondary Education curriculum to a Bachelor of Science degree.

Social Science Curriculum. Students preparing for positions in business, labor, government, research organizations, college teaching, and others with a special interest in economics should enroll in the Social Science curriculum with a major in economics.

Requirements of the Curriculum in Social Science are listed on page 120. Requirements for an economics major in this curriculum (X, page 120) are: Econ. 120, 430, 710; Stat. 320; B. A. 273; and 12 semester hours of courses numbered 400 or above in economics, agricultural economics, business administration, or psychology, of which at least six hours should be in economics, the particular courses to be selected in consultation with the student's adviser. Math. 100 should be used to satisfy requirement III, page 120. Econ. 110 should be taken to satisfy the economics requirement in VII, page 120.

Secondary Education Curriculum. Majors in economics who desire to prepare for teaching in secondary schools should enroll in the Curriculum in Secondary Education. The requirements of the Secondary Education curriculum are on page 110. The sequence of courses should be planned in cooperation with the student's advisers in both economics and education.

Labor and Industrial Relations Option. An economics or sociology major planning to work in the industrial relations field (holding a government, industrial, or trade union position) will become acquainted with the economic, political, psychological, and social aspect of labor-management relations, by taking the following courses as parts of either a terminal university program or a foundation for graduate study: Soc. 602; Econ. 620, 627; Psych. 515, 625, and 600 or 532; B. A. 400, 431.

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, development of economic thought, econometrics, location economics, labor economics, monetary and fiscal policy, economic development, international trade, and economic systems.

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. Ph. D. students must demonstrate a reading proficiency in one foreign language and reasonable proficiency in mathematics.

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 Commerce, with the Agricultural and Engineering Experiment Stations, and with various state agencies.

COURSES IN ECONOMICS

FOR 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; international economic relations.

225 120. Economics II. (3) I, II, S. Cont. 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; principles of economic development; other economic systems.

225 398. Honors Seminar in Economics. (1) I, II. Readings and discussion of selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

225 430. 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

225 610. Public Finance. (3) I, II, S. An analysis of federal, state, and local tax structures, with a consideration of the principles and problems underlying specific revenue sources. Attention is given to problems of social security, intergovernmental fiscal relations, and tax shifting. Pr.: Econ. 110.

225 620. Labor Economics. (3) I, II, S. History and philosophy underlying trade union organization and collective bargaining; analysis of selected major issues in the field of industrial relations, including wages, unemployment and inflation, and the concentration of economic and political power in unions and management. Pr.: Econ. 110.

225 627. Contemporary Manpower Problems. (3) II. Impact of automation and technological change on the labor force; employment, unemployment, and manpower trends; labor-management relations and policies; training, retraining and education; case studies of labor-management adjustment to technological change. Pr.: Econ. 620 or consent of instructor.

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.

225 636. Economic Systems. (2) I, II, some S. A survey of economic systems, Marxian socialism and modern socialism, giving attention to English socialism, communism, and to the essential characteristics of the free enterprise capitalistic system. Pr.: Econ. 110.

- 225 681. International Trade.** (3) I, some S. Economic principles underlying international trade and finance; governmental policies toward international trade; procedures in exporting and importing. Pr.: Econ. 110.
- 225 682. Strategy of Economic Development.** (3) II. An analytical study of the nature of, the obstacles to, and the future possibilities for the economic growth of nations. Special emphasis will be placed upon the "underdeveloped" nations and will include various theories of economic growth in relation to economic, political and sociological factors. Case studies of particular nations will be utilized. Pr.: Econ. 120 or 430.
- 225 686. Business Fluctuations and Forecasting.** (2) I, S in odd years. Types of business fluctuations; measurement of business cycles; theories of the causes of business cycles; proposals for stabilizing business activity, techniques of forecasting business activity. Pr.: Econ. 110.
- 225 690. Monetary, Credit, and Fiscal Policies.** (2) II. Monetary, central bank, tax, public expenditure, and public debt policies; their influences on business activity and the price level. Utilization of such policies to maintain economic stability and progress. Pr.: Econ. 430.
- 225 710. Intermediate Economic Analysis.** (3) I, S in even years. The nature and scope of economic analysis including the function of the price system; determination of price and output of commodities and factor services in different market structures, with emphasis on the business firm as a decision maker. Pr.: Econ. 120 or consent of instructor.
- 225 720. Income and Employment Theory.** (3) II, S in even years. Factors determining the national income, employment, and the price level. The income theory of J. M. Keynes is emphasized, with some attention being given to developments growing out of Keynesian theory. Pr.: Econ. 120.
- 225 730. Introduction to Econometrics.** (3) II. Analytical and quantitative methods used in economics. Applications to specific problems. Pr.: Math. 220 or 340 or equiv.

Effective September 1, 1966

- 225 735. Mathematical Economics.** (3) I. Application of mathematical tools to concrete problems in micro- and macro-economics; mathematical treatment of models of consumption, production, market equilibrium, and aggregate growth. Pr.: Econ. 710, Math. 221 or 340; or consent of instructor.
- 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 effecting the position and slope of the demand schedule for their products by different patterns of expenditure or advertising and selling. Pr.: Econ. 710.
- 225 795. Problems in Economics.** Credit arranged. 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.

FOR GRADUATE CREDIT

- 225 810. History of Economic Thought.** (3) I, some S. Development of economic ideas and doctrines and the relation of these two conditions existing when they were formulated. Pr.: Econ. 110.
- 225 815. Value and Distribution Theory.** (3) I, S in odd years. Neo-classical value and distribution theory; theories of imperfect competition; introduction to general equilibrium theory and dynamic analysis. Pr.: Econ. 710 or consent of instructor.

- 225 820. Labor Economics Seminar.** (3) I. A critical analysis of wage theories, collective bargaining and unemployment problems. Pr.: Econ. 620 or consent of instructor.
- 225 825. Location of Economic Activities.** (3) II. Integration of effects of factors affecting location of economic activities; selection of strategies the people of an economic area can use to optimize their responses to expected technological and political changes, and changes in consumer demand. Pr.: Econ. 815.
- 225 835. Econometric Methods.** (3) Offered on sufficient demand. Quantitative methods of research used in economics. Pr.: Econ. 730 or consent of instructor.
- 225 840. Economic Welfare and Public Policy.** (3) I. Theory of welfare economics, with applications to current economic problems and policy. Pr.: Econ. 815 or consent of instructor.
- 225 845. 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 micro-economic theories, with attention given to risk and uncertainty. Pr.: Econ. 815.
- 225 850. Advanced Income and Employment Theory.** (3) II. Post-Keynesian macro-economic theory; growth models and cyclical models; current developments in national income analysis. Pr.: Econ. 720 or consent of instructor.
- 225 855. 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. 825 or consent of instructor.
- 225 880. Seminar in Economics.** (3) I, II. Special topics in economic theory. Pr.: Graduate standing.
- 225 995. Research in Economics.** Credit arranged. I, II, S. Research for thesis or master's report.

ENGLISH

EARLE R. DAVIS,* *Head of Department*

Professors Davis, Higginson,* Hummel,* Moses,* Thornton* and Woolf; Associate Professors Adams,* Ansdell,* Jones,* Miller,* Noonan,* Rogerson,* Soellner* and White; Assistant Professors Brondell, Eitner,* Gillespie, Glenn,* Johnston, Kluz, Koch,* Laman,* Nichols, Nyberg, Pennel* and Rees; Instructors Cohen, Conover, Epstein, Oppy, Pederson, Peltschek and Schneider; Emeritus: Professors Aberle, Conover,* Faulkner and Sturmer*

UNDERGRADUATE

Students may elect under the Curriculum in Humanities a major program in either English or American Literature and Language. The general requirement in each is 30 semester hours subsequent to Engl. 120. All majors must take the English Comprehensive examination (including Secondary Education majors in English) in their sixth semester (Engl. 599). For the English emphasis the following courses are required: 420, 425, either 440 or 445, one Shakespeare course, from six to 12 hours of English Literature electives, from six to nine hours of American Literature electives, and from none to six hours of other departmental electives. For the American emphasis the following courses are required: 440, 445, either 420 or 425, one Shakespeare course, from six to 12 hours of American Literature electives, from six to nine hours of English Literature electives, and from none to six hours of other departmental electives.

Students preparing to teach English in high school may adopt either of two programs: (1) the major in English, leading to the B. A. Degree, or (2) the major in Secondary Education, leading to the B. S. Degree in Secondary Education. Under the first option, students qualify for certification by means of specified courses in the College of Education. Under the second, they satisfy the requirements of the English Department

by means of the following courses: 350 or 651, 406, 451, 475, 599; three of the surveys (420, 425, 440, 445); and nine hours in elective courses. The Comprehensive Examination (599) is required under either program.

The department offers general education courses aiming at introductory appreciation of literature for non-major students: Engl. 143, 144, 146, 147, 230, 251, 256, 270, 275, 345, 350, 370, and 375. Many programs require the Introduction to the Humanities, or the basic literature courses in English or American Literature, or Books and Men. In general it is proper to substitute in any curriculum or program an advanced course for an elementary one, if the student so elects and the teacher gives consent.

A minor program should include 15 hours beyond the freshman level, nine of which must be selected from courses numbered 400 or above.

GRADUATE

Work leading to the degrees Master of Arts and Doctor of Philosophy is offered in the Department of English. In addition to the field of English Literature special emphasis on one of the following may be indicated by the student's committee: American Literature, linguistic study, and, for the Master's Degree, Creative Writing.

Candidates for graduate work should have completed an undergraduate curriculum with a broad background in language and literature. Students lacking preparation in certain representative areas may be asked to do additional work. Those who have not previously taken the graduate record examination must do so in their first semester.

Other requirements for the degree Master of Arts include a minimum of 30 semester hours, approximately two-thirds of which will be in the major field. Candidates must demonstrate competence in reading knowledge of a foreign language, usually French or German. They must also write an acceptable thesis or report and pass written and oral examinations covering the field.

Other requirements for the degree Doctor of Philosophy include about 90 semester hours beyond the baccalaureate, approximately two-thirds of which will be in the major field. Candidates must demonstrate a proficiency in two languages, generally French and German. They must also pass a preliminary examination in English and American literature and language, write an acceptable dissertation, and defend it orally.

COURSES IN ENGLISH

FOR UNDERGRADUATE CREDIT

229 020. English Assembly. (0) I, II, S.

229 030. Writing Laboratory. (0) I, II, S. Laboratory practice in writing for all students who need review in fundamentals of composition. Especially designed to meet the needs of students who have difficulty in meeting standards in Written Communications or English Proficiency.

229 050. Developmental Reading Laboratory. (0) I, II. Designed to improve reading skills, speed, vocabulary, comprehension, and ability to analyze articles for basic consumption, propaganda techniques, and general construction. Fee for reading materials. Pr.: Evidence that candidate is in upper two-thirds of his class in grade average.

229 075. English for Foreign Students. (0) I, II, S. Review of English usage for students where English is not the first language, designed to improve understanding and usage in practice. Pr.: Recommendation of student's adviser.

229 090. English Proficiency. I, II, S. An examination to test the ability of the prospective graduate to write an expository essay logical in form and acceptable in grammar and diction. Required for graduation in all colleges. Pr.: Junior standing.

229 100. English Composition I. (3) I, II, S. Reading and composition for freshmen. Students may be assigned two additional hours a week

of writing laboratory upon recommendation of the instructor. Pr.: Satisfactory entrance test.

- 229 105. English Composition IA.** (3) I, II, S. Reading and composition for students whose reading comprehension falls materially below their linguistic capacity. Five hours rec. a week.
- 229 110. English Composition IH.** (3) I, II, S. Reading and composition for freshmen who score high on their entrance examination in English and who are interested in pursuing a more sophisticated and challenging program than is possible in Engl. 100. Not open to students with credit in Engl. 100.
- 229 115. English Composition IIA.** (3) I, II. Reading and composition for students whose reading comprehension falls materially below their linguistic capacity. Five hours rec. a week.
- 229 120. English Composition II.** (3) I, II, S. Cont. of Engl. 100, with emphasis on critical reading and evaluation. Students may be assigned to two hours a week of Writing Laboratory upon recommendation of the instructor. Pr.: Engl. 100 or 105.
- 229 125. English Composition IHH.** (3) I, II. Cont. of Engl. 110, with the emphasis on literary forms and themes. Pr.: Engl. 100 or 110.
- 229 143. Introduction to Humanities I.** (3) I, S. Classical cultures.
- 229 144. Introduction to Humanities II.** (3) II. Medieval and Renaissance culture.
- 229 146. Introduction to Humanities III.** (3) I, S. Culture of the Baroque Period and the Age of Reason.
- 229 147. Introduction to Humanities IV.** (3) II. Cultural trends of the nineteenth and twentieth centuries.
- These courses seek to develop a greater understanding, appreciation, and enjoyment of the humanistic resources of Western culture. The student is introduced to the great works in literature, philosophy, art, music and religion in each major period. The courses may be taken in any order, but a chronological sequence is recommended.
- 229 200. English Composition III.** (3) I, II, S. Composition and argumentation. Pr.: Engl. Comp. II.
- 229 230. Introduction to Fiction.** (2) I, II. Selected novels from world literature, with emphasis on the present.
- 229 251. English Literature I.** (3) I, II, S. Pr.: Engl. Comp. II.
- 229 256. English Literature II.** (3) I, II, S. Pr.: Engl. Comp. II.
- 229 270. American Literature I.** (3) I, II, S. Pr.: Engl. Comp. II.
- 229 275. American Literature II.** (3) I, II, S. Pr.: Engl. Comp. II.
- 229 345. Introduction to Drama.** (3) I, II. Study of classical, medieval, French neoclassical, and nineteenth century continental drama. Pr.: Engl. Comp. II.
- 229 350. Introduction to Shakespeare.** (3) I, II, S. An introductory study of representative comedies, tragedies, and histories. Pr.: Engl. Comp. II.
- 229 370. Books and Men I.** (3) I, II, S. Introduction to great world classics from present to past. Pr.: Engl. Comp. II.
- 229 375. Books and Men II.** (3) I, II, S. Cont. of Engl. 370: Huxley, Swift, and Plato; Dostoevsky; The Bible, Dante, T. S. Eliot, and other classics. Pr.: Engl. Comp. II.
- 229 397. Honors Seminar in Humanities.** (1) I, II. Colloquium on the interrelationships of the humanities fields, including art, literature, music, and philosophy. Pr.: Honors students only.
- 229 398. Junior Honors Colloquium.** (Variable credit) I, II. Open only to juniors in the Arts and Sciences Honors Program.
- 229 399. Honors Seminar in English.** (1) I, II. Readings and colloquia in selected masterpieces. For non-English majors in the Honors Program. Pr.: Honors students only.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 229 406. Advanced Composition.** (3) I, II, S. Expository writing, primarily for candidates for the teaching certificate in Secondary Education. Pr.: Engl. Comp. II.
- 229 416. Scientific Report Writing.** (2) I. Preparation of scientific reports in engineering, chemistry, physics, geology, agronomy, and other technical fields. Letters of authorization and submittal. Adaptation of written reports for oral presentation or for publication in technical journals. Pr.: Engl. Comp. II.
- 229 420. English Survey I.** (3) I, II, S. History of English literature from Anglo-Saxon times down to the close of the Elizabethan period. Required of majors with English emphasis program. Pr.: Engl. Comp. II.
- 229 425. English Survey II.** (3) I, II, S. Rise of Puritanism and its influence on English literature; classical movement; Romanticism and its development. Required of majors with English emphasis program. Pr.: Engl. Comp. II.
- 229 430. Narrative Writing I.** (3) I. Subjects selected from the student's particular field of work; exposition of mechanisms, processes, and general expository writing. Pr.: Engl. Comp. II.
- 229 436. Narrative Writing II.** (3) II. Narrative writing, both in its relation to the other forms of composition and as an independent form. Direction and criticism of thesis work are offered to graduate students. Pr.: Engl. Comp. II.
- 229 440. American Survey I.** (3) I, II, S. The colonials to the Civil War. Required of majors with American emphasis program. Pr.: Engl. Comp. II.
- 229 445. American Survey II.** (3) I, II, S. Whitman to the present. Required of majors with American emphasis program. Pr.: Engl. Comp. II.
- 229 451. Modern English Grammar.** (3) I, II, S. English etymology, parts of speech, inflection, syntax, and modern usage. For graduate credit reports on problems in modern grammar and usage. Pr.: Engl. Comp. II.
- 229 470. Literature for Children.** (3) I, II, S. Selecting, reading, and evaluating books for children; training in story-telling and oral reading; selection of records correlated with literature. For teachers of elementary grades and students of child guidance. Pr.: Engl. Comp. II.
- 229 475. Literature for Adolescents.** (3) I, II, S. Selecting reading, and evaluating books for adolescents; training in oral reading and selection of records correlated with literature. For teachers in the junior and senior high schools and students of guidance for adolescents. Pr.: Junior standing.
- 229 520. English Bible.** (3) II. The Bible as literature along with emphasis on the cultural and historical backgrounds of the Old Testament.
- 229 560. American Folklore and Folk Literature.** (3) I, II, S. Folk tales, heroes, ballads, with the literature developed from folk beginnings; Mark Twain, Bret Harte, Carl Sandburg, Stephen Vincent Benet, Mark Connally. Pr.: Engl. Comp. II.
- 229 570. American Short Story.** (3) II, S. A study of the form from its American beginnings to the present, with emphasis on the major writers: Poe, Hawthorne, James, Crane, Hemingway, Faulkner. Pr.: Engl. Comp. II. (English majors who have credit for either semester of 19th Century American Fiction may not take this course for credit.)
- 229 580. Twentieth Century American Novel.** (3) I, S. The modern American novel from Dreiser and Wharton to Hemingway and Faulkner. Pr.: Engl. Comp. II.

229 599. English Comprehensive. (0) I, II, S. An examination required of all majors, based on departmental reading list and the scope of literature covered in the English and American Survey courses. To be taken in sixth semester of academic program.

229 610. Dante. (3) I. An in-depth study of the *Divine Comedy* in translation, using Dante as an exponent of medieval thought. (Same as Mod. L. 610.)

FOR UNDERGRADUATE AND GRADUATE CREDIT

229 620. The Epic Tradition. (3) II. Greek and Roman masterpieces in translation as a background for the study of English literature. Pr.: Junior standing.

229 625. Medieval Narrative. (3) II. A survey of non-Chaucerian medieval literature, with emphasis on the Arthurian romance cycle. Pr.: Engl. Comp. II.

229 630. Chaucer. (3) I, II, S. Pr.: Engl. Comp. II.

229 641. Elizabethan Non-dramatic Literature. (3) I in alt. years. An introduction to the literature of the English Renaissance, with some emphasis on its Continental affiliations. Pr.: Engl. Comp. II.

229 645. English Drama I. (3) I, S in alt. years. A survey of the dramatic literature of Elizabethan and Jacobean times, exclusive of Shakespeare. Pr.: Engl. Comp. II.

229 646. English Drama II. (3) I, S in alt. years. A survey of the dramatic literature of the Restoration and Neoclassical periods. Pr.: Engl. Comp. II.

229 651. Shakespearean Drama. (3) I, II, S. A study of Shakespearean drama, with special attention to the criticism and bibliography. Pr.: Engl. Comp. II and junior standing.

229 652. Introduction to Linguistics. (3) I, II, S. Study of the basic concepts of modern descriptive linguistics. Pr.: Junior standing. (Same as Spch. 652 and Mod. L. 652.)

229 655. The Folk Tale. (3) II. Study of development of oral tradition in the folklore of basic cultures, with literary analogues. Pr.: Engl. 560.

229 664. Topics in Applied Linguistics. (3) II. Principles of contrastive structural analysis, especially English/French, English/Spanish, English/German. Course on another topic may be repeated for credit. Pr.: Spch. 652, Mod. L. 652 or Engl. 652. (Same as Mod. L. 664 and Spch. 664.)

229 665. Seventeenth Century Literature. (3) II, S. A survey of the principal non-dramatic writers, apart from Milton, 1600-1660, with emphasis on Donne and the Metaphysicals. Pr.: Engl. Comp. II.

229 669. Language Typology. (3) Presentation and discussion of the languages of the world and the variant methods of their classification. Pr.: Engl. 652, Mod. L. 652, Spch. 652 or consent of instructor and junior standing. (Same as Mod. L. 669 and Spch. 669.)

229 671. Milton. (3) II, S. Pr.: Engl. Comp. II.

229 673. 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 Mod. L. 673 and Spch. 673.)

229 674. Methods and Techniques of Learning a Second Language. (3) Linguistics applied to the learning of foreign language, especially English as a foreign language. Pr.: Twelve hours of a modern language, including English, and Spch. 652, Mod. L. 652 or Engl. 652. (Same as Spch. 674 and Mod. L. 674.)

229 675. American Colonial Literature. (3) I. American literature from the beginning to the close of the Revolutionary War. Pr.: Junior standing.

- 229 676. Phonetics and Phonemics of English.** (3) Detailed study of the speech sounds of English, their production, functions as signals, and realizations in the stream of speech in English. Pr.: Spch. 210 and Engl. 652, Mod. L. 652, Spch. 652 or consent of instructor and junior standing. (Same as Mod. L. 676 and Spch. 676.)
- 229 677. Morphology and Syntax of English.** (3) I, II, S. Consideration of current theories of grammar, with emphasis on morphemics and tagemics. Pr.: Engl. 451. Same as Mod. L. 677 and Spch. 677.)
- 229 681. Eighteenth Century I.** (3) I. English literature from the Restoration to the death of Swift, with emphasis upon Dryden, Swift, and Pope. Pr.: Engl. 120.
- 229 686. Eighteenth Century II.** (3) I. The age of Dr. Johnson and the beginnings of Romanticism. Pr.: Engl. 120.
- 229 691. English Novel I.** (3) I. Survey of British fiction from Defoe and Fielding to the Brontes. Pr.: Engl. 120.
- 229 696. English Novel II.** (3) II. Survey of British fiction from Dickens and Thackeray to Galsworthy and Bennett. Pr.: Engl. 120.
- 229 699. English Seminar.** (3) II. Intensive study of the writings of a single major author, English or American. Pr.: Senior or graduate standing and consent of instructor.
- 229 705. The Romantic Movement.** (3) I. Pr.: Engl. 120.
- 229 710. Romanticism in America.** (3) I, II, S. Emphasis on Emerson, Thoreau, Whitman and Dickinson. Pr.: Engl. 440 or consent of instructor.
- 229 715. Nineteenth Century American Fiction I.** (3) I, S. Emphasis on Brown, Irving, Cooper, Poe, Hawthorne and Melville. Pr.: Engl. 440 or consent of instructor.
- 229 718. Nineteenth Century American Fiction II.** (3) II, S. Emphasis on Twain, James, Howells, Crane, Norris. Pr.: Engl. 445 or consent of instructor.
- 229 720. The Victorian Era.** (3) II. Pr.: Engl. 120.
- 229 740. Twentieth Century English Novel.** (3) II in alt. years. British fiction from Conrad and Joyce to Greene and Waugh. Pr.: Engl. 120.
- 229 748. Twentieth Century European Novel.** (3) II. Offered in alt. years with Twentieth Century English Novel. A study of the works, in translation, of such modern European masters as Silone, Mann, Gide, Kafka, and others. Pr.: Engl. 120.
- 229 750. Twentieth Century English Poetry.** (3) I. Development of English poetry from Hardy and Yeats to the present time. Pr.: Engl. 120.
- 229 755. Twentieth Century American Poetry.** (3) I, S. Development of American poetry from Robinson and Frost to Eliot and the present time. Pr.: Engl. 120.
- 229 760. Twentieth Century English Drama.** (3) I. Special emphasis on Shaw. Pr.: Engl. 120.
- 229 765. Twentieth Century American Drama.** (3) S. American drama from O'Neill and Anderson to Miller and Williams. Pr.: Engl. 120.
- 229 775. Creative Writing.** (3) I, II. Imaginative writing, with particular emphasis on the short story. Pr.: Engl. 430 or consent of instructor.
- 229 780. Literary Criticism.** (3) I. Major points of view in modern literary theory, with background in earlier criticism; practice in the critical analysis and judgment of literary examples. Pr.: Senior standing.
- 229 790. History of the English Language.** (3) I. Nature of language and its development; English language and its use in the United States. Pr.: Senior standing or consent of instructor.
- 229 799. Problems in English.** Credit arranged. I, II, S. Work offered in major authors, types, and periods of English and American literature; linguistics; scientific report writing. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 229 802. Bibliography and Methods of Research.** (3) I, II, S. Pr.: Graduate standing.
- 229 810. Old English.** (3) II in alt. years. The elements of Old English grammar, with concurrent readings in prose and poetry. Pr.: Engl. 790 or consent of instructor.
- 229 811. Old English Poetry.** (3) I in alt. years. Pr.: Engl. 810 or consent of instructor.
- 229 812. Middle English Poetry.** (3) II in alt. years. Pr.: Engl. 790 or consent of instructor.
- 229 820. Selected Topics in the Study of Language.** (3) II in alt. years. Pr.: Engl. 790 or consent of instructor.
- 229 830. Chaucer Seminar.** (3) I in alt. years. Pr.: Engl. 630.
- 229 845. Studies in Sixteenth Century Literature.** (3) I, II, S in alt. years. Bibliographic and critical research in the works of selected major authors. Pr.: Consent of instructor.
- 229 850. Shakespeare Seminar.** (3) II in alt. years. Pr.: Engl. 651.
- 229 855. Studies in Seventeenth Century Literature.** (3) I, II, S in alt. years. Bibliographic and critical research in the works of selected major authors. Pr.: Consent of instructor.
- 229 870. Milton Seminar.** (3) II in alt. years. Pr.: Engl. 671 or consent of instructor.
- 229 875. Studies in Eighteenth Century Literature.** (3) I, II, S in alt. years. Bibliographic and critical research in the works of selected major authors. Pr.: Consent of instructor.
- 229 885. Studies in Nineteenth Century Literature.** (3) I, II, S in alt. years. Bibliographic and critical research in the works of selected major authors. Pr.: Consent of instructor.
- 229 895. Studies in Twentieth Century Literature.** (3) I, II, S in alt. years. Bibliographic and critical research in the works of selected major authors. Pr.: Consent of instructor.
- 229 920. Topics in Poetry.** (3) I in alt. years. Intensive study of a poet or group of poets, either English or American. Pr.: Consent of instructor.
- 229 930. Topics in Drama.** (3) II in alt. years. Intensive study of a dramatist or group of dramatists, either English or American. Pr.: Consent of instructor.
- 229 940. Topics in Fiction.** (3) I in alt. years. Intensive study of a novelist or group of novelists, either English or American. Pr.: Consent of instructor.
- 229 950. Selected American Novelists of the Twentieth Century.** (3) I, II, S. Intensive reading in the writings and criticism of American novelists from 1900 to 1950. Pr.: Consent of instructor.
- 229 999. Research in English.** Credit arranged. I, II, S. Pr.: Registration in the Graduate School, with sufficient training to carry on the line of research undertaken.

GEOLOGY AND GEOGRAPHY

JOSEPH R. CHELIKOWSKY,* *Head of Department*

GEOLOGY

Professors Beck, Chelikowsky* and Shenkel;* Associate Professors Brookins,* Twiss* and Walters;* Assistant Professors Chaudhuri, Riseman* and Viam;* Instructor Clark; Emeritus: Professor Sperry**

UNDERGRADUATE

Geology offers optional programs of study in Geology, Geochemistry, Geophysics, and cooperates with the College of Education in an Earth

Science program for high school teachers. For detailed plans of study and for information regarding dual degrees in Civil Engineering and Geology, consult the head of the department.

Geology Option

In addition to the requirements for a geology major under the Curriculum in Physical Science (p. 119), the following must be completed: Geol. 110, 300, 420, 430, 460, 470, 480, 530, 600, 603, and 640. Hard rock majors must take Geol. 602; soft rock majors, paleobotany or advanced paleontology. The biology requirement must be satisfied with Zool. 205 and Bot. 210.

Geochemistry Option

In addition to the requirements on p. 119, the following must be completed: Geol. 110, 430, 460, 470, 530, 600, 603, 612, 614, and 640; Math. 222 and 240; Phys. 535; Chem. 300, 350, 351, 585, 586, 595, and 598. The biology requirement must be satisfied with Zool. 205 and Bot. 210.

Geophysics Option

In addition to the requirements on p. 119, the following must be completed: Geol. 110, 430, 460, 470, 530, 603, and 640; Math. 222 and 240; Phys. 211, 212, and 407 may be substituted for Phys. 310 and 311. Other physics courses required are Phys. 421, 432, 472, 473, 602, and 680.

Earth Science Options for High School Teachers

In addition to the requirements for a Geology major, emphasis under the Curriculum in Education (p. 110) for Secondary Education majors, the following must be completed: Geol. 100, 110, 420, 430, and 460; Geog. 207; Math. 100 and 150; Chem. 210, 230, and 250; Zool. 205; Bot. 210; Phys. 131, 135, 211, and 212, also five hours of social science electives.

GRADUATE

The prerequisite to graduate work is the completion of a four-year undergraduate program including suitable preparatory work in geology, mathematics, and the physical and biological sciences.

Research facilities include an X-ray diffractometer and X-ray fluorescence unit, a fully equipped geochemistry laboratory for isotopic work, complete petrographic facilities, paleontology and geology laboratories. Geophysical facilities include a seismological observatory, seismic and magnetic exploration equipment.

The University area abounds in excellent outcrops and is unusually well situated for field work involving studies in sedimentary petrology, stratigraphy, groundwater geology, soil mineralogy, petroleum geology, plains-type structures and invertebrate paleontology.

COURSES IN GEOLOGY

FOR UNDERGRADUATE CREDIT

- 234 100. General Geology.** (3) I, II, S. Structural and dynamic features of the earth; the rock-forming minerals; the rocks and their decay; a short history of the earth. One or two field trips during the semester.
- 234 110. General Geology Laboratory.** (1) I, II, S. Minerals, rocks; topographic and geologic maps; field trips. Three hours lab. a week. Pr.: Geol. 100 or conc. enrollment.
- 234 300. Introductory Geochemistry.** (2) I, II. Introduction to the distribution of the elements in the lithosphere, hydrosphere, biosphere and atmosphere as related to the evolution of the earth and the formation of igneous, metamorphic and sedimentary rocks. Two hours rec. a week. Pr.: Geol. 100, 460; Chem. 230, 250.
- 234 399. Honors Seminar in Geology.** (1) Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 234 412. Earth Science.** (4) 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. and three hours lab. a week. Pr.: Geol. 100 or Geog. 207 or junior standing.
- 234 420. 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.
- 234 430. Historical Geology.** (4) I, II, S. Physical and biological events through which the earth has gone. Three hours rec. and three hours lab. a week. Pr.: Geol. 100.
- 234 440. Petroleum Geology.** (3) I or II. Origin, migration, and accumulation of petroleum. Stratigraphy and structure of important fields. Three hours rec. a week. Pr.: Geol. 430.
- 234 460. Mineralogy.** (5) I or II. Crystallography, physical and chemical mineralogy, and classification of common minerals. Three hours rec. and six hours lab. a week. Pr.: Chem. 210.
- 234 470. Field Methods in Geology.** (2) I or 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. 430.
- 234 480. Invertebrate Paleontology.** (4) I or II. Evolution and geologic history of the invertebrate animals. Three hours rec. and three hours lab. a week. Pr.: Geol. 430.
- 234 530. Structural Geology.** (4) I or II. Mechanics of the earth's crust, interrelation of structures found in the earth. Three hours rec. and three hours lab. a week. Pr.: Geol. 470.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 234 600. Optical Petrography.** (4) I, II. Polarizing microscope used to identify crystal fragments, powders, sediments, and thin sections; optical theory and methods of microscopic research. Two hours rec. and six hours lab. a week. Pr.: Geol. 460.
- 234 601. Geologic Reports and Illustrations.** (2) I, II. Preparation and representation of geologic reports and illustrations. Two hours rec. a week. Pr.: Geology majors with senior or graduate standing.
- 234 602. Economic Geology.** (3) I or II. Origin and mode of occurrence of non-metallic minerals, including coal and petroleum, and of metallic mineral deposits. Two hours rec. and three hours lab. a week. Pr.: Geol. 430, 460.
- 234 610. 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.
- 234 612. Geochemistry I.** (3) I or II. Application of chemical principles to geologic systems, emphasis on low-temperature aqueous equilibrium, oxidation-reduction, crystal chemistry, thermodynamics, high temperature phase equilibria. Three hours rec. a week. Pr.: Chem. 585 or equiv., Geol. 600 or consent of instructor.
- 234 614. Geochemistry II.** (3) I or II. Distribution of elements in the earth's crust, geochemistry of meteorites, igneous, metamorphic, sedimentary rocks, weathering, the hydrosphere, biosphere, atmosphere, ore deposits. Geothermometry, geochemical prospecting. Three hours rec. a week. Pr.: Geol. 612 or equiv.
- 234 616. Geochemistry Laboratory Techniques.** (2) I or II. Application of X-ray diffractometry, ion exchange, mineral separation, petrographic modal analysis, and flame photometry to specific geologic problems. Two three-hour labs. per week. Pr.: Geol. 612 or conc. enrollment.
- 234 620. Geology of Subsurface Water.** (3) I or II. Three hours rec. a week. Pr.: Geol. 510, 530.

- 234 640. Field Geology.** Credit arranged. S. Opportunity is offered students to do field work in the Rocky Mountains. Students interested should consult the head of the department.
- 234 660. Micropaleontology.** (3) I or II. Preparation, identification, and use of microscopic fossils. One hour rec. and six hours lab. a week. Pr.: Geol. 480 and junior standing.
- 234 670. Subsurface Methods.** (3) I, II. Study of well cuttings, 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. 440, 460.
- 234 680. Vertebrate Paleontology.** (3) I or II. Evolution, geologic history, and classification of the vertebrates. Pr.: Geol. 430 or 10 hours of zoology.
- 234 690. Petrography.** (3) I or II. Study of constituents, composition textures, structures, and classifications of rocks; study of hand specimens and thin sections. Two hours rec. and three hours lab. a week. Pr.: Geol. 600.
- 234 700. Index Fossils.** (2) I or II. Identification of those fossil plants and animals of value in the age correlation of the sedimentary rocks of North America. Six hours lab. a week. Pr.: Geol. 480.
- 234 710. Igneous Petrology.** (3) I or II. The origin and history of igneous rocks; the study of selected rock suites. Two hours rec. and three hours lab. a week. Pr.: Geol. 690.
- 234 720. Pleistocene Geology.** (2) I or II. Pleistocene stratigraphy and its development in North America; correlation of European and North American Pleistocene rocks. Two hours rec. a week and one field trip a semester. Pr.: Geol. 420, 510.
- 234 730. Metamorphic Petrology.** (3) I or II. Problems in metamorphism and advanced studies of metamorphic rocks; study of selected rock suites. Two hours rec. and three hours lab. a week. Pr.: Geol. 690.
- 234 740. Regional Geology.** (3) I or II. Structure and the stratigraphy of the major tectonic units of North America. Pr.: Geol. 510, 530.
- 234 750. Aerial Photogeology.** (3) I or II. Interpretation and use of aerial photographs; characteristics of photographs; adjustment of geologic, cultural, and topographic detail. One hour rec. and six hours lab. a week. Pr.: Geol. 470.
- 234 760. Sedimentary Petrology.** (3) I or II. Petrography, classification and origin of soils, sediments and sedimentary rocks. Two hours rec. and three hours lab. a week. Pr.: Geol. 690.
- 234 790. Problems in Geology.** Credit arranged. I, II, S. Work is offered in mineralogy, paleontology, stratigraphy, structural geology, sedimentary petrology. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 234 800. Graduate Seminar in Geology.** Variable credit. I, II. Topics in geology, geochemistry and geophysics.
- 234 810. Isotope Geology I.** (3) I or II. Radioactive decay in geologically important systems, rigorous treatment of Pb, Sr, and Ar isotope variations, radiation damage and diffusion in minerals, instrumentation. Three hours rec. a week. Pr.: Phys. 535 or equiv., Geol. 690 or consent of instructor.
- 234 820. Isotope Geology II.** (3) I or II. Stable isotope variation, rigorous treatment of S, O, C, and H isotope systems, cosmogenic nuclides, application of isotope variations to problems of petrogenesis and continental growth. Three hours rec. a week. Pr.: Geol. 810 or equiv.
- 234 860. Goniometry and Crystal Drawing.** (2) I or II. Measurements, calculations, projections, and drawings of crystals. Measurements will be made with contact and optical goniometers and the universal stage microscope. Six hours lab. a week. Pr.: Geol. 600 and senior standing.

- 234 920. Clay Mineralogy.** (3) 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.
- 234 990. Research in Geology.** Credit arranged. I, II, S. Work is offered in mineralogy, paleontology, stratigraphy, structural geology, igneous, metamorphic and sedimentary petrology. Pr.: Registration in the Graduate School, with sufficient training to carry on the line of research undertaken.

GEOGRAPHY DIVISION

W. R. SIDDALL,* *Chairman*

Professor Stacey, Associate Professor Siddall,* Assistant Professors Bussing, Estlow, Kromm, Leigh, Self* and Stover;* Emerita: Instructor Larson*

UNDERGRADUATE

Requirements for a major in geography under the Curriculum in Social Science (see page 120) consist of a minimum of 25 hours in geography. Included in this total must be Geog. 115, 207, 215, and 325, plus a minimum of 12 additional hours of geography courses numbered 500 and above.

Requirements for a major in geography under the Curriculum in Physical Science (see page 119) consist of a minimum of 24 hours in geography. Included in this total must be Geog. 115, 215, 325, and 625; Geol. 110, 420, 470, and 750; Agron. 400; plus 12 additional hours of geography courses numbered 500 or above.

GRADUATE

Graduate work in geography is offered in the human and regional aspects of the discipline. Closely related courses in the fields of history, economics, regional planning, and agriculture may be made an integral part of the student's program. Candidates for the Master of Arts degree are required to take Geog. 789 and other advanced courses as may be determined by their advisory committees. The Geography Division is equipped with a good collection of maps and a cartography laboratory, and the University Library contains a large collection of geographical journals.

COURSES IN GEOGRAPHY

FOR UNDERGRADUATE CREDIT

- 235 115. World Regional Geography.** (3) I, II, S. 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.
- 235 125. Geography of Kansas.** (2) I, II, S. 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.
- 235 207. Introductory Physical Geography.** (4) I, II, S. A study of the geographic factors of our physical environments: map fundamentals, climatic factors, landforms, natural vegetation, soils, water and mineral resources. Three hours rec. and three hours lab. a week.
- 235 215. Economic Geography.** (3) I, II, S. The production, transportation, and manufacturing of world commodities, especially power, minerals, and agricultural resources. Emphasized are the changes in producing regions, as affected by geographic, economic, and political factors.
- 235 325. Cartography.** (3) I. Theory, interpretation, and design and drafting of maps, with emphasis on presenting quantitative data.

235 399. Honors Seminar in Geography. (1) Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE AND GRADUATE CREDIT

235 525. Geography of Anglo-America. (3) I. A regional analysis of the United States and Canada, giving special attention to the historical, political, and economic factors which contribute to areal differentiation within the area. Pr.: Three hours of geography or junior standing.

235 625. Climatology. (3) I or II. A systematic analysis of climatic elements and controls and a world regional study of climate. Pr.: Geog. 207 or Phys. 135 or junior standing.

235 645. Political Geography. (3) I. The interrelationship between large political units and geography; location, size, boundaries, and resources as they affect the strength of nations. Pr.: Three hours of geography or junior standing.

235 647. Geography of World Agriculture. (3) II. Distribution, variations, and significance of the major types of agriculture. Pr.: Junior standing or consent of instructor.

235 695. Geography of Latin America. (3) I. 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. Pr.: Six hours of geography or junior standing.

235 705. Geography of Europe. (3) II. The nations and regions of Europe west of the U. S. S. R.; the people and their economies; trends of development as affected by changing political and economic factors. Pr.: Six hours of geography or junior standing.

235 715. Geography of the Soviet Union. (3) I or II. Geographic regions of the U. S. S. R.; the agriculture, minerals, manufacturing, and settlement in each, particularly as affected by climatic and locational factors. Pr.: Six hours of geography or junior standing.

235 717. Historical Geography of the United States and Canada. (3) II. The geography, during selected past periods, of the area now occupied by these countries. Description, explanation, and evaluation of changing distributional patterns, with emphasis on settlement and land use. Pr.: Junior standing or consent of instructor.

235 735. Geography of Eastern Asia. (3) I or II. Relationships between oriental land resources, agriculture, industry, and population; trends in economic and political development in Eastern and Southern Asia, with concentration in India, China, and Japan. Pr.: Six hours of geography or junior standing.

235 775. Urban Geography. (3) I, II. A study of geographic principles relating to the distribution, function, and structure of cities; a geographic analysis and classification of urban settlements. Pr.: Six hours of geography or consent of instructor.

235 776. Geography of Transportation. (3) II in even years. A consideration of the nature of spatial interaction, the various kinds of transport media, and the relationship between transportation and economic and social patterns. Pr.: Six hours of geography and/or economics, or consent of instructor.

235 786. Seminar in Regional Geography. (1 to 3) I, II, S. Pr.: Consent of instructor.

235 787. Seminar in Cultural-Economic Geography. (1 to 3) I, II, S. Pr.: Consent of instructor.

235 795. Problems in Geography. Credit arranged. I, II, S. Pr.: Nine hours of geography and consent of instructor.

FOR GRADUATE CREDIT

235 801. Graduate Colloquium. (1) I. The nature, aims, methods, and

evaluation of geographical research. Required of all graduate students majoring in geography.

235 805. Advanced Economic Geography. (3) I or II. Economic and place factors in the shifting locations of major production: agricultural, mineral, manufacturing and other world industries. Lecture and seminar.

235 900. History and Philosophy of Geography. (2) II in odd years. 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.

235 995. Research in Geography. Credit arranged. I, II, S. Pr.: Registration in Graduate School, with sufficient training to carry on the line of research undertaken.

HISTORY

ROBERT P. BROWDER,* *Head of Department*

Professors Brooks, Browder,* Carey,* Higham,* Sageser,* Socolofsky,* Sweedlun* and Wilcoxon;* Associate Professors Crawford,* Kren* and Riggs;* Assistant Professors Briggs,* Donovan,* Ferguson,* Greene,* Jones,* Linder,* Sinclair* and Weiss;* Emeritus: Professors Correll* and Parrish;* Associate Professor Alsop**

UNDERGRADUATE

Requirements for a major in history consist of a minimum of 27 hours in history, including Hist. 111 and 112, at least one semester course in non-western history, a minimum of 15 hours in courses numbered 600 and above and a three-hour colloquium (Hist. 795) in the senior year. Students must distribute their upper division courses over at least three of the following four fields:

- I. Ancient, medieval and early modern Europe
- II. Modern Europe (including Britain)
- III. Russia and Asia
- IV. The Americas (including Latin America)

Students may select courses in the history of science and technology and military history in lieu of one of the above fields.

GRADUATE

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 the Catalog.

Candidates for the Master of Arts must offer two seminars, one to be taken the first semester, and the year's course in historiography and demonstrate reading proficiency in an approved foreign language. In addition to a written thesis or report, they must pass a written and oral examination covering their fields of concentration.

For the Doctor of Philosophy degree, candidates must present four fields in history and one 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.

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 Ad-

ministration, 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 and General Staff College at Fort Leavenworth and the regional Federal Records Center at Kansas City, the latter presently rich in military and civil records and eventually to have a microfilm duplication of the main holdings of the National Archives in Washington.

FOR UNDERGRADUATE CREDIT

- 241 101. History of Western Civilization I—Honors.** (4) I, II. Major trends in Western Civilization to the end of the seventeenth century. Pr.: For freshmen and sophomores in the Honors Program.
- 241 102. History of Western Civilization II—Honors.** (4) I, II. Principal developments in Western Civilization from the eighteenth century to the present. Pr.: For freshmen and sophomores in the Honors Program.
- 241 111. History of Western Civilization I.** (3) I, II, S. Major trends in Western Civilization to the end of the seventeenth century. Required of all majors in history. Pr.: Not open to juniors and seniors except with consent of instructor.
- 241 112. History of Western Civilization II.** (3) I, II, S. Principal developments in Western Civilization from the eighteenth century to the present. Required of all majors in history. Pr.: Not open to juniors and seniors except with consent of instructor.
- 241 201. Ancient Mediterranean Civilizations.** (3) I and alt. S. Civilizations of the ancient Near East, Greece, and Rome to the fall of the Roman Empire.
- 241 202. Civilization of the Middle Ages.** (3) II and alt. S. European and Near Eastern civilizations from the fall of the Roman Empire to the end of the thirteenth century.
- 241 209. Latin American Nations.** (3) II and alt. S. Economic, social and political progress of the Latin American nations from independence to the present. Emphasis is placed on Argentina, Brazil, Chile, and Mexico.
- 241 211. Asian Civilization I.** (3) I and alt. S. A survey of Asian Civilization to 1650, emphasizing cultural and political developments.
- 241 212. Asian Civilization II.** (3) II and alt. S. A survey of Asian Civilization from 1650 to the present. Emphasis is placed on cultural and political developments including European imperialism and the new nationalism.
- 241 221. History of England to 1660.** (3) I. A survey of English history from Roman and Teutonic Britain to the Restoration. Pr.: Not open to juniors and seniors except with consent of instructor.
- 241 222. History of England from 1660.** (3) II. Political, constitutional, economic, and cultural history of modern England. Pr.: Not open to juniors and seniors except with consent of instructor.
- 241 251. History of the United States to 1877.** (3) I, II, S. Colonial and Revolutionary America, the federal union, Civil War, and Reconstruction. Pr.: Not open to juniors and seniors except with consent of instructor.
- 241 252. History of the United States since 1877.** (3) I, II, S. The American nation from Reconstruction to the present. Pr.: Not open to juniors and seniors except with consent of instructor.
- 241 257. American Social History.** (3) I or II. Social customs and institutions from colonial times to the late nineteenth century. Pr.: Sophomore standing.
- 241 258. History of Kansas.** (2) II, S. Land, people, problems, and cultural development of Kansas. Pr.: Sophomore standing.
- 241 399. Honors Seminar in History.** Variable credit. I, II.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 241 603. History and Culture of Greece.** (3) I and alt. S. The political evolution of ancient Greece, its social and economic structure, the development of Hellenic culture and its diffusion throughout the Mediterranean world and Near East. Pr.: Hist. 201 or consent of instructor.
- 241 606. History and Culture of Rome.** (3) II and alt. S. Constitutional development of Rome, agrarian and social problems, fall of the republic and growth of the empire. Rome's contribution to classical culture and its influence on the modern world. Pr.: Hist. 201 or consent of instructor.
- 241 619. The History of Christianity.** (3) I, II, alt. S. A history of the Christian religion from the time of Christ to the present. Pr.: Junior or senior standing, or consent of instructor.
- 241 623. Medieval Institutions.** (3) I, II. A study of the important institutions of Europe during the Middle Ages, with special attention to the Christian Church, manorialism, feudalism and the rise of the universities. Pr.: Junior standing.
- 241 624. Medieval Intellectual History.** (3) I, II. The main trends of medieval thought from St. Augustine to William of Ockham in their historical setting. Pr.: Junior or senior standing.
- 241 631. The Renaissance.** (3) II and alt. S. The Italian Renaissance as a major phase in the history of Western Civilization and its spread to Northern Europe. Pr.: Junior or senior standing, or consent of instructor.
- 241 632. The Reformation.** (3) I, II. Religious developments and their impact on political, economic, social and intellectual history, 1500-1648. Pr.: Junior or senior standing.
- 241 633. Science and Thought in the Eighteenth Century.** (3) I, II. Scientific development in the eighteenth century from Newton to Laplace. Pr.: Junior or senior standing.
- 241 634. Science and Thought in the Nineteenth Century.** (3) I, II. Scientific development in the nineteenth century. Pr.: Junior or senior standing.
- 241 637. History of Science I.** (3) I and alt. S. The growth of scientific thought from ancient times to about 1700. Pr.: Junior or senior standing, or consent of instructor.
- 241 638. History of Science II.** (3) II and alt. S. The development of scientific thought from about 1700 to the recent past. Pr.: Junior or senior standing, or consent of instructor.
- 241 641. Europe in the Seventeenth Century.** (3) I in alt. years. The intellectual history of Europe from the Wars of Religion through the Age of Louis XIV. Pr.: Junior or senior standing, or consent of instructor.
- 241 642. Europe in the Eighteenth Century.** (3) II in alt. years and S. Intellectual history of Europe from the death of Louis XIV through the Congress of Vienna. Pr.: Junior or senior standing, or consent of instructor.
- 241 643. Revolutionary Europe, 1760-1815.** (3) I in alt. years and S. Ideological and social revolution of Europe from the Enlightenment to the downfall of Napoleon. Pr.: Junior or senior standing, or consent of instructor.
- 241 648. Europe, 1914-1945.** (3) I, S. History of Europe from World War I through World War II; emphasis will be placed on the crisis of democracy and the significance of totalitarian movements. Pr.: Junior or senior standing, or consent of instructor.
- 241 651. Twentieth Century European Thought.** (3) I, II. Pr.: Junior or senior standing, or consent of instructor.
- 241 652. Tudor England.** (3) I in alt. years. Pr.: Junior or senior standing, or consent of instructor

- 241 653. Stuart England.** (3) II in alt. years. Pr.: Junior or senior standing, or consent of instructor.
- 241 656. England in the Eighteenth Century.** (3) I in alt. years. Pr.: Junior or senior standing, or consent of instructor.
- 241 658. Victorian Britain.** (3) I. Pr.: Junior or senior standing, or consent of instructor.
- 241 659. Modern Britain.** (3) II in alt. years. Pr.: Junior or senior standing, or consent of instructor.
- 241 663. Modern France.** (3) II in alt. years and S. Pr.: Junior or senior standing, or consent of instructor.
- 241 667. Modern Germany to 1914.** (3) I, II. Major developments in German history in the nineteenth century. Pr.: Junior or senior standing, or consent of instructor.
- 241 668. Modern Germany, 1914-1945.** (3) I, II. German history in the twentieth century; major emphasis on the failure of German democracy and on an analysis of the nature of national socialism. Pr.: Junior or senior standing, or consent of instructor.
- 241 671. Europe, 1815-1870.** (3) I, II. The history of Europe from 1815-1870; major emphasis on intellectual history and the relationship between ideas and their political, economic and social context. Pr.: Junior or senior standing, or consent of instructor.
- 241 672. Europe, 1870-1914.** (3) I, II. The history of Europe from 1870 to 1914; major emphasis on intellectual history and the relationship between ideas and their political, economic and social context. Pr.: Junior or senior standing, or consent of instructor.
- 241 680. History of Russia from the Beginnings to 1801.** (3) I, II, and alt. S. Rise and fall of Kievan Russia, the Mongol occupation, the ascendancy of Moscow and the beginnings of the Russian Empire. Pr.: Junior or senior standing, or consent of instructor.
- 241 681. Nineteenth Century Russia.** (3) I, II, and alt. S. Political, social, economic and intellectual developments in Russia and her conduct of foreign policy from Alexander I to the Russian Revolution of 1917. Pr.: Junior or senior standing, or consent of instructor.
- 241 682. The Russian Revolution and the Soviet Regime.** (3) I, II, and alt. S. The Revolution of 1917 and the subsequent development of the Soviet State in society. Pr.: Junior or senior standing, or consent of instructor.
- 241 685. Russian Intellectual History.** (2) II. A study of intellectual developments in Russia from 1762. Pr.: Hist. 684 or consent of instructor.
- 241 691. Technology and War I.** (3) I. The history of military technology, 1000 to 1900. Pr.: Junior or senior standing, or consent of instructor.
- 241 692. Technology and War II.** (3) II. The history of military technology, 1900 to 1960. Pr.: Junior or senior standing, or consent of instructor.
- 241 693. The History of Peacekeeping Forces.** (3) I, II. A historical survey of the problems of military work in peacetime, with particular emphasis upon colonial wars, guerrilla activities and civic action. Pr.: Junior or senior standing.
- 241 694. The History of Military Thought.** (3) I, II. An examination of the evolution of military thinking from Vauban to Liddell Hart and the atomic age. Pr.: Junior or senior standing.
- 241 695. European Economic History.** (3) I, S. Major economic developments, institutions, and ideas since the seventeenth century. Pr.: Junior or senior standing, or consent of instructor.
- 241 700. Colonial America.** (3) I, II, and alt. S. Discovery, foundation and development of the North American colonies; the European rivalry for the American empire. Pr.: Junior or senior standing, or consent of instructor.

- 241 701. The American Revolution.** (3) I, II, and alt. S. The foundations of the American republic, 1763-1789. Pr.: Junior or senior standing, or consent of instructor.
- 241 702. The Early National Period.** (3) I, II, and alt. S. Contest between Federalists and Jeffersonian Republicans for national leadership; the War of 1812 and the growth of American nationality. Pr.: Junior or senior standing, or consent of instructor.
- 241 703. The Age of Jackson.** (3) I, II, and alt. S. Growth of democracy, Westward expansion and divisive sectionalism; the flowering of the American mind; the perfectable society. Pr.: Junior or senior standing, or consent of instructor.
- 241 708. Civil War and Reconstruction.** (3) II and alt. S. Pr.: Junior or senior standing, or consent of instructor.
- 241 709. Foundations of Modern America.** (3) II, S. Growth of the industrial economy, role of the entrepreneur, and the new forces in American life from the Civil War to World War I. Pr.: Junior or senior standing, or consent of instructor.
- 241 711. The United States in the Twentieth Century.** (3) I, S. Major developments in recent American history. Pr.: Junior or senior standing, or consent of instructor.
- 241 712. Frontier America.** (3) I, S. Environmental factors, peoples, settlements, and institutions of the frontier. Pr.: Junior or senior standing, or consent of instructor.
- 241 721. The Great Plains.** (3) II and alt. S. The historical development of the region comprising the Great Plains, and its impact on American history. Pr.: Junior or senior standing, or consent of instructor.
- 241 732. American Thought to 1860.** (3) I, II, and alt. S. American thought from the Puritans through New England domination. Pr.: Junior or senior standing, or consent of instructor.
- 241 733. American Thought since 1860.** (3) I, II, and alt. S. Emphasis upon the impact of industrialism, populism, science, technology, and politics. Pr.: Junior or senior standing, or consent of instructor.
- 241 736. History of American Technology, 1607-1960.** (3) I, II, and alt. S. The interaction of technology with agriculture, transportation, communications, and transmission of European techniques and the concept of American ingenuity. Pr.: Junior or senior standing, or consent of instructor.
- 241 739. Science in America.** (3) I, II, and alt. S. Survey of American science from the colonial era to the present, with special attention given to the historical context and the role of institutions and government. Pr.: Junior or senior standing, or consent of instructor.
- 241 740. History of the American Working Class.** (3) II. A general history of American workers and their involvement in changing political, intellectual, social and economic aspects of American development. Pr.: Hist. 251, 252 or consent of instructor.
- 241 745. American Immigration History.** (3) I and alt. S. Cultural factors based on race and nationality in American history, emphasizing the white minorities. Pr.: Hist. 252 or consent of instructor.
- 241 746. American Urban History.** (3) II and alt. S. The history of urbanism in America, its beginnings, its position in American life and its complexity. Pr.: Hist. 252 or consent of instructor.
- 241 748. History of American Foreign Policy.** (3) I, S. The development of American foreign policy and the role of the United States in world affairs since 1898. Pr.: Junior or senior standing, or consent of instructor.
- 241 749. American Economic History I.** (3) I, II, and alt. S. Development of the American economy to 1825. An examination of colonial agriculture and mercantilism to the emergence of the factory system and a national economy. Pr.: Junior or senior standing, or consent of instructor.

- 241 750. American Economic History II.** (3) I, II, and alt. S. From 1825 to the present; industrial capitalism, laissez-faire, and large-scale business and agricultural enterprises will be studied, along with government and private reactions to these developments. Pr.: Junior or senior standing, or consent of instructor.
- 241 751. Colonial Hispanic America.** (3) I and alt. S. Exploration, settlement, and development of Central and South America and the Caribbean in the colonial period. Pr.: Junior or senior standing, or consent of instructor.
- 241 759. Modern Mexico.** (3) I, II. The last decade of Porfirio Diaz, 1900-1910. The principal developments of the political and social revolution, 1910-1938. Recent changes in Mexico. Pr.: Junior or senior standing.
- 241 761. Far Eastern History I.** (3) I, II. The traditional civilization and cultures of the Far East. Focus on China and Japan prior to the advent of European power. Pr.: Junior or senior standing.
- 241 762. Far Eastern History II.** (3) I, II. From the rise of European and American power in the Far East to the present. Focus on the crises within traditional Chinese and Japanese cultures, the rise of nationalism, World War II, and the post-war period of resurgence of Chinese power. Pr.: Junior or senior standing.
- 241 767. South Asia I.** (3) I, II. The traditions and civilization of South Asia—Pakistan, India, and Ceylon—prior to the intrusion of Europeans. Examination of social, intellectual, religious and political history. Pr.: Junior or senior standing.
- 241 768. South Asia II.** (3) I, II. The rise of European powers in South Asia, creation of the British Empire in India, growth of nationalism and the creation of India, Pakistan and Ceylon to the present. Pr.: Junior or senior standing.
- 241 785. Readings in History.** (1 to 3) I, II, S. Students will read on a central theme, attend weekly discussions, and write a final report. Open to majors and graduate students with the consent of instructor.
- 241 790. Problems in History.** Credit arranged. I, II, S. Intensive study of a particular phase of history. Students will attend weekly discussions and write a major research paper on their findings.
- 241 795. Senior Colloquium.** (3) I, II. Pro-seminar in historical method and historiography required for graduation of all majors in history.

FOR GRADUATE CREDIT

- 241 801. Historiography I.** (2) I and alt. S. 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.
- 241 802. Historiography II.** (2) II and alt. S. Cont. of Hist. 801. Required of all graduate students in history.
- 241 820. Seminar in American Social History.** (3) I, II, S. Usually emphasizing problems of immigration and urbanization. Pr.: Consent of instructor.
- 241 821. Seminar in Latin American History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 822. Seminar in American Diplomatic History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 823. Seminar in the History of the American West.** (3) I, II, S. Pr.: Consent of instructor.
- 241 824. Seminar in Colonial America.** (3) I, II, S. Pr.: Consent of instructor.
- 241 825. Seminar in American Intellectual History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 826. Seminar in American Economic History.** (3) I, II, S. Pr.: Consent of instructor.

- 241 827. Seminar in American Science and Technology.** (3) I, II, S. Pr.: Consent of instructor.
- 241 830. Seminar in Modern European History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 831. Seminar in German History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 832. Seminar in French History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 835. Seminar in Modern Russian History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 836. Seminar in Renaissance and Reformation.** (3) I, II, S. Pr.: Consent of instructor.
- 241 837. Seminar in English History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 840. Seminar in Military History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 850. Seminar in South Asian History.** (3) I, II, S. Pr.: Consent of instructor.
- 241 879. Studies in the History of Science.** (3) I or II. An intensive examination of problems in the history of science. Emphasis will be placed upon the relationship between scientific changes and intellectual-institutional developments. Pr.: Consent of instructor.
- 241 887. European Intellectual History.** (3) I or II. An examination of the methodology of intellectual history and its relationship to other methodologies and disciplines, the application of this methodology to intellectual developments and to the non-intellectual factors which explain them. Pr.: Consent of instructor.
- 241 995. Research in History.** Credit arranged. I, II, S. Work offered in European, American, Latin American, English, Russian, and Asiatic History, and in the history of science and technology, the history of ideas, intellectual history, military history and economic and agricultural history. Pr.: Consent of instructor.

MATHEMATICS

RALPH G. SANGER,* *Head of Department*

Professors Cunkle, Fuller,* Hsu,* Marr,* Parker,* Sanger* and Stamey,* Associate Professors Dixon,* Janes, Sloat and Yates,* Assistant Professors Miller and Williams,* Instructors Cammack, Chatelain, Corbet, Grosh, Herzmann, Ratcliffe, Schrag, Sitz and Woldt; Emeritus: Professors Babcock* and White,* Associate Professor Mossman* Schrag, Sitz and Woldt; Emeritus: Professors Babcock* and White,* Associate Professor Mossman**

UNDERGRADUATE

In all curriculums in which college algebra is required, students take a proficiency test in algebra within the first two weeks of their enrollment in any course in algebra. Results of this test determine whether a student shall be required to take intermediate algebra to qualify for college algebra.

The requirements in the Curriculum in Physical Science for a major in mathematics (VIII, p. 119) are: Math. 222, 240, Stat. 320 or 410 and 15 semester hours chosen from among courses in mathematics numbered 400 to 799. For a mathematics major in Humanities (IX, p. 117) the following courses are required: Math. 220, 221, 222, 240, Stat. 320 or 410 and 15 semester hours from courses in mathematics with numbers between 400 and 799. Math. 100, if not taken in high school, should be taken to satisfy the college mathematics, logic, or approved philosophy course (III, p. 117).

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 had on writing to the department.

GRADUATE

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 person should have completed work in mathematics equivalent to what is required for a B. S. degree here with a better than B average. The general requirements for advanced degrees are given on pp. 39-42. Information on special requirements for an advanced degree may be obtained by writing to the Department of Mathematics.

FOR UNDERGRADUATE CREDIT

- 245 010. Intermediate Algebra.** (0) I, II, S. Review of elementary algebra; topics preparatory to Math. 100. Three hours rec. a week. Pr.: One unit of high school algebra.
- 245 100. College Algebra.** (3) I, II, S. Pr.: Plane geometry and satisfactory placement test score in algebra. Students with $1\frac{1}{2}$ entrance units of algebra should normally be eligible for this course.
- 245 150. Plane Trigonometry.** (3) I, II, S. Pr.: Plane geometry and $1\frac{1}{2}$ units of high school algebra.
- 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.
- 245 221. Analytic Geometry and Calculus II.** (4) I, II, S. Cont. of Math. 220 to include transcendental functions. Pr.: Math. 220.
- 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.
- 245 240. Series and Differential Equations.** (4) I, II, S. Convergence of series, expansions in series, solutions of elementary differential equations, with applications. Pr.: Math. 222.
- 245 301. Concepts of Mathematics.** (3) Intuitive logic to include negation of statements, introduction to connectives, quantifiers, implication and truth tables, set algebra, mappings, definitions, axioms, theorems and methods of proof. Pr.: Math. 220.
- 245 325. Basic Mathematics.** (4) I, II, S. Selected topics in elementary mathematics taught from an advanced viewpoint. Designed to broaden the student's understanding of elementary concepts.
- 245 340. Introduction to Analytic Processes.** (3) II. 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.
- 245 350. Elementary Digital Computing Techniques.** (2) I. Introduction to punched card equipment. Digital computers. Fixed and floating-point arithmetic. Programming for high-speed computers. Pr.: Math. 100.
- 245 399. Seminar in Mathematics.** Credit arranged. On sufficient demand. Primarily for Honors Students. Pr.: Consent of instructor.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 245 408. Topics in Mathematics for Elementary School Teachers.** (4) I, 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.: Membership in Institute for Elementary School Teachers.
- 245 409. Intuitive Geometry.** (2) S. Measurement, triangles, quadrilaterals, nonmetric geometry, similarity, volumes, elementary coordinate geometry. Pr.: Membership in Institute for Elementary School Teachers.

- 245 417. The Real Number System.** (2) An extensive development of number systems, with emphasis upon structure. Includes systems of natural numbers, integers, rational numbers and real numbers. Pr.: Math. 221. (For members of an Institute only.)
- 245 420. Introduction to Analysis.** (3) Theory of limits, continuity, emphasis on proofs. Pr.: Math. 222, 301.
- 245 470. History of Mathematics.** (3) II in alt. years. Cannot be used as part of the advanced mathematics needed by mathematics majors. Pr.: Math. 220.
- 245 475. 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 Lobachevskian and Riemannian geometries. Pr.: Math. 221.
- 245 501. Set Theory and Logic.** (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. 301.
- 245 505. Determinants and Matrices.** (3) I, II. Applications of determinants and matrices to genetics, economics, electronics, and other fields. Pr.: Math. 100 and junior standing.
- 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 301 or graduate standing.
- 245 513. Introduction to Modern Algebra II.** (3) II. Vector spaces, linear transformations, elementary matrix theory, determinants and homogeneous forms. Credit cannot be obtained for this course and Math. 505. Pr.: Math. 512.
- 245 550. Introduction to Applied Mathematics I.** (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.
- 245 551. Introduction to Applied Mathematics II.** (3) I, II. Vector calculus, line and surface integrals, formulas of Gauss, Green and Stokes, matrix algebra, systems of linear equations, matrix eigenvalue problems. Pr.: Math. 240. No credit to those with credit in Math. 505.
- 245 552. Introduction to Applied Mathematics III.** (3) II in alt. years. Bessel and Legendre functions, basic concepts and techniques in Fourier Series, boundary value problems in partial differential equations. Pr.: Math. 550.
- 245 573. Foundations of Geometry.** (3) Euclid's parallel postulate, non-Euclidean geometries, incidence, affine geometries, order, congruence, continuity. Pr.: Math. 475.
- 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.
- 245 577. Elementary Topology.** (3) Introduction to general topological spaces and invariants under continuous mappings and under homeomorphisms. Pr.: Math. 240, 301.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 245 601. Differential Equations.** (3) On sufficient demand. Properties of solutions of differential equations; existence theorems; special differential equations; singular solutions. Pr.: Math. 240.
- 245 606. Theory of Numbers.** (3) II in alt. years. Pr.: Math. 221.
- 245 621. Analysis I.** (3) I, II, S. Partial differentiation, with applications to the geometry of three dimensions; envelopes, maxima and minima of functions of several variables, series. Pr.: Math. 240 and 301 or graduate standing.

- 245 622. Analysis II.** (3) I, II, S. Line integrals, improper integrals, beta and gamma functions; integrals dependent on a parameter, elliptic integrals, uniform convergence of series and integrals. Pr.: Math. 621.
- 245 671. Projective Geometry.** (3) I in alt. years. An introduction to the projective geometry of one and two dimensions. Pr.: Math. 513.
- 245 672. Differential Geometry.** (3) II in alt. years. An introduction to the differential geometry of curves and surfaces. Pr.: Math. 601.
- 245 675. Non-Euclidean Geometry.** (3) II in alt. years. Geometries that do not assume the fifth postulate of Euclid. Hyperbolic and elliptic geometries. Pr.: Math. 222.
- 245 701. Theory of Matrices I.** (3) I. Pr.: Math. 240, 513.
- 245 702. Theory of Matrices II.** (3) II. Cont. of Math. 701. Pr.: Math. 701.
- 245 710. Higher Algebra I.** (3) I. Theory of groups, theory of rings and ideals, polynomial domains, theory of fields and their extensions. Pr.: Math. 513.
- 245 711. Higher Algebra II.** (3) II. Cont. of Higher Algebra I. Pr.: Math. 710.
- 245 721. Theory of Functions of a Complex Variable I.** (3) I. Pr.: Math. 621.
- 245 722. Theory of Functions of a Complex Variable II.** (3) II. Pr.: Math. 721.
- 245 725. Theory of Functions of a Real Variable I.** (3) I in alt. years. Real number systems, theory of measure, theories of integration. Pr.: Math. 622.
- 245 726. Theory of Functions of a Real Variable II.** (3) II in alt. years. Cont. of Math. 725. Pr.: Math. 725.
- 245 740. Calculus of Variations.** (3) On sufficient demand. Necessary and sufficient conditions for an extreme value; applications to geometry and mechanics. Pr.: Math. 622.
- 245 747. Advanced Differential Equations.** (3) II in alt. years on sufficient demand. Selected topics in differential equations. Pr.: Math. 601, 622.
- 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.
- 245 752. Tensor Analysis.** (3) On sufficient demand. Introduction to theory of tensors, with applications to geometry, relativity, and applied mathematics. Pr.: Math. 551, 621.
- 245 761. Numerical Analysis I.** (3) I. Solution of algebraic and transcendental equations, with emphasis on linear algebraic systems. Applications of finite differences to interpolation, numerical differentiation, and integration. Introduction to desk calculator, I. B. M. equipment, analog computer. Pr.: One of Math. 550, 551, 621, 622.
- 245 762. Numerical Analysis II.** (3) II. Numerical methods for solving ordinary and partial differential equations; matrix inversion, with applications; method of least squares; use of orthogonal polynomials. Pr.: Math. 761.
- 245 763. Numerical Analysis III.** (3) On sufficient demand. Cont. of Math. 762. Approximation by polynomials and orthogonal functions; matrices and eigenvalue problems; large-scale linear systems; harmonic analysis; data analysis. Pr.: Math. 762.
- 245 771. Topology I.** (3) I in alt. years. Cardinal and ordinal numbers, general topological spaces, homeomorphic invariants of point sets, metrization, structure of Peano continua. Pr.: Math. 622.
- 245 772. Topology II.** (3) II in alt. years. Cont. of Math. 771. Pr.: Math. 771.

245 799. Topics in Mathematics. Credit arranged. I, II, S. Background of courses needed for topic undertaken and consent of instructor.

FOR GRADUATE CREDIT

245 851. Partial Differential Equations. (3) II in alt. years. Solutions of partial differential equations. Pr.: Math. 621, 622 and preferably 721.

245 901. Topics in Algebra. (3) On sufficient demand. Selected topics in modern algebra. May be taken more than once for credit. Pr.: Consent of instructor.

245 921. Topics in Analysis. (3) On sufficient demand. Selected topics in modern analysis. May be taken more than once for credit. Pr.: Consent of instructor.

245 961. 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.

245 971. Topics in Geometry. (3) On sufficient demand. Selected topics in geometry, such as convex sets or distance geometry. May be taken more than once for credit. Pr.: Consent of instructor.

245 981. 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.

245 999. Research in Mathematics. Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor.

MILITARY SCIENCE

COL. RALPH WRIGHT, *Head of Department*

Professor Wright; Associate Professors Catrell, Eddy, Heuschkel and Smith; Assistant Professors Biberstein, Dyer, Terry and Wendt; Instructors Mays, Reed and Wilkins

Kansas State University offers the General Military Science curriculum to undergraduates. This curriculum is designed to give all students who complete the four-year program the basic knowledge and skills necessary to all officers in the U. S. Army as well as the historical background requisite for a proper understanding of the Army and its relation to the nation. Specialization in a particular branch will come after graduation and commissioning.

The first two years constitute the Basic Course. All students enrolled in the Basic Course are furnished free of charge complete uniforms, texts, and other necessary equipment. These articles are the property of the United States and must be returned at the end of each school year or upon withdrawal from the University. The value of any article not returned is chargeable to the student.

In the Basic Course, students receive one credit hour per semester. The third and fourth years constitute the Advanced Course, in which enrollment is selective and voluntary. Students should consult the Department of Military Science for conditions which govern selection for the Advanced Course. In the Advanced Course, students receive a total of eight semester hours credit.

As part of the Freshman ROTC curriculum, students will be required to take and satisfactorily complete an academic class presented by another department. The elective course must be selected from one of the following general academic areas: (1) Effective Communication; (2) Science Comprehension; (3) General Psychology; and (4) Political Development and Political Institutions. Enrollment in English Composition I, IA or II satisfies this requirement. Since English Composition I and II are required of all students at Kansas State University, transfer students receiving credit for English Composition I and II will be required to substitute another course in lieu thereof.

Under present regulations, freshmen in the first-year Basic ROTC are subject to screening by a board of officers after conclusion of the first semester, with a view to selection for Deferment Agreement within established quotas. Those who show the greatest promise as potential officer material may be granted a Deferment Agreement, provided they agree to apply for enrollment in the Advanced Course at the appropriate time.

A student can earn an Army Commission by completing the Advanced ROTC program (junior and senior years). He can become eligible to enter the Advanced program in either of two ways: (1) complete the Basic Course (freshman and sophomore years); or (2) complete a Summer Camp prior to enrolling as a junior. Students in the Advanced Course must complete a Summer Camp between junior and senior years or at the end of senior year.

As part of the Advanced ROTC Course, in the first semester of the junior year and the second semester of the senior year, students will take an elective course presented by another department. The elective subject must be for three semester hours credit and must be from one of the following general academic areas: (1) Effective Communications; (2) Science Comprehension; (3) General Psychology; and (4) Political Development and Political Institutions. The Department of Military Science in conjunction with the student's faculty adviser will evaluate and approve the elective subject selected. Consideration will be given to the value of the subject in furthering the professional qualification of the student as a prospective commissioned officer in the United States Army. In the event that a particular subject was required in the student's normal academic curriculum during his freshman and sophomore years, electives must be selected either from another general area or an advanced subject in the same area.

Students enrolled in the Advanced Course must sign a Deferment Agreement. The Deferment Agreement exempts the student from selective service induction in return for a promise to accept a reserve commission, if tendered, upon completion of the course of instruction and to serve on active duty for a period of either two years or six months, as determined by the Secretary of the Army.

Senior Advanced Course cadets are eligible to participate in the Army ROTC Flight Training Program on a volunteer and selective basis. This training consists of 35 hours of ground school and 36½ hours of dual and solo flight instruction. Successful completion of this training will qualify students for Civil Aeronautics Administration Pilot's Certificate. Students enrolling in flight training must agree to serve at least three years on active duty with the Army following graduation.

The ROTC program offers to selected students both two-year and four-year scholarships. These scholarships pay tuition and fees, up to \$100.00 per year for books and special fees, and pay the student a subsistence of \$50.00 per month. A student must apply for and be approved for a four-year scholarship prior to coming to the University. The two-year scholarships for the Advanced Course are available only to students who have completed the Basic ROTC Course. Applications for the two-year scholarships are made in the second semester of the sophomore year.

Any male student may apply at least four hours of ROTC credit toward his degree without being required to take more credits than his non-ROTC colleagues in the same curriculum.

BASIC COURSE FOR UNDERGRADUATE CREDIT

249 113. Military 1A. (1) I. Organization of the Army and ROTC; United States Army and National Security. Conc. enrollment in English Composition I, IA or II, or an approved substitute. Two hours a week including leadership training.

249 114. Military 1B. (1) II. Individual weapons and marksmanship; leadership laboratory (drill and command). Conc. enrollment in English Composition I, IA or II, or an approved substitute. One hour rec. and one hour leadership lab. a week.

249 125. Military 2A. (1) I. American military history; leadership laboratory (drill and command). Two hours rec. and one hour leadership lab. a week.

249 126. Military 2B. (1) II. Map and aerial photograph reading; introduction to basic tactics and techniques; leadership laboratory (drill and command). Two hours rec. and one hour leadership lab. a week.

ADVANCED COURSE

249 233. Military 3A. (1) I. Principles of leadership; leadership laboratory (drill and command). Conc. enrollment in an approved course. One hour rec. and one hour leadership lab. a week.

249 234. Military 3B. (3) II. Branches of the Army; military teaching principles; small unit tactics and communications; countersurgency; leadership laboratory (drill and command). Four hours rec. and one hour leadership lab. a week.

249 243. Military 4A. (3) I. Operations; Logistics; Army administration; Military law; leadership laboratory (drill and command). Four hours rec. and one hour leadership lab. a week.

249 244. Military 4B. (1) II. Map reading; the role of the United States in world affairs; service orientation; leadership laboratory (drill and command). Conc. enrollment in an approved course. One hour rec. and one hour leadership lab. a week.

MODERN LANGUAGES

RICHARD C. CLARK,* *Head of Department*

Professors Clark and Moore;* Associate Professor Cortes; Assistant Professors Aliberti,* Beeson* and Vazquez; Instructors Alexander, Fernandez, Freund, Greene, McGraw, Miller, Northrup, Weinglass and Zilius; Emeritus: Professor Limper;* Associate Professors Munro* and Pettis**

UNDERGRADUATE

Students majoring in language should enroll in the Curriculum in Humanities (see page 117).

For a minor, 18 hours in a single language are to be taken at K. S. U.

For a major (IX, p. 117), 30 hours at K. S. U. in a single language should be completed, which includes the 12-hour curricular requirement. The attention of the student preparing for graduate school (as well as for high school teaching) is directed to the corollary courses: Spch. 210, Mod. L. 652 and 664. Six hours of history in the country and period related to the student's major language interest are desirable.

Students who have had two years or more of French, German, or Spanish in high school may not duplicate that work for college credit. An achievement and placement examination will be given by the department at the beginning of each semester; on the basis of these results a maximum of three credits may be awarded and the student assigned to the particular level in the language he or she has studied.

GRADUATE

Prerequisite to graduate work in German, French, and Spanish is completion of a four-year undergraduate curriculum substantially equivalent to that required of general arts and science students, but including sufficient work in the languages to prepare the student for advanced work in the language he has chosen. Major work leading to the Master of Arts degree is offered in French, German and Spanish. The candidate must demonstrate a reading knowledge in an additional foreign language.

See page 17 for key to the general reference of course numbers and prerequisites for admission to the courses listed below. The first group is one which cuts across all languages; the second concerns the specific languages.

FOR UNDERGRADUATE CREDIT

- 253 399. Honors Seminar in Modern Languages.** Credit arranged. I, II. Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 253 652. Introduction to Linguistics.** (3) I. Study of the basic concepts of modern descriptive linguistics. Pr.: Junior standing. (Same as Engl. 652 and Spch. 652.)
- 253 664. Topics in Applied Linguistics.** (3) II. Principles of contrastive structural analysis, especially English/French, English/Spanish, English/German. Course on another topic may be repeated for credit. Pr.: Spch. 652, Mod. L. 652 or Engl. 652. (Same as Engl. 664 and Spch. 664.)
- 253 669. Language Typology.** (3) Presentation and discussion of the languages of the world and the variant methods of their classification. Pr.: Engl. 652, Mod. L. 652 or Spch. 652 or consent of instructor and junior standing. (Same as Engl. 669 and Spch. 669.)
- 253 673. Introduction to Historical Linguistics.** (3) I. Methods of historical linguistics as used in the reconstruction of earlier forms and stages of a language. Pr.: Junior standing. (Same as Engl. 673 and Spch. 673.)
- 253 674. Methods and Techniques of Learning a Second Language.** (3) II. Linguistics applied to the learning of a foreign language, especially English as a foreign language. Pr.: Twelve hours of a modern language, including English, and Spch. 652, Mod. L. 652 or Engl. 652. (Same as Engl. 674 and Spch. 674.)
- 253 676. Phonetics and Phonemics of English.** (3) Detailed study of the speech sounds of English, their production, functions as signals, and realizations in the stream of speech in English. Pr.: Spch. 210 and Engl. 652, Mod. L. 652, Spch. 652, or consent of instructor and junior standing. (Same as Engl. 676 and Spch. 676.)
- 253 677. Morphology and Syntax of English.** (3) I, II, S. Consideration of current theories of grammar, with emphasis on morphemics and tagmemics. Pr.: Engl. 451. (Same as Engl. 677 and Spch. 677.)
- 253 799. Problems in Modern Languages.** Credit arranged. I, II, S. Pr.: Consent of department head and instructor involved.

FOR GRADUATE CREDIT

- 253 999. Research in Modern Languages.** Credit arranged. Pr.: Thirty hours in one modern language or equiv.

FRENCH

FOR UNDERGRADUATE CREDIT

- 253 131. French I.** (3) I, II, S. Introduction to the grammar of Modern French, with the use of the language laboratory's facilities.
- 253 135. French II.** (3) I, II, S. Completion of the grammar of Modern French with the use of the language laboratory's facilities. Pr.: Mod. L. 131 or equiv.
- 253 230. French III.** (3) I, II, S. Reading of selections from modern prose and review of the structure of the language as needed. Pr.: Mod. L. 135 or equiv.
- 253 235. French IV.** (3) I, II. Selections from nineteenth and twentieth century French prose. Pr.: Mod. L. 230 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 253 422. Contemporary French Civilization.** (2) II. To present to students the broad sweep of French culture from the medieval period to the present and to give a basis upon which students may continue study of French culture in France. The presentation of factual information, as well as the classroom discussions, to be in French. Pr.: Fifteen hours of college French or consent of instructor.

- 253 430. French V.** (3) I, II. An introduction to the finest representatives of French writing. Pr.: Mod. L. 235 or equiv.
- 253 431. French Composition and Conversation I.** (3) I. Review in depth of the structure of Modern French on the basis of themes and conversations in French. Pr.: Mod. L. 235 or equiv.
- 253 432. French Composition and Conversation II.** (3) II. Cont. of the study of the grammar and syntax of Modern French and its phonetic basis. Pr.: Mod. L. 431 or equiv.
- 253 434. French Conversation III.** (2) I. A course devoted to the spoken language and its proper use. Pr.: Mod. L. 432 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 253 623. Survey of French Literature I.** (3) I or II. The reading and discussion of French literature from the Middle Ages to the end of the eighteenth century. Pr.: Eighteen hours of college French or equiv.
- 253 624. Survey of French Literature II.** (3) I or II. The reading and discussion of French literature from the early nineteenth century to the mid-twentieth century. Pr.: Eighteen hours of college French or equiv.
- 253 626. French Poetry.** (2) I or II. Reading and discussion of a representative anthology of French poems from Villon to Baudelaire. Pr.: Eighteen hours of college French or equiv.
- 253 630. French Novel I.** (3) I or II. Reading, explication and discussion of several novels of the seventeenth and eighteenth centuries. Pr.: Eighteen hours of college French or equiv.
- 253 631. French Novel II.** (3) I or II. Reading, explication and discussion of several novels of the nineteenth century, e.g., those by Flaubert and Stendhal. Pr.: Eighteen hours of college French or equiv.
- 253 632. French Drama I.** (3) I or II. Reading and discussion of a selection of French plays of the nineteenth century. Pr.: Eighteen hours of college French or equiv.
- 253 633. French Drama II.** (3) I or II. Reading and discussion of a selection of modern twentieth century French plays. Pr.: Eighteen hours of college French or equiv.
- 253 634. Moliere.** (3) I or II. One of the great French dramatists as seen in a representative selection of his plays. Pr.: Eighteen hours of college French or equiv.
- 253 635. Contemporary French Literature.** (3) I or II. Reading and explication of a selection of twentieth century poetry and prose. Pr.: Twenty-one hours of college French or equiv.
- 253 636. Nineteenth Century French Literature I.** (3) I, II. A study of Pre-romanticism and Romanticism. Pr.: Eighteen hours of college French or equiv.
- 253 637. Nineteenth Century French Literature II.** (3) I, II. A study of Naturalism and Symbolism. Pr.: Eighteen hours of college French or equiv.
- 253 638. Comparative Study of the Phonology and Morphology of French and Spanish.** (3) II. French phonetics, Spanish phonetics, comparison and contrast between the grammars of French and Spanish. Pr.: Eighteen hours of college French or Spanish or equiv.

GERMAN

FOR UNDERGRADUATE CREDIT

- 253 105. Technical German I.** (3) I. Introduction to the grammar and syntax of German and the reading of basic material selected from modern German scientific writing.
- 253 111. Technical German II.** (3) II. Continued study of the grammar and syntax of the German written by the present-day German research scientist. Pr.: Mod. L. 105 or equiv.

- 253 121. German I.** (3) I, II, S. Introduction to the structure of modern German, reading of selected prose texts, and practice of the spoken language in the language laboratory.
- 253 126. German II.** (3) I, II, S. Cont. and conclusion of the introduction to the syntax and grammar of modern German, reading of selected prose texts. Pr.: Mod. L. 121 or equiv.
- 253 221. German III.** (3) I, II, S. Reading and discussion of a selection of modern German prose and review of the structure of German. Pr.: Mod. L. 126 or equiv.
- 253 225. German IV.** (3) I, II. Reading and discussion of modern German prose and review of the more difficult points of German grammar. Pr.: Mod. L. 221 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 253 421. German V.** (3) I or II. Reading of selected prose and drama from the nineteenth and twentieth centuries. Pr.: Mod. L. 225 or equiv.
- 253 423. German Culture.** (2) II. To acquaint students (particularly those contemplating study in Germany) with contemporary German culture. Lectures and discussions in German. Pr.: Fifteen hours of college German or equiv.
- 253 426. German Composition and Conversation.** (3) I or II. Study of the basic structure of spoken German, with practice in the writing and speaking of German. Pr.: Mod. L. 225 or equiv.
- 253 427. Advanced German Composition and Conversation.** (3) I or II. Continued study in depth of spoken and written German using audio-visual and audio-lingual aids where applicable. Pr.: Mod. L. 426 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 253 720. German Drama I.** (3) I or II. Reading and discussion of selected plays from the late eighteenth and nineteenth centuries. Pr.: Eighteen hours of college German or equiv.
- 253 721. German Drama II.** (3) I or II. Reading and discussion of selected plays from the twentieth century. Pr.: Twenty-four hours of college German or equiv.
- 253 722. Schiller.** (3) I or II. Reading and discussion of selected plays and poems from the work of Schiller. Pr.: Fifteen hours of college German or equiv.
- 253 723. Goethe.** (3) I or II. Reading and discussion of selected dramas, poetry, and prose from the work of Goethe. Pr.: Eighteen hours of college German or equiv.
- 253 724. German Lyric Poetry.** (2) I or II. Reading and explication of selected poems from the Middle Ages to the twentieth century. Pr.: Fifteen hours of college German or equiv.
- 253 725. Survey of German Literature I.** (3) I or II. Introduction to German literature from Ulphilas to German Classicism. Pr.: Eighteen hours of college German or equiv.
- 253 726. Survey of German Literature II.** (3) I or II. German literature in survey from German Classicism to the twentieth century. Pr.: Eighteen hours of college German or equiv.
- 253 727. The German Novelle.** (3) I or II. A selection of the outstanding German Novelle of the nineteenth and twentieth centuries. Pr.: Eighteen hours of college German or equiv.

GREEK

FOR UNDERGRADUATE CREDIT

- 253 171. Greek I.** (3) I. Introduction to the grammar of classical Greek and reading of elementary prose.

- 253 172. Greek II.** (3) II. Completion of the grammar of classical Greek and continuation of the reading of elementary prose. Pr.: Mod. L. 171 or equiv.

ITALIAN

FOR UNDERGRADUATE CREDIT

- 253 151. Italian I.** (3) I. Introduction to the structure of modern Italian.
253 155. Italian II. (3) II. Cont. and completion of the study of modern Italian grammar, using the facilities of the language laboratory for audio-lingual practice. Pr.: Mod. L. 151 or equiv.
253 251. Italian III. (3) I. Grammar review and reading selections from Italian literature. Pr.: Mod. L. 155 or equiv.
253 253. Italian IV. (3) II. Selective review of grammar and reading of examples of modern Italian literature. Pr.: Mod. L. 251 or equiv.
253 610. Dante. (3) I. An in-depth study of the *Divine Comedy* in translation, using Dante as an exponent of medieval thought. (Same as Engl. 610.)

LATIN

FOR UNDERGRADUATE CREDIT

- 253 115. Latin I.** (3) I. An introductory study of the structure of Latin.
253 116. Latin II. (3) II. Cont. and completion of the study of the structure of Latin. Pr.: Mod. L. 115 or equiv.
253 270. Latin III. (3) I. Review of Latin grammar and reading of an anthology of Roman prose and poetry. Pr.: Mod. L. 116 or equiv.
253 271. Latin IV. (3) II. Cont. of the study of Latin syntax and grammar, based upon the reading of Roman prose and poetry.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 253 450. Cicero.** (3) II. A study of the versatility of Cicero as evidenced in various works. Pr.: Mod. L. 271 or equiv.
253 451. Vergil. (3) I. A study of the Latin epic as exemplified by Vergil's *Aeneid*. Pr.: Mod. L. 450 or equiv.
253 501. Horace. (3) II. A critical study of the major works of Horace. Pr.: Mod. L. 451 or equiv.
253 502. Roman Comedy. (3) I. A study of the techniques of Roman comedy. Pr.: Mod. L. 501 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 253 641. Juvenal.** (3) I. A study of the satires of Juvenal. Pr.: Mod. L. 502 or equiv.
253 642. Survey of Latin Literature. (3) II. Primarily a study of authors not stressed in other courses. Pr.: Mod. L. 641 or equiv.

RUSSIAN

FOR UNDERGRADUATE CREDIT

- 253 161. Russian I.** (3) I. Introduction to the structure of modern Russian and reading of elementary prose. Pr.: Six hours of another foreign language.
253 165. Russian II. (3) II. Cont. and completion of the study of the grammar and syntax of modern Russian. Pr.: Mod. L. 161 or equiv.
253 261. Russian III. (3) I. Reading of selected prose on the intermediate level. Pr.: Mod. L. 165 or equiv.
253 265. Russian IV. (3) II. Reading and discussion of selected nineteenth and twentieth century poetry and prose. Pr.: Mod. L. 261 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 253 460. Russian Conversation and Composition.** (3) Discussion, writing of compositions, study of current events. Pr.: Mod. L. 265 or equiv.

- 253 500. Russian Literature in Translation.** (3) I, II. Development of Soviet literature since the revolution, stressing the prose works.
- 253 530. Introduction to Russian Literature.** (3) Russian literary and intellectual trends to the Revolution of 1917. Pr.: Mod. L. 265 or equiv.
- 253 531. Russian Drama.** (3) Development of the Russian theater, with special emphasis on dramatists of the period from 1850 to 1920. Reading of plays by Griboedov, Gogol, Turgenev, Ostrovsky, and Gorky. Pr.: Mod. L. 530 or equiv.
- 253 532. Russian Novelists of the Nineteenth Century.** (3) Major masters of the fiction of the nineteenth century, excluding Pushkin, Dostoevsky, and Tolstoy; emphasis on Lermontov, Gogol, Turgenev, Leskov, and Saltykov-Shchedrin. Pr.: Mod. L. 530 or equiv.

SPANISH

FOR UNDERGRADUATE CREDIT

- 253 141. Spanish I.** (3) I, II, S. Basic introduction to the structure of the Spanish language, emphasizing oral and written drills, as well as practice in the language laboratory.
- 253 145. Spanish II.** (3) I, II, S. Cont. 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. 141 or equiv.
- 253 241. Spanish III.** (3) I, II, S. An intensive review of syntax and a comprehensive structural review of Spanish, with emphasis on composition and conversation. Pr.: Mod. L. 145 or equiv.
- 253 245. Spanish IV.** (3) I, II. Reading and discussion of selections from contemporary prose, and review of grammatical structures as needed. Pr.: Mod. L. 241 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 253 440. Spanish V.** (3) I or II. An introduction to the prose of Spain, with a review of difficult grammatical points as they arise. Pr.: Mod. L. 245 or equiv.
- 253 445. Spanish Composition and Conversation.** (3) I. Review in depth of the structure of modern Spanish on the basis of classroom discussion and assigned topics. Pr.: Mod. L. 245 or equiv.
- 253 446. Advanced Spanish Composition and Conversation.** (3) II. Cont. of the study of the grammar and syntax of modern Spanish and its phonetic basis. Pr.: Mod. L. 445 or equiv.
- 253 447. Spanish Civilization.** (3) Survey of Spanish culture and civilization from its beginnings to the present; emphasis on Spanish contributions over the centuries in the humanistic fields. Pr.: Fifteen hours of Spanish or equiv.
- 253 448. Hispanic-American Civilization.** (3) Cultural development of Latin American countries. Pr.: Fifteen hours of Spanish or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 253 678. Survey of Spanish Literature I.** (3) I or II. Introduction to the verse, prose, and drama of Spain from the Middle Ages to Calderon. Pr.: Eighteen hours of college Spanish or equiv.
- 253 679. Survey of Spanish Literature II.** (3) I or II. Verse, prose, and drama of Spain from 1700 to the present. Pr.: Eighteen hours of college Spanish or equiv.
- 253 680. Spanish Novel I.** (3) I or II. Reading and discussion of several nineteenth century novels, their form and content. Pr.: Eighteen hours of college Spanish or equiv.
- 253 681. Spanish Novel II.** (3) I or II. Reading and discussion of Golden Age novels including the picaresque novel, the novel of costume, and Don Quixote. Pr.: Eighteen hours of college Spanish or equiv.

- 253 682. Spanish Drama I.** (3) I or II. Reading of a selection of dramas from the Golden Age. Pr.: Fifteen hours of college Spanish or equiv.
- 253 683. Spanish Drama II.** (3) I or II. The reading of selected plays from the nineteenth century Spanish stage. Pr.: Fifteen hours of college Spanish or equiv.
- 253 684. Spanish-American Literature.** (3) I or II. Reading and discussion of a broad selection of the prose and verse of Spanish America. Pr.: Eighteen hours of college Spanish or equiv.
- 253 685. Cervantes.** (3) I or II. Reading of the great classics of Spanish literature and discussion of the literary and cultural background of the period. Pr.: Twenty-one hours of college Spanish or equiv.
- 253 686. Contemporary Spanish Literature.** (3) I or II. Reading and discussion of prose and poetry from Spanish literature of the twentieth century, particularly the work of Garcia Lorca. Pr.: Twenty-one hours of college Spanish or equiv.
- 253 687. Spanish-American Novel.** (3) I or II. The reading of representative novels from Latin America. Pr.: Eighteen hours of college Spanish or equiv.
- 253 688. The Works of Federico Garcia Lorca.** (3) Study of drama and poetry. Pr.: Eighteen hours of Spanish or equiv.

SOUTH ASIAN LANGUAGES

- 253 690. Punjabi I.** (3) The script, structure and grammar of the language of 35 million people in India and Pakistan. Pr.: None; some knowledge of another language desirable.
- 253 691. Punjabi II.** (3) Cont. and completion of the study of the script, structure, and grammar of the language of 35 million people in India and Pakistan. Pr.: Mod. L. 690.
- 253 790. Urdu I.** (3) The script, structure, and grammar of the official language of Pakistan. Pr.: None; some knowledge of another language desirable.
- 253 791. Urdu II.** (3) Cont. of the study of the script, structure, and grammar of the official language of Pakistan. Pr.: Mod. L. 790.

MUSIC

LUTHER O. LEAVENGOOD,* *Head of Department*

Professors Leavengood and Steunenbergh;* Associate Professors Fischer,* Hayes,* Hays,* Leedham,* Pelton* and Walker;* Assistant Professors Jussila,* Painter, Shull, Sidorfsky,* Tanner and Voots; Instructors Sherman and Sloop*

UNDERGRADUATE

The Department of Music is a member, with institutional accrediting, of the National Association of Schools of Music.

Curriculums in Applied Music and Music Education with majors in voice, piano, organ, stringed, woodwind, and brass instruments are offered. For specific requirements for each curriculum, see pages 111 and 118.

A major program of music leading to the degree Bachelor of Arts in the Curriculum in Humanities may be elected in the fields of music literature, theory, or applied music. The general requirement is 30 semester hours subsequent to Music 201, 202, 304, 305. Specific requirements covering all three fields are: Music 250, 421, 422, 651, 652. Additional requirements in the field of music literature are: Music 401, 402, eight semesters in voice, piano or instrument, and six semester hours elected from Music 626, 633, 650, 654, 656, 658. Additional requirements in the field of theory are: Music 401, 402, 501, 502, 505, 521, eight semester hours of piano, and two semester hours of electives from the music literature group. Additional requirements in the field of applied music are: instrument or voice, 16 semester hours, Music 505, 521. Recital attendance throughout each year is required of all students major-

ing in music. This major is not intended to prepare students to teach music as a major field in the public schools of Kansas.

Prerequisites in applied music for students taking a 30-hour major in applied music in the Curriculum in Humanities are the same as for candidates for the Bachelor of Science degree in Music Education. See page 170 for requirements for this degree.

For a minor, the following courses are required: Music 060 (two semesters), 100, 201, 202, 270, or instrument courses (four hours), 287 (four hours).

Students who intend to be certified to teach music in the public schools of Kansas as a secondary teaching subject only must take in addition to the courses required for a minor in music the following courses: For grade supervisors and choral directors, Music 412, 413, and two years in a choral organization; for band and orchestra directors, Music 413, 630, and two years in band or orchestra.

Courses in music are available to any student enrolled in the University, subject to the prerequisites listed under course descriptions. Courses in applied music do not require prerequisites for the non-music major, but such students should have some knowledge of notation and fundamentals of music. This elective credit in applied music, however, cannot be used later toward a music degree unless it meets the requirements of that course. No more than two credits a semester will be granted for applied music as an elective.

Curriculum in Applied Music

A four-year curriculum with options in instrument and voice is offered in Applied Music. The curriculum is designed to give the student an opportunity for personalized training in voice, piano, organ, stringed, woodwind, and brass instruments. The student who completes a curriculum in Applied Music is awarded a Bachelor of Music degree.

The basic requirements in the Curriculum in Applied Music with a major in voice or instrument are: Music 201, 202, 250, 304, 305, 401, 402, 421, 422, 450, 505, 515, 521, 522, 550, 642, 644, 651, and 652.

For a major in voice the following courses must be taken: 32 semester hours in Voice (Music 287), four hours of Piano (Music 270), four hours of Vocal Ensemble (Music 290). Elective courses in areas other than music must include Spch. 245, 12 semester hours in one foreign language, six semester hours in a second foreign language, and six semester hours of literature.

For a major in instrumental (piano, organ, string, woodwind, brass, percussion) the following courses must be taken in addition to the basic requirements: Music 501, 502, 32 semester hours on the major instrument, eight semester hours on the minor instrument, six hours of Instrumental Ensemble (Music 288). If piano or organ is not the major instrument, it must be the minor instrument. Elective courses must include nine hours of a foreign language.

Recital attendance and participation in a music organization (selected on the advice of the department) are required each semester.

Requirements for Entrance and Graduation

Preliminary examinations in piano must be taken by all students majoring in music regardless of what curriculum is selected.

The above examinations are compulsory before any enrollment is made. For dates of examinations, consult the calendar.

General Information

Regular attendance at student and faculty recitals, choral and orchestral concerts, and the artist series is required of all music majors. Seventy-five percent attendance is required for graduation.

All students enrolled in music must have the consent of their instructor in order to perform in public or on the radio.

Practice room privileges are included in the tuition for students who are regularly enrolled in college. All others pay the fee stated on page 175.

The various courses in voice or instrument are divided into grades.

Students majoring in either the Curriculum in Applied Music or the Curriculum in Music Education must satisfy the following requirements for entrance in order to receive credit for the work and complete the grade indicated under each major before graduation.

Applied Music Requirements for Curriculum in Applied Music

Piano Majors: Students majoring in piano must pass grade 6 upon entrance and complete grade 10 by the end of the senior year.

Voice Majors: Students majoring in voice must pass grade 2 of the voice curriculum and grade 2 of the piano curriculum upon entrance and complete grade 6 in voice and grade 4 in piano by the end of the senior year.

Organ Majors: Students majoring in organ must pass grade 6 of the piano curriculum upon entrance and complete grade 4 of the organ curriculum by the end of the senior year.

String Majors: Students majoring in stringed instruments must pass grade 6 of the major instrument upon entrance and grade 1 for piano and complete grade 10 of the major instrument and grade 3 in piano.

Woodwind and Brass Majors: Students majoring in woodwind or brass instruments must pass grade 4 upon their major instrument upon entrance and complete grade 8 by the end of the senior year. In addition, all instrument majors must pass grade 1 in piano for entrance and complete grade 3 by the end of the senior year.

Applied Music Requirements for Curriculum in Music Education

Piano Majors: Students majoring in piano must pass grade 3 in piano upon entrance and complete grade 7 by the end of the senior year.

Voice Majors: No specific entrance requirements. However, a student should possess the ability to sing in time and in tune. Students majoring in voice must pass grade 2 in piano. For graduation, voice majors must complete grade 4 of the voice curriculum and grade 4 of the piano curriculum.

Organ Majors: Students majoring in organ must pass grade 6 of the piano curriculum upon entrance and complete grade 2 of the organ curriculum by the end of the senior year.

String Majors: Students majoring in stringed instruments must pass grade 3 upon their major instrument and grade 1 of the piano curriculum upon entrance. They must complete grade 7 of the major instrument and grade 3 of the piano curriculum by the end of the senior year.

Woodwind and Brass Majors: Students majoring in woodwind or brass instruments must pass grade 1 upon their major instrument and grade 1 of the piano curriculum upon entrance. They must complete grade 5 of the major instrument and grade 3 of the piano curriculum by the end of the senior year.

Outlines of each of the curriculums in music may be secured upon request from the head of the Department of Music. In each case, the major instrument should be specified.

GRADUATE

Graduate work leading to the degrees Master of Science and Master of Arts is offered in the Department of Music.

Prerequisite to work in the graduate program is the completion of a four-year undergraduate curriculum leading to the degrees B. Mus., B. Mus. Ed., or B. S. in Music Education, with graduation requirements substantially equivalent to those of the music curriculums in this University.

For the degree Master of Science, either music education or applied music may be chosen as a field of concentration, carrying a minimum of 12 semester hours. In the field of music education such cognate courses as psychology of music, problems in music and research in music may be used for partial fulfillment of this requirement. In the field of applied music a graduate recital and a master's report are required.

Electives to the extent of eight semester hours credit are required in the fields of music literature and music theory. If music education is the field of concentration, electives to the extent of four semester hours in applied music, provided proficiency warranting enrollment for graduate credit can be shown at time for enrollment, are required.

For the degree Master of Arts, the fields of concentration may be in music literature, carrying a minimum of 12 semester hours, including a master's report. In addition, six semester hours of Advanced Analysis and four semester hours of Applied Music are required. A minor carrying a minimum of six semester hours may be chosen from courses in one department other than the Music Department and in which the candidate is qualified to carry courses on the graduate level.

Facilities for advanced work in this department include an extensive library of music and records, adequate practice facilities, and a growing collection of the most important reference works.

COURSES IN THE THEORY OF MUSIC

FOR UNDERGRADUATE CREDIT

- 257 100. Music Fundamentals.** (3) I, S. Elementary instruction in the theory of music. Three hours rec. a week. Not open to music students.
- 257 201. Theory of Music I.** (3) I, S. An integrated course comprising ear training, sight singing, keyboard assignments and the principles of diatonic harmony. Five hours rec. a week.
- 257 202. Theory of Music II.** (3) II, S. Cont. of Music 201. Five hours rec. a week. Pr.: Music 201.
- 257 203. Voice Class.** (1) I, II, S. Basic rudiments of voice production and fundamentals of singing. Not open to majors in voice.
- 257 204. Piano Class.** (0) I, II, S. Instruction in the rudiments of playing the piano. Open to students without previous study. Required of music majors who do not meet entrance requirements in piano.
- 257 205. Music for Elementary Teachers.** (3) II, S. Pr.: Music 100.
- 257 241. The Opera.** (2) I, S. Survey of the history of the opera, with a review of a number of the most important operas. Course is designed for students majoring in curriculums other than music. Pr.: Music 250.
- 257 243. The Symphony.** (2) II, S. 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 curriculums other than music. Pr.: Music 250.
- 257 245. Programmatic Music.** (2) I, S. The presentation of a number of programmatic compositions with non-musical sources from which they are derived. The course is designed for students majoring in curriculums other than music. Pr.: Music 250.
- 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 the music which he may hear at concerts, in broadcasts, and on records.
- 257 303. General Principles of Harmony.** (3) I. A course designed for the general student who is interested in music, which presents such basic concepts as tonality, modality, chord structure and progression. Not open to students majoring in music or music education. Pr.: Ability to read music.
- 257 304. Theory of Music III.** (3) I, S. Intensified study of chord connections; choral harmonization; non-harmonic tones and chromatic harmony; cont. of integrated work in ear training and keyboard harmony; clef transpositions. Four hours rec. a week. Pr.: Music 202.
- 257 305. Theory of Music IV.** (3) II, S. Cont. of Music 160. Four hours rec. a week. Pr.: Music 304.
- 257 399. Honors Seminar in Music.** (1) II. Not open to students majoring in music or music education. Pr.: Honors students only.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 257 401. Counterpoint I.** (2) I, S. Devices of counterpoint and imitation leading to the writing of short contrapuntal compositions in two voices. Analysis of choral preludes and inventions. Pr.: Music 224.
- 257 402. Counterpoint II.** (2) II, S. Cont. of Music 170. Contrapuntal composition in three or four voices. Analysis of the fugue. Pr.: Music 401.
- 257 412. School Music I.** (3) I, II, S. Methods and materials for teaching music in kindergarten, primary, and intermediate grades. Pr.: Music 202 or consent of instructor.
- 257 413. School Music II.** (3) I, II, S. Methods and teaching materials suitable for junior and senior high school. Pr.: Music 412 or consent of instructor.
- 257 421. History of Music I.** (2) I, S. Chronological study of significant musical trends; the influence of cultural forces upon musical developments; the contributions of individual composers.
- 257 422. History of Music II.** (2) II, S. Cont. of Music 421.
- 257 431. Broadcast Musical Programs.** (2) I, II, S. Planning and arranging broadcasts of musical programs; copyright law as applied to musical broadcasts; theme, transitional background, and incidental music; microphone technic applied to music. Three hours rec. a week. Pr.: Spch. 160 or equiv.
- 257 501. Instrumentation and Orchestration I.** (2) I, S. Instruments of the band and orchestra studies with relation to tone, color, range, and function. Pr.: Music 304.
- 257 502. Instrumentation and Orchestration II.** (2) II, S. Simple and familiar compositions scored for ensemble, including full orchestra. Pr.: Music 501.
- 257 505. Musical Form and Analysis.** (2) I, II, S. Forms used in composition; the music of Bach, Haydn, Mozart, Beethoven, Schumann, Chopin, Brahms, Wagner, and others. Pr.: Music 305.
- 257 521. Composition I.** (2) I, S. Composition in the small forms for piano, voice, and instruments. Development of style conception. Pr.: Music 402.
- 257 522. Composition II.** (2) II, S. Cont. of Music 521, with emphasis on more complex treatment of the small and compound forms. Pr.: Music 521.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 257 601. Advanced Analysis I.** (3) I and alt. S. Combination of harmony, counterpoint, and form as used in compositions in their historical setting. Pr.: Music 305, 505.
- 257 602. Advanced Analysis II.** (3) II and alt. S. Modern chord structures, atonality, polytonality, form used in contemporary compositions. Pr.: Music 305, 505.
- 257 603. Pedagogy of Music Theory.** (2) S. The high school theory course, its objects and content; ear-training techniques and development of creative work; music history and appreciation in a high school program. Pr.: Music 305.
- 257 609. Music of the Twentieth Century.** (2) S. The historical aspect in musical analysis of composition since the romantic period. Pr.: Music 422, 505.
- 257 610. Techniques of Vocal Instruction.** (2) S. An analytical presentation of vocal methods and techniques, with primary emphasis on preparing the students to give studio lessons. Included are advanced repertoire and diction. Pr.: Senior or graduate standing.
- 257 611. Seminar in Music Education.** (3) I. Special phases of music education adapted to need of the student enrolled. Pr.: Music 413, 505.
- 257 612. The Junior High Music Program.** (3) S. A methods course dealing with the particular problems of this age group such as the

changing voice, the importance of the general music class, and the planning and selecting of music literature for the junior high voice. Pr.: Consent of instructor.

257 622. Workshop in Elementary Music. (1) S. Organizing old and new materials for various levels of elementary music. Correlation of academic subjects with the music program. Pr.: Music 413 and senior standing.

257 623. Workshop in Secondary Vocal Music. (1) S. Choral techniques and interpretation of Baroque, Classical, Romantic, and Modern styles. Pr.: Music 413 and senior standing.

257 624. Workshop in Instrumental Music. (1) S. Teaching techniques, methods, and materials for the woodwind, brass, string, percussion, and marching band. Pr.: Music 413 and senior standing.

257 625. Workshop in Piano Pedagogy. (1) S. Methods, materials, and teaching techniques for all grade levels. Pr.: Consent of instructor.

257 630. Band Administration and Percussion Techniques. (3) II, S. A study of percussion instruments, with emphasis on the snare drum; problems of school band organization, with emphasis on the marching band. Three hours rec. a week. Pr.: Junior standing.

257 633. Choral Techniques and Literature. (3) II, S. Study and discussion of basic problems involved in training of choral groups; emphasis upon arranging music for standard vocal groups. Pr.: Junior standing.

257 634. Advanced Instrumental Methods. (2) II. Methods, repertoire, conducting contest, interpretation, individual instruction, and ensembles. Pr.: Music 515.

257 636. Advanced Conducting. (2) S. Score reading, crosscueing, development of left-hand technique. Pr.: Music 515 and consent of instructor.

257 642. Methods and Materials for the Studio. (1) I, II. Methods of teaching fundamentals technic; selection of teaching materials, and outlining of courses of study. For students in the Curriculum in Music (Applied); taught in separate divisions for voice, piano, organ, and violin. Two hours rec. a week.

257 651. Music Literature I. (2) I, S. Style characteristics of music as revealed through a careful analysis of the music of different periods.

257 652. Music Literature II. (2) II, S. Cont. of Music 651. Pr.: Music 651.

257 661. Bach and Handel. (2) I, S. A comparison of the musical styles of Bach and Handel as revealed by careful analysis of representative works. Pr.: Senior standing.

257 662. Haydn and Mozart. (2) II, S. A comparison of the musical styles of Haydn and Mozart as revealed by a careful analysis of representative works. Pr.: Music 305.

257 663. Beethoven. (2) I, S. A study of Beethoven's musical style through the careful analysis of selected works. Pr.: Music 305.

257 664. Music of the Romantic Period. (2) II, S. A study of musical trends in the nineteenth century through the analysis of works by representative composers. Pr.: Music 305.

257 799. Problems in Music. Credit arranged. I, II, S. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

257 999. Research in Music. Credit arranged. I, II, S. Pr.: Registration in the Graduate School, with sufficient training to carry on the line of research undertaken.

COURSES IN APPLIED MUSIC

FOR UNDERGRADUATE CREDIT

257 050. Recital Attendance. (0) I, II.

- 257 111. A Cappella Choir.** (1) I, II. Membership by tryout.
257 115. Band. (1) I, II. Membership by tryout.
257 121. Oratorio Chorus. (1) I, II, S. Membership by tryout.
257 125. Kansas State Singers. (1) I, II. Membership by tryout.
257 130. Orchestra. (1) I, II. Membership by tryout.
257 135. Varsity Men's Glee Club. (1) I, II, S. Membership by tryout.
257 136. Apollo Men's Glee Club. (1) I, II, S. Membership by tryout.
257 140. Women's Glee Club. (1) I, II. Membership by tryout.
257 233. Wind Techniques and Materials. (2) I, S. The fundamentals of playing and methods for teaching wind instruments.
257 234. String Techniques and Materials. (2) II, S. The fundamentals of playing and methods for teaching string instruments.

The following undergraduate courses in Applied Music offered each semester and summer carry from 0 to 4 credits, with a maximum of 32 hours in any one applicable to a degree. The fees for these courses are listed following Music 800.

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|-----------------------------|----------------------------|-----------------------------|
| 257 252. Baritone | 257 264. Oboe | 257 276. Trumpet |
| 257 254. Bassoon | 257 266. Organ | 257 278. Tuba |
| 257 256. Clarinet | 257 268. Percussion | 257 280. Viola |
| 257 258. Double Bass | 257 270. Piano | 257 282. Violin |
| 257 260. Flute | 257 272. Saxophone | 257 284. Violoncello |
| 257 262. French Horn | 257 275. Trombone | 257 287. Voice |
- 257 288. Instrumental Ensemble.** (1) I, II, S. Three hours lab. a week. Elective for selected students.
257 290. Vocal Ensemble. (1) I, II, S. Two hours lab. a week. Elective for students of superior vocal talent.
257 291. Madrigal Ensemble. (1) I, II.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 257 450. Junior Recital.** (1) I. A joint solo recital appearance. For students in Applied Music.
257 516. Conducting I. (2) I, S. Basic meters and the proper manner of executing each; introduction to score reading and transposition. Pr.: Music 305.
257 517. Conducting II. (2) II, S. (Choral) Continued stress on acquiring basic mechanical skills; analysis of differences between instrumental and choral conducting; study of the stylistic factors which are involved in the interpretation of representative compositions from the various historical periods; practical application of conducting skills by working with one of the large choral organizations. Pr.: Music 516.
257 530. Advanced String Technics and Materials. (2) I, II, S. Playing and teaching skills beyond fundamentals, and presentation of materials suitable for private and public school instruction at the secondary level. Pr.: Music 234.
257 531. Advanced Woodwind Technics and Materials. (2) I, II, S. Playing and teaching of materials suitable for private and public school instruction at the high school level. Pr.: Music 233.
257 550. Senior Recital. (2) II. An individual solo recital appearance. For students in Applied Music.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 257 640. Ensemble.** (1) I, II, S. A graduate course in ensemble techniques and materials. Pr.: Consent of instructor.
257 644. Practice Teaching in Applied Music. (1) II. Practice teaching in private classes for students in Applied Music. Pr.: Music 642.
257 660. Survey of Writings on Music and Music Education. (3) II, S. A survey of writings in the fields of aesthetics, criticism, psychology

of music, and philosophy of music education. Pr.: Graduate standing or consent of instructor.

FOR GRADUATE CREDIT

257 800. Applied Music. Credit arranged. I, II, S. Consent of instructor.

FEES IN MUSIC

Private Music Lessons and Practice Facilities

University students enrolled in the **Applied Music** or **Music Education** curriculums 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 curriculums may take private music instruction by paying one of the following fees:

Two 30-minute lessons a week per semester—\$42.

One 30-minute lesson a week per semester—\$24.

Two 30-minute lessons a week, summer session—\$21.

One 30-minute lesson a week, summer session—\$12.

Single lessons, each—\$4.

Practice piano, 1 hour daily per semester—\$5.

Practice organ:

Two-manual, 1 hour daily per semester—\$10.

Two-manual, 2 hours daily, summer session—\$10.

Three-manual, 1 hour daily per semester—\$20.

Three-manual, 2 hours daily, summer session—\$20.

PHILOSOPHY

CECIL H. MILLER, *Acting Chairman*

Professors Miller and Tremmel;* Associate Professor Hausman;* Assistant Professors Eberle and Vaught;* Instructor Cagle; Visiting Professor David L. Miller*

The program in Philosophy falls under the Humanities curriculum. The objective of the program is to provide a broad base in all the traditional areas of philosophical study. At the same time, opportunity is offered for emphasis in one of the following areas: the history of philosophy, logic and the foundations of science, social and political philosophy, metaphysics and theory of knowledge, value theory (ethics and aesthetics), philosophy of religion.

UNDERGRADUATE

Requirements for a major in philosophy in the curriculum of humanities are 27 hours in philosophy. Majors are to distribute their courses as follows: a minimum of six hours in courses in the history of philosophy, a minimum of three hours in logic or the foundations of science, nine hours in other areas, not more than nine hours in an emphasis area.

GRADUATE

Requirements for the Master of Arts degree in philosophy are: completion of the general requirements; passing an examination in one foreign language; passing written comprehensive examinations in the history of philosophy and two of the following areas: logic and foundations of science, social and political philosophy, metaphysics and the theory of knowledge, value theory (ethics and aesthetics); a thesis; and successful performance on the final oral examination.

FOR UNDERGRADUATE CREDIT

259 150. Elementary Logic. (3) I, II, S. A study of correct thinking, its principles and conditions, in relation to observation, biases, prejudices, scientific induction, systematic deductive inference, sophistry, fallacies, and propaganda.

259 165. Introduction to Philosophy. (3) I, II, S. A survey of the major problems of philosophy. Consideration of their tentative solutions and implications for one's philosophy of life.

- 259 166. Honors Introduction to Philosophy.** (4) I, II. A study of the major problems of knowledge and values as they are treated by philosophers in the tradition of Western Civilization. For honors students or those with consent of instructor.
- 259 175. Introduction to the Philosophy of Religion.** (3) I in alt. years. A course designed to acquaint the student with the nature of the religious experience, with the basic language and literature of religion, and with the similarities and differences in polity and belief among the major contemporary religious institutions and theologies.
- 259 185. Professional Ethics.** (2) I, II, S. An inquiry into the rules of correct practice and the development of ideals of professional conduct in recognized professions and related skill groups.
- 259 221. Ethics.** (2) I, II, S. An inquiry into ideas of right and wrong, duty, happiness, and the good life.
- 259 300. Man and Ideas.** (3) I or II. Examines philosophically such basic ideas as God, Immortality, Freedom, Self.
- 259 310. Religious Dialogue.** (3) I in alt. years. Examines the epistemological, doctrinal and ethical principles of Christianity from the Roman Catholic theological position and the several contemporary Protestant theological positions, and places them all in the confrontation of philosophical dialogue.
- 259 350. History of Philosophy I.** (3) I. The development of philosophical ideas in the West through the medieval period, with special emphasis on ancient Greek philosophy. Pr.: Phil. 165 or equiv.
- 259 351. History of Philosophy II.** (3) II. The development of philosophical ideas from the Renaissance to the nineteenth century. Pr.: Phil. 165 or equiv.
- 259 398. Honors Colloquium.** Credit arranged. I or II. Open only to juniors in the Arts and Sciences Honors Program.
- 259 399. Honors Seminar in Philosophy.** Variable credit. I or II.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 259 400. Comparative Religion.** (3) I, II. A course which analyzes and compares the central concepts of the world's religions—such as Hinduism, Buddhism, Sikhism, Taoism, Shintoism, Zoroastrianism, Judaism, Christianity and Islam. Pr.: One course in philosophy.
- 259 410. The Age of Analysis.** (3) I in alt. years. Covers contemporary British and American philosophies of science and language, from pragmatism and the scientific philosophy of Bertrand Russell to recent empiricism and linguistic analysis. Pr.: One course in philosophy.
- 259 414. Oriental Philosophy.** (2) I in alt. years. Confucianism, Taoism, Carvaka, Buddhism, Vedanta, Yoga. Emphasis will be placed on basic assumptions, methods of reasoning, and ways of life associated with each. Pr.: One course in philosophy or consent of instructor.
- 259 420. Existentialism.** (3) I or II. A study of prominent thinkers in the existentialist tradition. Pr.: One course in philosophy.
- 259 430. 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.
- 259 500. Introduction to Philosophy of Science.** (3) I or II. Philosophic ideas and problems encountered by physicists, mathematicians, economists, psychologists, and biologists in basic and frontier areas of research. Pr.: One course in philosophy.
- 259 515. Aesthetics.** (3) I or II, S. A critical examination of contemporary theories of artistic creation, aesthetic experience, the nature of art and its role in society, the foundations and function of art criticism. Pr.: One course in philosophy and one course in art, literature, or music, or consent of instructor.

- 259 525. Metaphysics and Theory of Knowledge.** (3) II in alt. years. A study of major theories concerning the nature of knowledge and reality. Pr.: Phil. 165 or equiv.
- 259 545. 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.: Phil. 175 or 310 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 259 615. History of Medieval Philosophy.** (3) I or II in alt. years. The history of the main philosophical ideas of the medieval period from St. Augustine to the Renaissance. Pr.: Phil. 165 or equiv.
- 259 630. American Philosophy.** (3) I or II in alt. years, S. A study of great American philosophers from earliest times to the present, including Royce, Peirce, Dewey, Santayana, and others. Pr.: Phil. 165 or consent of instructor.
- 259 655. Philosophic Trends.** (3) I or II or S. One major trend in philosophy, either in a given area, e.g., metaphysics, ethics, philosophy of language, etc., or in a given school of thought, e.g., Continental Rationalism, Logical Empiricism, Neo-Thomism, etc. Pr.: One course in the History of Philosophy sequence or equiv. May be taken more than once for credit.
- 259 695. Advanced Ethics.** (3) I or II in alt. years. Examination of moral discourse and its relation to thought, emotion, and action. Pr.: Phil. 221 or equiv.
- 259 735. A Major Philosopher.** (3) I or II. Readings in one: Plato, Aristotle, Plotinus, Augustine, Aquinas, Descartes, Hobbes, Spinoza, Leibnitz, Locke, Berkeley, Hume, Kant, Hegel, Mill, Bradley, Whitehead, Russell, Bergson, Peirce, Santayana, James, Dewey, Ayer, Wittgenstein, Husserl, Heidegger. Pr.: One course in the History of Philosophy sequence or equiv. May be taken more than once for credit.
- 259 760. Symbolic Logic.** (3) A systematic introduction to modern logic. Truth-functions, truth-tables, calculus of propositions, classes, and relations. Illustrations from practical affairs, science, mathematics. Pr.: Elementary Logic or consent of instructor.
- 259 765. Philosophy of Natural Language.** (3) The semantics and pragmatics of natural languages and the evaluation of language as a vehicle for both emotive and conceptual expression, based upon either phenomenological or ordinary language analysis. Pr.: One course in philosophy or consent of instructor.
- 259 766. Philosophy of Formalized Languages.** (3) Introduction to the syntax and semantics of formalized languages: formation rules, truth, logical truth, analyticity, synonymy, definition, translation, and formal interpretations. Pr.: One course in philosophy or consent of instructor.

FOR GRADUATE AND ADVANCED UNDERGRADUATE CREDIT

- 259 770. Seminar in Philosophy.** (2-3) Study in one area: Aesthetics, epistemology, ethics, logic, metaphysics, philosophy of history, philosophy of religion, political or social philosophy, philosophy of science. Pr.: Consent of instructor and five hours of credit basic to the field involved.
- 259 780. Problems in Philosophy.** Credit arranged. I, II, S. For students who desire to pursue subject matter beyond the field of a specific course. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 259 810. Special Topics in Philosophy.** (2-5) I or II. Intensive study of an issue associated with topics such as perception, creativity, philosophy of art, mathematical logic, and others. Pr.: Consent of instructor. May be taken more than once for credit.

259 820. Seminar. (2-5) Pr.: Consent of instructor.

259 898. Research in Philosophy. Credit arranged. I, II, S. Pr.: Registration in the Graduate School, with sufficient training to carry on the line of research undertaken.

PHYSICAL EDUCATION

THOMAS M. EVANS,* *Head of Department*

Professors Evans and Geyer;* Associate Professor Lyman;* Assistant Professors Green, McKinney, Snyder,* Thompson* and Wauthier;* Instructors Fedosky, Hick, Piper, Poole, Rector and Sheriff; Emeritus: Professors Myers and Washburn**

UNDERGRADUATE

Each student receives a physical examination before enrollment in the Department of Physical Education. All freshman students enroll in Basic Physical Education 011 to satisfy the physical education requirement. Transfer students entering this University are excused from this requirement providing prior credit in courses equivalent to 011 has been granted. All university students, after completion of 011 or equivalent, are also encouraged to enroll in any one of the following: Ph. Ed. 107, 109, 110, 111, 116, 118, 124, 125, 126, 127, 128, 129, 130 where an opportunity will be given for gaining knowledge, skills and appreciation in activities for leisure-time pursuit and physical well-being.

For the major, a student should enroll in one of the curriculums in physical education. (See page 113.) For a minor, a student should enroll in the following courses: Ph. Ed. 206, 216,* 230, 235, 356, 450, 455, 481, physical education elective, four hours, sports elective, four hours chosen from 415, 420, 426, 430.

For a minor in Health Education a student should enroll in the following courses: Bot. 121, 122,** F. & N. 130, Ph. Ed. 356, 375, 410, 481, 486.

GRADUATE

Graduate study leading to the degree Master of Science in Physical Education is offered in the Department of Physical Education.

Prerequisite to the work in the graduate program is the successful completion of a four-year undergraduate curriculum substantially equivalent to that required of undergraduate students at this University.

Persons desiring to do major work should have sufficient preparation in the biological and social sciences, and in health and physical education to prepare a person for the advanced work in physical education.

Of the 32 hours required for the graduate degree, a person must complete a minimum of 18 semester hours in the major field and a minimum of nine hours in a minor outside the field.

Facilities available for graduate work in physical education include a well-equipped library containing bulletins, journals, books and other publications. In addition, a new modern, well-equipped gymnasium will furnish numerous possibilities for experimental work in collecting data for problems and research studies of various types relating to the field of health, physical education, and recreation.

COURSES IN PHYSICAL EDUCATION FOR MEN AND WOMEN

FOR UNDERGRADUATE CREDIT

261 011. Basic Physical Education. (0) I, II, S. Activities offered: Swimming, Trampolining, Gymnastics and Tumbling. Calisthenics and Weight-conditioning Exercises, Wrestling, Adaptive Physical Education, Individual and Team Sports, Modern and Social Dance and Recreational Activities. Assignments to these activities will usually follow a motor ability test. Required of all freshmen.

The following undergraduate courses in Physical Education offered

* Option on Ph. Ed. 216 and 241.

** Option on Zool. 200, 210, and 425.

each semester and summer carry from 0 to one hour credit with a maximum of two credit hours applicable to a degree.

- 261 012. Basic Varsity Baseball (0) 261 115. Advanced Varsity Golf (1)
 261 013. Basic Varsity Basketball (0) 261 116. Sports Officiating (1)
 261 014. Basic Varsity Football (0) 261 117. Advanced Varsity Gymnastics (1)
 261 015. Basic Varsity Golf (0) 261 118. Advanced Judo Sports (1)
 261 016. Basic Varsity Gymnastics (0) 261 119. Advanced Varsity Rowing (1)
 261 017. Basic Judo Sports (0) 261 120. Advanced Varsity Swimming (1)
 261 018. Basic Varsity Rowing (0) 261 121. Advanced Varsity Tennis (1)
 261 019. Basic Varsity Swimming (0) 261 122. Advanced Varsity Track (1)
 261 020. Basic Varsity Tennis (0) 261 123. Advanced Varsity Wrestling (1)
 261 021. Basic Varsity Track (0) 261 124. Apparatus and Trampolining (1)
 261 022. Basic Varsity Wrestling (0) 261 125. Bait and Fly Casting (1)
 261 107. Beginning Bowling (1) 261 126. Gymnastics and Tumbling (1)
 261 109. Advanced Bowling (1)
 261 110. Coeducational Bowling (1)
 261 111. Tennis and Golf (1)
 261 112. Advanced Varsity Baseball (1)
 261 113. Advanced Varsity Basketball (1)
 261 114. Advanced Varsity Football (1)
 261 206. Introduction to Physical Education. (1) I. Introductory survey of the field and study of the principles of health and physical education.
 261 290. Kinesiology. (2) II. Mechanics of movement; body movements analyzed and principles involved applied to the teaching of physical education. Pr.: Zool. 210.
 261 341. Life Saving and Water Safety Instruction. (1) I, II. Methods of teaching swimming and life saving. Upon satisfactory completion of this course a certificate is awarded by the American Red Cross as a senior life saver and a water safety instructor. Three hours lab. a week. Pr.: Advanced Swimming.
 261 351. Rhythms for Elementary and Secondary Schools. (2) II. Fundamental rhythms and music, methods and materials for teaching folk, square, and social dance in elementary and secondary schools. Four hours lab. a week.
 261 356. 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.
 261 375. First Aid. (2) I, II, S. Prevention of accidents and the treatment of injuries in an emergency. Upon satisfactory completion of this course a certificate is awarded by the American Red Cross and the holder is in line for consideration as an instructor in first aid. Not open to students in Physical Education.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 261 481. Teaching Health in Elementary and Secondary Schools. (2) II. Materials and methods of teaching health in elementary, junior and senior high schools. Pr.: Ph. Ed. 356; Zool. 210, 425.

- 261 486. 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.
- 261 570. Methods in Physical Education in Elementary Schools.** (2) II, S. Methods of teaching and organization of material for a progressive elementary school physical education program. Pr.: Ph. Ed. 380.
- 261 595. Community Recreation.** (2) II, S. A study of organization and activities of club work for youth, camping, playgrounds, and indoor recreation centers. Pr.: Ph. Ed. 230, Psych. 110.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 261 600. Physiology of Exercise.** (2) II, S. Effects of exercise on the tissues, systems, and organs of the body.
- 261 610. Tests and Measurements in Physical Education.** (3) I, S. A study of capacity, achievement, knowledge, and skill tests, for purposes of classification and measurement of school progress.
- 261 620. Administration of Physical Education in Colleges and Universities.** (2) I, S. Study of policies and procedures in the organization and administration of the total program of physical education, with special emphasis from the standpoint of colleges and universities.
- 261 630. Curriculum Construction in Physical Education.** (2) II, S. A study of materials, problems, and guiding principles involved in curriculum construction. Pr.: Ph. Ed. 450 or equiv.
- 261 650. Advanced Methods of Teaching Physical Education.** A study of Physical Education teaching methods applied to instruction at the secondary school level; organization of teaching materials and management of Physical Education classes.
- 261 675. Seminar in Physical Education.** Credit arranged. Recent trends and problems in physical education. Pr.: Senior standing and consent of instructor.
- 261 700. Seminar in Health Education.** Credit arranged. Recent trends and problems in health education. Pr.: Ph. Ed. 486 and consent of instructor.
- 261 799. Problems in Physical Education.** Credit arranged. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 261 820. Supervision of Physical Education.** (2) II, S. A study of the objectives, organization, and methods of supervision for elementary and secondary schools. Pr.: Educ. 477, Ph. Ed. 486.
- 261 840. Administration of School Health Education Program.** (2) I, S. A study of the organization and administration of health service, health instruction, and health environment for primary and secondary schools; health councils. Pr.: Ph. Ed. 481.
- 261 860. Advanced Athletic Coaching.** (3) S. For advanced students of football and basketball. Underlying principles of major sports strategy, the designing of plays, methods of teaching and controlling players; special problems of management connected with selecting, handling equipment, and making trips. Pr.: Graduate standing and one year of coaching experience.
- 261 999. Research in Physical Education.** Credit arranged. Pr.: Sufficient training to carry on the line of research undertaken.

COURSES FOR MEN

FOR UNDERGRADUATE CREDIT

- 261 111. Tennis and Golf.** (1) II. Study of rules, theory, and practice; methods of coaching.
- 261 116. Sports Officiating.** (1) I. Principles and practices of officiating athletic games.

- 261 216. Games and Combative Activities for Elementary and Secondary Schools.** (2) I. Practice and teaching methods of soccer, speedball, gymnasium games, adapted games and wrestling for elementary and secondary school physical education programs. One hour rec. and three hours lab. a week.
- 261 225. History of Physical Education.** (2) I. The leaders in development of the Physical Education Program. Early European through today's public school systems. Pr.: Ph. Ed. 206.
- 261 230. Nature and Function of Play.** (2) I. Theoretical explanations of play; age and sex characteristics which influence play; values of play to individual and community. Pr.: Psych. 110.
- 261 235. Tumbling, Balancing and Trampolining for Elementary and Secondary Schools.** (1) II. Practice and teaching methods in calisthenics; the gymnastic lesson; tumbling and trampolining. Three hours lab. a week.
- 261 241. Apparatus Activities for Elementary and Secondary Schools.** (1) I. Methods and materials for teaching graded exercises and activities on gymnasium apparatus and pyramids for use on apparatus. Three hours lab. a week.
- 261 245. Swimming for Elementary and Secondary Schools.** (1) II, S. Methods of teaching swimming, water safety, theory and practice of "drownproofing," diving, Red Cross swimming strokes; competitive swimming, its stroke theory and meet organization.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 261 410. Health Examinations.** (3) I. Methods of giving health examinations; postural deviations; corrective exercise. Pr.: Ph. Ed. 230.
- 261 415. Technics of Basketball.** (2) I. Study of rules, theory, and practices; methods of coaching. Pr.: Sophomore standing.
- 261 420. Technics of Baseball.** (2) I. Study of rules, theory, and practices; methods of coaching. Pr.: Sophomore standing.
- 261 426. Technics of Track and Field.** (2) II. Study of rules, theory, and practices; methods of coaching. Pr.: Sophomore standing.
- 261 430. Technics of Football.** (2) II. Study of rules, theory, and practices; methods of coaching. Pr.: Sophomore standing.
- 261 450. Methods and Materials in Physical Education for Elementary and Secondary Schools.** (2) I, II. Educational, health, and recreative significance of the physical education program; methods of teaching, materials, content, and types of activities in elementary grades, junior and senior high schools. Pr.: Senior standing.
- 261 455. Athletic Injuries and First Aid.** (3) II, S. Standard and advanced Red Cross First Aid certificates given for successful completion of work; principles and practice of massage, taping, and care of minor athletic injuries. Pr.: Zool. 210.
- 261 460. Practice Teaching in Physical Education.** (2) II. Supervised students assist in physical education class and officiate in intramural games. Six hours lab. a week.

COURSES IN PHYSICAL EDUCATION FOR WOMEN

KATHERINE GEYER, *In Charge*

Recreational swimming is offered on Tuesdays and Thursdays at 5 o'clock for women registered in college.

For a major, a student should enroll in one of the curriculums in physical education. (See page 113.) For a minor, a student should enroll in the following courses: Ph. Ed. 306, 320, 331, 351, 356, 366 or 515; 380, 481, 506 or 560; 526, 555, 566,* and 580.*

FOR UNDERGRADUATE CREDIT

- 262 051. Basic Physical Education.** (0) I, II, S. Activities offered:

* Optional.

Swimming, Body Mechanics, Individual and Team Sports, Modern Folk and Social Dance, and Recreational Activities. Assignment to swimming follows a swimming test. Required of all freshmen two semesters.

The following undergraduate courses offered each semester and carrying one credit hour with a maximum of two credit hours are applicable to a degree.

- | | |
|---|---|
| 262 151. Beginning Bowling (1) | 262 159. Advanced Modern Dance (1) |
| 262 152. Advanced Bowling (1) | 262 160. Recreational Sports (1) |
| 262 153. Tennis (1) | 262 161. Tumbling (1) |
| 262 154. Beginning Swimming (1) | 262 162. Gymnastics (1) |
| 262 155. Intermediate Swimming (1) | 262 163. Badminton (1) |
| 262 156. Advanced Swimming (1) | 262 164. Archery (1) |
| 262 157. Synchronized Swimming (1) | 262 165. Golf (1) |
| 262 158. Intermediate Modern Dance (1) | 262 166. Riflery (1) |

262 065. Physical Education W Lectures. (0) I, II. Required of women enrolled in the Curriculum in Physical Education for Women. Orientation and general survey of health, physical education, and recreation.

262 306. Tumbling and Recreational Sports. (2) I. Theory and practice of tumbling and recreational sports. One hour rec. and three hours lab. a week.

262 320. Recreational Leadership W. (2) II in even years. Principles and methods of organizing communities for leisure activities.

262 331. Individual Activities. (2) II. Methods of teaching tennis, badminton, and archery. One hour rec. and three hours lab. a week. Pr.: Ability to play tennis, badminton, and archery.

262 360. Dance Composition. (1) I, II. Principles and methods of modern dance composition. Discussion of costuming and staging dance. Three hours lab. a week. Pr.: Ph. Ed. 011, one semester of modern dance, or consent of instructor. May not be taken more than four semesters for credit.

262 366. Team Sports I. (2) II. Methods of teaching softball, hockey, and volleyball. One hour rec. and three hours lab. a week. Pr.: Ability to play softball, volleyball, and hockey.

262 380. Physical Education Material for Elementary Schools. (3) I, II, S. Games, rhythms, stunts, and other activities suitable for different age periods in the elementary schools. One hour rec. and four hours lab. a week. Pr.: Sophomore standing and Educ. 200 or consent of instructor.

262 382. Camp Counseling. (2) I. Basic principles and skills in camping for future counselors. Pr.: Sophomore standing or consent of instructor.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

262 506. Sports Officiating W I. (2) I. Principles and practices of officiating athletic games: softball, hockey, and volleyball. Pr.: Team Sports I or consent of instructor.

262 515. Team Sports II. (2) I. Methods of teaching soccer, speedball, and basketball. One hour rec. and three hours lab. a week. Pr.: Ability to play soccer or speedball and basketball.

262 526. Health Examinations and First Aid. (3) II. Methods of giving health examinations, analysis of normal body mechanics, postural deviations; first aid emergency treatment. Two hours rec. and three hours lab. a week. Pr.: Zool. 210, 425, junior standing, or consent of instructor.

- 262 531. Therapeutics.** (3) I. Postural defects studied and exercises given for correction of each. Two hours rec. and three hours lab. a week. Pr.: Ph. Ed. 290, 526; Zool. 210.
- 262 555. Principles and Philosophy of Physical Education.** (3) I. Aims and objectives, historical development, relation to general education, and analysis of programs and methods of physical education. Pr.: Senior standing.
- 262 560. Sports Officiating W II.** Principles and practices of officiating athletic games: soccer, speedball, and basketball. Pr.: Team Sports II or consent of instructor.
- 262 566. Methods and Materials of Dance.** (2) I. History of the dance; methods of teaching dance. One hour rec. and three hours lab. a week. Pr.: Semester each of beginning and intermediate dance.
- 262 575. Methods in Physical Education in Secondary Schools.** (3) I. Organization of physical education material for a progressive program in junior and senior high school; teaching methods to achieve desired aims of education. Pr.: Ph. Ed. 306, 331, 336, 515.
- 262 580. Swimming.** (2) II in alt. years. Methods of teaching swimming. One hour rec. and three hours lab. a week. Pr.: Semester each of beginning and intermediate swimming.

PHYSICS

ALVIN B. CARDWELL,* *Head of Department*

Professors Cardwell, Curnutte,* Dragsdorf,* Ellsworth,* Kellenberger,* K. Lark,* Mandeville* and Williams;* Associate Professors Avery, Bark,* Bhalla, Chapin,* Crawford,* Dale,* Fisher and Molbert; Assistant Professors Bode,* Brown,* Evans, Folland, Friesen,* Hathaway,* C. Lark, Lee, Nelson,* Parks,* Potnis* and Spangler;* Temporary Assistant Professors Lessor, Querry and Rinard; Instructors Green and Nieschmidt; Emeritus: Associate Professors Lyon and Maxwell*

UNDERGRADUATE

Undergraduate physics majors may select one of the following options; I. Physics, II. Industrial Physics, III. Meteorology, IV. Biophysics, V. Astronomy, VI. Physics Teaching in Secondary Schools, all of which are based on the common physical science curriculum (p. 119).

For majors in physics, under any of the options, the following courses, in addition to those specified in the core curriculum (VIII, p. 119), are required: Phys. 410, 432, 472, 473, 500, 501, 560, 740, and Math. 222, 240. A further course requirement for those in each of the options follows: Option I. Physics, Phys. 434, 640, 645 and Math. 550, 551; Option II. Industrial Physics, Phys. 610, 640, Math. 350, Mech. Engg. 211, 411, and three hours in engineering to be chosen in consultation with adviser. Option III. Meteorology, Phys. 135, 401, 480, 481, Geol. 625 and Math. 350; Option IV. Biophysics, Phys. 690, Biochem. 660, Chem. 511, 512, 516, 517, 585, 595; Option V. Astronomy, Phys. 330, 331, 645, Math. 551; Option VI. Physical Science Teaching in Secondary Schools, Bot. 210, Educ. 202, 400, 450, 476, 477, Psych. 110 and Zool. 205.

A student meeting the requirements under Option V will be certified to teach biology, chemistry, general science, mathematics and physics in high school.

Electives will be chosen in consultation with the student's departmental adviser.

GRADUATE

The Department of Physics offers major work leading to the degrees Master of Science and Doctor of Philosophy. To enter such a program the prospective graduate student must have taken: (1) intermediate courses in mechanics, heat, electricity, light and atomic physics; (2) at least one semester credit hour of laboratory in each of three of the above fields; (3) at least six semester hours of mathematics beyond elementary calcu-

lus, including differential equations. Prospective graduate students majoring in physics whose undergraduate training does not meet these criteria will be admitted on a provisional basis and will be required to enroll for courses, which will not be applied for graduate credit, to make up this deficiency.

Graduate students who plan to pursue a career of research in physics or to prepare themselves for teaching physics at the college level should plan a program leading to a Master of Science or a Doctor of Philosophy degree. Graduate students who plan to teach physics in high school should consider the same program or that leading to the degree Master of Science in Physical Science Teaching. The latter program permits a broader choice of course work in several science fields.

Research is conducted in solid-state physics, gaseous electronics, molecular physics, biophysics, nuclear physics, theoretical physics, meteorology, and applied physics. Computational facilities including an analogue and a digital computer are available on campus. A glass and an instrument shop and a reference library are maintained in the building under the supervision of trained personnel.

FOR UNDERGRADUATE CREDIT

- 265 101. Man's Physical World I.** (4) I, II, S. A general education course in physical science concerned primarily with the concepts of the nature and interrelationships of matter and energy. May be offered in partial fulfillment of the science laboratory and natural science requirements in curriculums of the College of Arts and Sciences. Three hours lec. and two hours lab. a week. Pr.: Completion of high school mathematics as required for admission to the curriculum in which the student is enrolled. Not open to seniors.
- 265 102. Man's Physical World II.** (4) I, II, S. A general education course in physical science concerned primarily with the logical development of contemporary ideas in the physical sciences and with the nature of scientific investigation. May be offered in partial fulfillment of the science laboratory and natural science requirement in curriculums of the College of Arts and Sciences. Three hours lec. and two hours lab. a week. Pr.: Completion of high school mathematics as required for admission to the curriculum in which student is enrolled. Man's Physical World I is not a prerequisite. Not open to seniors.
- 265 112. Descriptive Physics.** (4) I, II. Two hours rec. and three hours lab. a week.
- 265 115. Household Physics.** (4) I, II. Physical laws and principles involved in household appliances. Three hours rec. and three hours lab. a week.
- 265 121. Physics for Medical Technicians.** (4) I. Physical laws and principles involved in medical technology. Three hours rec. and three hours lab. a week.
- 265 125. Physics for Musicians.** (2) I, II. Selected topics applied to the physics of music and musical instruments.
- 265 131. Descriptive Astronomy.** (3) I, II. A general study of the solar system and the universe. Laboratory observation period is scheduled in the evening. Two hours rec. and two hours lab. a week.
- 265 135. Descriptive Meteorology.** (3) II, S. Atmospheric phenomena, meteorological instruments and their understanding from physical concepts. Application of meteorological knowledge to agriculture, engineering, and other aspects of everyday life.
- 265 141. Photography.** (2) Chemical and physical principles involved in photography; practice in making good negatives and prints. One hour rec. and three hours lab. a week.
- 265 211. General Physics I.** (4) I, II, S. Mechanics, heat, and sound. One hour lec., two hours rec., one hour quiz, and two hours lab. a week. Pr.: Math. 150.

- 265 212. General Physics II.** (4) I, II, S. Magnetism, electricity, and light. One hour lec., two hours rec., one hour quiz, and two hours lab. a week. Pr.: Phys. 211.
- 265 310. 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.: Math. 221 or 231 or conc. enrollment.
- 265 311. 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. 310; Math. 221 or 231.
- 265 330. General Astronomy I.** (3) A quantitative introduction to astronomy. Topics considered will include astronomical instrumentation; satellite and planetary orbits; determination of physical characteristics of stars and planets; time, shape and size of the universe. Three hours lec. a week. Pr.: Phys. 211, 212 or 310, 311.
- 265 331. General Astronomy II.** (2) Cont. of Phys. 330. Two hours lec. a week. Pr.: Phys. 330.
- 265 333. Observational Astronomy.** (1) Observation laboratory for use with Phys. 331. Two hours observ. a week. Pr.: Conc. enrollment in Phys. 331.
- 265 398. Junior Honors Colloquium.** Variable credit. Open only to juniors in the Arts and Sciences Honors Program.
- FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY
- 265 401. Microclimate.** (3) Fundamental meteorological and climatological processes near the ground. Pr.: Math. 100, Phys. 211.
- 265 405. Physics for Science Teachers.** (2) Apparatus and demonstration methods in teaching physics. One hour rec. and three hours lab. a week. Pr.: Phys. 212 or 311.
- 265 407. Intermediate Physics.** (3) The application of analytic geometry, calculus, vectors, and elementary differential equations to the description of physical phenomena and the solution of physical problems in mechanics, electricity, and magnetism. Pr.: Phys. 212 or 311, Math. 240 or conc. enrollment.
- 265 410. Light.** (3) I. Pr.: Math. 240 or 421.
- 265 421. Geophysics I.** (3) Principles and methods of exploration geology by physical methods. Pr.: Phys. 212 or 311, Math. 221 or 232.
- 265 432. Mechanics I.** (3) Principles of statics and dynamics of particles and rigid bodies by the methods of the calculus. Pr.: Math. 240 or 421 or conc. enrollment in either.
- 265 435. Mechanics II.** (3) Cont. of Phys. 432. Pr.: Phys. 432.
- 265 440. Sound.** (3) Pr.: Math. 222 or 231, Phys. 212 or 311.
- 265 472. Electricity and Magnetism.** (3) A study of electric and magnetic fields using the calculus. The development and solution of Maxwell's equations. Pr.: Phys. 212 or 311, Math. 222 or 232.
- 265 473. Electromagnetic Circuits and Measurements.** (2) One hour rec. and three hours lab. a week. A study of a.c. and d.c. circuits and measuring instruments. Pr.: Phys. 212 or 311, Math. 222 or 232.
- 265 480. Dynamic Meteorology I.** (3) Mathematical treatment of atmospheric thermodynamics and hydrodynamics. Pr.: Phys. 212, Math. 222.
- 265 481. Dynamic Meteorology II.** (3) Cont. of Phys. 480. Pr.: Phys. 480.
- 265 500. Physics Laboratory I.** (2) See Phys. 610. Pr.: One year of college physics.
- 265 501. Physics Laboratory II.** (2) Cont. of Phys. 500. See Phys. 610.
- 265 535. Radioactive Tracer Techniques.** (3) (See Chem. 535.) 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.: Consent of instructor.

265 560. Atomic Physics. (3) Contemporary theories and problems. Pr.: Math. 222, Phys. 212 or 311.

FOR UNDERGRADUATE AND GRADUATE CREDIT

265 600. Electronic Physics I. (3) Pr.: Math. 222 or 232; Phys. 472, 473, and 560 or conc. enrollment.

265 602. Electronic Physics II. (3) Pr.: Phys. 472.

265 604. X-ray and Crystal Physics. (3) Pr.: Phys. 472.

265 607. X-ray Laboratory. (1) Three hours lab. a week. Pr.: Phys. 604 or conc. enrollment.

265 610. Advanced Physics Laboratory. (2) The courses Phys. 500, 501, and 610 are designed to give the advanced student in science an opportunity to perform for himself some experiments of historical and current significance and to develop skill in making precise physical measurements involving the use of the high-grade mechanical, optical, electrical and thermal instruments. Experiments in the broad fields of atomic physics, electronics, heat and thermometry, light, nuclear physics and spectroscopy are available for students. Pr.: Phys. 500 and either 473 or 501.

265 613. Introduction to Astrophysics. (3) Topics in radiation measurement, spectra, constitution of planets and stars, celestial mechanics, thermodynamics and kinetic theory of gases, and nuclear processes in the sun. Three hours lec. a week. Pr.: Phys. 560.

265 615. Special Theory of Relativity. (2) Fundamental development of relativistic concepts, with emphasis on mechanics and electricity and upon experimental verification of the theory. Pr.: Phys. 212 or 311, Math. 220.

265 621. Geophysics II. (3) An extension of Phys. 421 to include a quantitative treatment of geophysical principles. Pr.: Phys. 421 and 472.

265 625. Applied Spectroscopy. (3) Spectrographic methods for detecting, qualitatively and quantitatively, chemical constituents of minerals, metals, and biological specimens. Two hours rec. and three hours lab. a week.

265 630. Semiconductor Physics. (3) The physics of conduction in homogeneous semiconductors and semiconductor device structures. Pr.: At least senior standing in physics or electrical engineering.

265 640. Introductory Quantum Mechanics. (3) Methods of quantum mechanics and solution of some basic problems in atomic, molecular, and solid-state physics. Pr.: Phys. 432, 560; Math. 240 or 421.

265 645. Thermodynamics. (3) Pr.: Phys. 435 or conc. enrollment; Math. 240 or 421.

265 675. Nuclear Physics. (3) Modern theories of nuclear physics. Pr.: Phys. 560.

265 680. Modern Physics Laboratory. (1) Selected experiments in atomic and nuclear physics designed to develop appropriate laboratory techniques and methods. Three hours lab. a week. Pr.: Phys. 560 or conc. enrollment.

265 685. Electro-optics. (3) Selected topics in modern optics, with special emphasis on electro-optic and magneto-optic effects. Physical phenomena forming the basis of laser technology and modulation of light waves. Pr.: Phys. 410, 472, 473, 640.

265 690. Biophysics I. (2) Molecular Biology. An introduction to the molecular structure of biological materials and physical techniques for studying biological materials. The molecular basis of biological function. Pr.: Consent of instructor.

- 265 691. Biophysics II.** (2) An introduction to a general theory of regulation: transformations, feedback, system analysis, rhythmic phenomena in cells.
- 265 692. Radiation Biophysics.** (2) The origin, measurement, physical and chemical and biological effects of ionizing radiation and ultra-violet light. Pr.: Phys. 535 or consent of instructor.
- 265 701. Journal Club.** Credit arranged. Seminar in current topics in physics or biophysics. Pr.: Consent of instructor.
- 265 705. Introduction to Theoretical Physics.** (3) Pr.: Phys. 432; Math. 240 or 421, 621.
- 265 710. Electrodynamics I.** (3) Pr.: Phys. 705, Math. 622.
- 265 720. Introduction to Solid State Physics.** (3) Pr.: Phys. 600 and 640.
- 265 740. Colloquium in Physics.** Required of graduate majors and undergraduate majors.
- 265 799. Topics in Physics.** Credit arranged.

FOR GRADUATE CREDIT

- 265 825. Advanced Dynamics.** (3) Pr.: Phys. 710.
- 265 835. Electrodynamics II.** (3) Pr.: Phys. 710.
- 265 855. Statistical Mechanics.** (3) Pr.: Phys. 845.
- 265 860. Advanced Statistical Mechanics.** (3) Advanced equilibrium statistical mechanics; approach to equilibrium; topics from applications to many-body problems. Pr.: Phys. 855.
- 265 865. Quantum Mechanics I.** (3) Pr.: Phys. 705 or conc. enrollment, Phys. 640, Math. 621.
- 265 875. Quantum Mechanics II.** (3) Pr.: Phys. 865.
- 265 890. Atomic and Molecular Spectra.** (3) Atomic and molecular energy levels and the origins of spectra. Pr.: Phys. 640.
- 265 899. Problems in Physics I.** (1) 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.
- 265 915. Advanced Molecular Spectra.** (3) Pr.: Phys. 890.
- 265 925. X Ray.** (3) Pr.: Math. 240 or 421, Phys. 604.
- 265 936. Solid State Physics I.** (3) Pr.: Phys. 604 or 720, 855, 875 or conc. enrollment.
- 265 937. Solid State Physics II.** (3) Pr.: Phys. 936.
- 265 945. Advanced Nuclear Physics.** (3) Pr.: Math. 622; Phys. 675, 865.
- 265 955. Mathematical Physics.** (3) Pr.: Phys. 875.
- 265 970. Quantum Field Theory.** (3) Pr.: Phys. 835, 865.
- 265 998. 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. 899 and consent of instructor.
- 265 999. Research in Physics.** Credit arranged. Work is offered in solid-state physics, gaseous electronics, molecular physics, biophysics, nuclear physics, theoretical physics, meteorology and applied physics. Pr.: Consent of instructor.

POLITICAL SCIENCE

WILLIAM W. BOYER,* *Head of Department*

Professors Boyer and Douglas;* Associate Professor Hajda;* Assistant Professors Chamberlin, Gustafson,* Jones,* Linford,* Richter, Schultze,* Suleiman* and Waters;* Emeritus: Professor Iles**

A major in political science provides a liberal arts student with the opportunity to acquire a broad education that will equip him to adapt to a wide variety of careers. The program for majors is designed to en-

courage the student to analyze the theories, institutions, and processes of political systems in the context provided by the social sciences; to stimulate the student to attain a grasp of the broad sweep of political science as a discipline; to develop a continuing and responsible interest in political activity and public affairs; to provide the student with the opportunity to acquire a fundamental understanding of political science as a basis for citizenship, a career in government, or professional study or service; to stimulate the qualified student's interest in graduate study in political science.

A major consists of 24 credits in political science. Courses in political science are grouped into four fields: (1) American government and politics; (2) comparative government and politics; (3) international relations, law, and organization; and (4) political thought.

The course credits of a major are distributed as follows:

(a) Lower-division Courses. Political Science 110 or 220 plus a minimum of one course under 400. Normally, these should be taken in the freshman and sophomore years.

(b) Field Requirement. One course numbered above 600 in each of the four fields of political science, as indicated, and such additional courses above 600 in one or more fields as are necessary to complete the minimum political science credit requirements. This distribution permits the student to develop broad competence in political science and competence in depth in one of the dimensions of the discipline.

Advisory Services

A special advisory program offered by the department is pre-legal training designed to provide a background that will help the student in his law studies and will prove useful to the lawyer in practice. The department also maintains a special advisory program for students interested in government service.

Graduate Study

In accordance with Graduate School requirements, an M. A. degree in political science consists of either (1) a minimum of 30 semester hours of which 24 shall be in political science including a master's thesis of six to eight semester hours; or (2) a minimum of 32 semester hours without a master's thesis but including a seminar research paper for which two semester hours of credit are given. Each candidate must take P. Sci. 800 and at least one graduate seminar in political science in each of two fields, as set out above, in which he chooses to offer himself for comprehensive examinations.

Facilities for research include the resources of the Computing Center, the University Library, and in the vicinity of the University—the Eisenhower and Truman Libraries, and State Historical Library and other research centers and libraries.

FOR LOWER-DIVISION UNDEGRADUATE CREDIT

269 110. Introduction to Political Science. (3) I, II, S. Introduction to principles and major fields of political science.

269 111. Introduction to Political Science. (3) (Honors) Introduction to principles and major fields of political science. Pr.: Membership in Arts and Sciences Honors Program.

269 220. American Government. (3) I, II, S. The national government, with emphasis on constitutional principles, basic structure, functions, and the political process.

269 320. State and Local Government. (3) The American system of federalism, with emphasis on the government and politics of the American states and their subdivisions.

269 333. World Politics. (3) Introduction to politics among nations, including a survey of major contemporary problems of world politics and focusing on the international struggle for power and order.

269 399. Honors Seminar in Political Science. (1)

FOR UPPER-DIVISION UNDERGRADUATE CREDIT

- 269 444. The American Democracy.** (3) Emphasis on extending, deepening, and intensifying understanding of the American political system. For upper-division majors of other departments who have had no previous course in political science. Not open to students who have had P. Sci. 110 or 220 or equiv.
- 269 555. Senior Honors Seminar.** (3) Open to senior majors who have attained a 3.0 grade-point average in political science.

COURSES IN AMERICAN GOVERNMENT AND POLITICS

FOR UPPER-DIVISION UNDERGRADUATE AND GRADUATE CREDIT

- 269 605. The American Presidency.** (3) The presidency as an institution, its historical evolution; Congressional relationships; executive organization.
- 269 610. Public Policies Toward Business.** (3) Analysis of governmental processes related to domestic problems at the level of the national government; policy formation and decision making.
- 269 614. Rural Politics.** (3) Fundamental problems of political power, behavior, and decision making in agricultural policy and rural government settings.
- 269 616. Urban Politics.** (3) Fundamental problems of political power and decision making in urban-suburban governmental settings.
- 269 617. The Administrative Process.** (3) Public administration as a process of organization and methods management, with emphasis on conditions, elements, and problems common to all levels and functions of bureaucracy.
- 269 619. Administrative Policy Making.** (3) Agency policy making, with emphasis on administrative decision making that affects private rights and interests against a setting of multiple and powerful pressures.
- 269 621. 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.
- 269 623. 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.
- 269 625. Constitutional Law.** (3) Development of the government of the United States through judicial interpretation of the Constitution.
- 269 665. Civil Liberties.** (3) History, theory, and development of constitutional liberties in the Bill of Rights and the Fourteenth Amendment.
- 269 677. Political Parties and Elections.** (3) Origins, structure, and functions of political parties. Dynamics of the two-party system. Roles of third parties. Analysis of election results and voting behavior.
- 269 681. Interest Groups and Political 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 opinion.

COURSES IN COMPARATIVE GOVERNMENT AND POLITICS

- 269 711. European Political Systems.** (3) Comparative analysis of British democracy, totalitarianism, and contemporary Continental European political systems.
- 269 713. South Asian Political Systems.** (3) Analysis of selected political systems in South Asia.
- 269 717. The Soviet Political System.** (3) Government and politics of the Soviet Union.

- 269 719. The Politics of Developing Nations.** (3) Comparative analysis of politics in emergent states, with emphasis on processes of modernization and nation building.
- 269 721. 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.

COURSES IN INTERNATIONAL RELATIONS, LAW AND ORGANIZATION

- 269 731. International Relations.** (3) The nature of international relations, with emphasis on contemporary theories explaining the international behavior of states.
- 269 733. American Foreign Policy.** (3) American external relations since 1945 and evaluation of processes involved in the formulation and conduct of contemporary foreign policy of the United States.
- 269 737. International Law.** (3) Theories of international law, and general problems, such as: recognition, responsibility, war crimes, sources, evidence, codification, and settlement of disputes.
- 269 741. International Organization.** (3) Structure, functions, values, and effectiveness of international organizations, with emphasis on the United Nations, Common Market, and other regional arrangements.

COURSES IN POLITICAL THOUGHT

- 269 751. Political Thought: Classical to Sixteenth Century.** (3) Systematic study of ideas about law, politics, and government of great philosophers of Western civilization from Greek antiquity to the sixteenth century.
- 269 753. Political Thought: Since the Sixteenth Century.** (3) The development of Western political thought from the sixteenth century to the twentieth century.
- 269 757. American Political Thought.** (3) Political ideas underlying the American union, including the doctrine of rights, the nature of union, liberty, property, and democracy.
- 269 761. Modern Political Thought.** (3) Contemporary political ideas and social thought.

READINGS

- 269 785. Readings in Political Science.** Variable credit. Students will undertake directed reading and discussion of a selected topic in political science.

FOR 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.
- 269 801. Seminar in Public Policy and Decision Making.** (3)
- 269 811. Seminar: International Politics.** (3)
- 269 821. Seminar: Political Thought.** (3)
- 269 831. Seminar: Public Administration.** (3)
- 269 841. Seminar: Comparative Politics.** (3)
- 269 851. Seminar: Public Law.** (3)
- 269 861. Political Organization and Behavior.** (3)
- 269 890. Research in Political Science.** Credit arranged. Pr.: Sufficient training to carry on the line of research undertaken.

PSYCHOLOGY

MERRILL E. NOBLE,* *Head of Department*

Professors J. L. Brown, Helson,* Langford,* Noble,* Phares,* Rohles* and Trumbo;* Associate Professors Danskin,* Mitchell,* Samelson* and Sinnett;* Assistant Professors S. C. Brown,* Christ,* Handel,* Haygood,* Rappoport* and Thompson;* Emeritus: Professors Alm, Peterson and Showalter*

Psychology is the systematic study of behavior. The undergraduate curriculum at Kansas State is designed to serve several functions: (1) to give the student, as part of a liberal education, some familiarity with the principles, methods and findings of psychology; (2) to provide knowledge and skill requisite for study at the graduate level; and (3) to provide valuable background for students preparing for work in a variety of professions and jobs—e. g., medicine, law, theology, business, teaching, and engineering. The graduate program prepares the student for college teaching, laboratory research, counseling in schools, colleges and industry, and personnel training and human engineering work in the industrial setting.

The undergraduate major requires Stat. 320 or 520 and a minimum of 24 hours of course work, including Psych. 110, 440, 720, 775 and one of the following: Psych. 409, 410, or 700. Additional courses are determined in consultation with the student's adviser. Students majoring in the Social Sciences curriculum should take Math. 100 to meet the university mathematics requirement. Those in the Biological Science curriculum take Math. 100 and A. H. 400; and six hours of zoology beyond Zool. 205 in addition to curriculum requirements (see p. 108). A more detailed description of the program may be obtained from the Department of Psychology.

Students interested in the industrial relations field should take the following electives: Psych. 515 and 625 as well as Econ. 620 and 627, Soc. 541 and B. A. 400 and 431. This program, acquainting the student with economic, political, psychological and social aspects of labor-management relations, may be taken as a terminal university program or as a foundation for graduate study in the labor and industrial relations field. Students preparing for work in business should take the following electives: Psych. 505 and 515, Econ. 120, B. A. 272 and 305 as a basic program as well as some additional Business Administration courses such as B. A. 400, 405, 440, etc. These selections of electives, as well as those of students planning other careers, should be discussed with the departmental adviser.

GRADUATE

The graduate curriculum leads to the M. S. and Ph. D. degrees. At the master's level, students may specialize in most of the traditional areas of psychology. Doctoral programs are offered in the areas of general-experimental, industrial, and personality-social psychology. The instructional programs are supplemented by laboratory and on-the-job experience. Internships are an integral part of the training program. Participation in staff research and teaching will give the graduate student experience in a wide variety of situations.

For most students, the master's program requires two years beyond the baccalaureate level; the doctorate, two more years. It is expected that entering students will have had background work essentially equivalent to our undergraduate major. Deficiencies can be made up after enrollment.

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.

FOR UNDERGRADUATE CREDIT

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.

- 273 111. General Psychology (Honors).** (3) I, II. An introduction to the study of behavior. Pr.: Participation in Honors Program or consent of instructor.
- 273 399. Honors Seminar in Psychology.** (1) Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 273 405. Abnormal Psychology.** (3) An introductory study of behavior pathologies, with emphasis on their etiology and treatment. Pr.: Junior standing; Psych. 110 or consent of instructor.
- 273 409. Experimental Psychology I.** (4) II. Laboratory investigation of the sensory and perceptual processes. Two hours rec. and four hours lab. a week. Pr.: Psych. 110 and Stat. 320 or 520.
- 273 410. Experimental Psychology II.** (4) I. Laboratory investigation of learning and motivation. Two hours rec. and four hours lab. a week. Pr.: Psych. 110 and Stat. 320 or 520.
- 273 415. Psychology of Childhood and Adolescence.** (3) Survey of behavioral development from birth through adolescence. Pr.: Sophomore standing; Psych. 110.
- 273 420. 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.
- 273 425. 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. 415 or Educ. 202.
- 273 435. 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.
- 273 440. 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.
- 273 465. Psychology of Art.** (3) The role of psychological facts and principles in the production and appreciation of visual art, with emphasis on pictorial art. Pr.: Sophomore standing; Psych. 110 or consent of instructor.
- 273 505. Consumer Psychology.** (3) II. A survey of consumer research problems and methods, with emphasis on the application of psychologically sound principles and practices in consumer surveys, advertising, and selling. Pr.: Sophomore standing; Psych. 110.
- 273 515. Personnel Psychology.** (3) I. The application of psychological facts and principles in job analysis, employee selection and training, and interpersonal relationships in the job setting. Pr.: Sophomore standing; Psych. 110 or consent of instructor.
- 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 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 273 611. Introduction to Physiological Psychology.** (4) A survey of basic concepts and experiments in the study of physiological correlates of behavior, including sensory and motor processes, learning motivation, emotion, and instinctive behavior. Three hours rec. and three

- hours lab. a week. Pr.: Zool. 205 and Psych. 110 or consent of instructor.
- 273 625. Industrial and Engineering Psychology.** (3) The application of psychological facts and principles in creating the optimum work environment, work schedule, and work procedures; the role of behavioral factors in the design and operation of machines and equipment. Pr.: Psych. 110, Stat. 320 or 520 or consent of instructor.
- 273 700. 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. 520.
- 273 705. 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. 320 or 520 or equiv.
- 273 716. Comparative Psychology.** (4) Behavior at different phylogenetic levels as an aid to the clarification of behavioral principles. Three hours rec. and three hours lab. a week. Pr.: Consent of instructor.
- 273 720. Psychology of Personality.** (3) I. Discussion of different approaches to the study of personality. Pr.: Any of the following: Psych. 409, 410, 700 and consent of instructor.
- 273 775. History of Current Trends.** (3) II. A review of the contributions of individuals and intellectual movements to the development of modern psychology. A survey of theoretical systems currently of influence. Pr.: Psych. 110; either nine additional hours of psychology or consent of instructor; senior standing.
- 273 790. Topics in Psychology.** Credit arranged. I, II, S. Pr.: Psych. 110 and consent of instructor.
- 273 799. Problems in Psychology.** Credit arranged. I, II, S. Pr.: Psych. 110 and consent of instructor.

FOR GRADUATE CREDIT

- 273 800. Advanced Measurement.** (3) The logic of measurement, scaling theory, psychophysics and psychometrics, and problems in classification and prediction. Pr.: Psych. 700.
- 273 805. Experimental Design in Psychology.** (3) Introduction to techniques of research planning and experimental design, including critical evaluation of selected experiments. Pr.: Psych. 705 or Stat. 521 or consent of instructor.
- 273 809. Sensory Processes.** (3) Experimental study of sensory and perceptual processes, with emphasis on recent developments in the field. Pr.: Psych. 409 or consent of instructor.
- 273 810. Learning and Motivation.** (3) Experimental study of learning and motivation, with emphasis on recent developments in the field. Pr.: Psych. 410 or consent of instructor.
- 273 811. 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. 409 or 809 or consent of instructor.
- 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. 809 or consent of instructor.
- 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. 810 or consent of instructor.

- 273 820. Personality Theory.** (3) A comparative examination of contemporary theories of personality structure. Pr.: Psych. 720 or consent of instructor.
- 273 821. 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.
- 273 822. Psychopathology.** (3) A systematic review of behavior disorders, their etiology and treatment. Pr.: Psych. 405 and 720 or consent of instructor.
- 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.
- 273 831. 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 or consent of instructor.
- 273 835. Introduction to Clinical Psychology.** (3) Survey of the problems and methods of the clinical psychologist. Pr.: Nine hours of psychology and consent of instructor.
- 273 836. Techniques of Individual Intelligence Testing.** (1) May be taken only in conjunction with Psych. 835 (Introduction to Clinical Psychology). Supervised practice in interviewing and in the administration and interpretation of selected individual intelligence tests. Pr.: Conc. enrollment in Psych. 835.
- 273 837. Projective Techniques.** (3) Theory and techniques of personality assessment, with emphasis on the administration, interpretation, and research data of selected projective techniques. Pr.: Psych. 820, 822, 836 and consent of instructor.
- 273 840. Advanced Personnel Psychology.** (3) Survey of theories and methods in job analysis, job design, personnel selection, placement and training, with special attention to criteria for evaluation of personnel practices. Pr.: Psych. 515 or equiv. and Psych. 700 or consent of instructor.
- 273 844. Counseling Psychology.** (3) Survey of the problems and methods of the counseling psychologist, with major emphasis on theories of counseling. Pr.: Psych. 440 or 700, and 405, 420 or 720, and consent of instructor.
- 273 846. Advanced Industrial Psychology.** (3) Review of current trends in industrial psychology and human engineering, including laboratory demonstrations and field trips. Two hours rec. and two hours field work a week. Pr.: Psych. 625 and consent of instructor.
- 273 847. Performance Theory.** (3) Analysis of skilled human performance and complex man-machine systems, both military and civilian, with particular attention to the role of the human operator. Pr.: Psych. 805, 809, 810, or consent of instructor.
- 273 850. Seminar in Personnel and Industrial Psychology.** Credit arranged. Intensive discussion of a problem of current professional interest, based on the class's study of the pertinent original literature. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.
- 273 851. Seminar in Physiological Psychology.** Credit arranged. Selected topics in physiological psychology. May be taken more than once. Pr.: Anat. Physi. 655, 660, or consent of instructor.
- 273 854. Seminar in Experimental Psychology.** Credit arranged. 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. 809, or 810, or consent of instructor.

- 273 856. Seminar in Psychological Measurement.** Credit arranged. 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.
- 273 858. Seminar in Personality and Social Psychology.** Credit arranged. 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 the supervisory committee. Pr.: Psych. 820, or 830, or consent of instructor.
- 273 860. Practicum in Counseling Psychology.** Credit arranged. Supervised practical experience in counseling. Pr.: Psych. 844 and consent of instructor.
- 273 865. Internship in Counseling or Industrial Psychology.** Credit arranged. Pr.: For counseling students: Psych. 860 and consent of the supervisory committee; for industrial students: Psych. 515, 625, and consent of supervisory committee.
- 273 999. Research in Psychology.** Credit arranged. Pr.: Consent of supervisory committee.

SOCIOLOGY AND ANTHROPOLOGY

EUGENE A. FRIEDMANN,* *Head of Department*

Professors Dakin, Friedmann,* Hill* and Rohrer;* Assistant Professors Di Santo, Hiebert, Long,* Lupri, Rogers,* Sabin, Stanislawski* and Taylor;* Instructor Jogland*

SOCIOLOGY

Sociology is the study of the development and the interaction of the individual in society. Some of the principal areas considered are the origin and development of cultural patterns; the growth, distribution, and characteristics of populations; the major social institutions and their trends; the problems of modern societies; community and organization planning for the orderly development of our society.

The trained sociologist is prepared for professional work with community planning and service agencies, teaching in the social sciences, and social research. Undergraduate work in sociology is also a desirable background for further professional training in other social sciences, law, social work, medicine and other fields. The student who desires to major in sociology should refer to the Curriculum in Social Science with a major in sociology. (See page 120.) The student interested in sociology who also desires to prepare for teaching in secondary schools should enroll in the Curriculum in Secondary Education with a major in sociology. (See page 113.)

The requirements in the curriculum in Social Science with a major in Sociology (page 120) are: 24 semester hours of sociology beyond the elementary course, including Soc. 410, 620, and 710 and two of the following: Soc. 430, 440, 450, and 460. Soc. 211 should be taken to satisfy the three hours required in sociology in the Social Science core curriculum (page 120). Ten hours of electives in sociology are to be taken, all at or above the 500 course level.

Major work leading to the degree of Master of Arts is offered in the following areas: Sociological Theory and Research Methods, Demography and Human Ecology, Social Organization and Social Structure, Social Interaction and Processes, Deviant Behavior and Social Disorganization.

Prerequisite to major graduate work in these fields is the completion of the baccalaureate at a recognized college or university, superior academic standing, and background work in sociology preparing the student for advanced study.

At least 50 per cent of the course work for an M. A. in Sociology is to be graduate level seminars in sociology (at least 12 semester credit hours). A candidate for the master's degree will be required to pass a written comprehensive examination over his graduate course work and associated topics. This examination will be given three or four weeks

before the final examination week of the semester preceding the student's final semester of work for the degree.

COURSES IN SOCIOLOGY

FOR UNDERGRADUATE CREDIT

- 277 130. Rural Sociology.** (3) I, II. Social and cultural life of rural people, principal groups, institutions and organizations and their functioning in communities.
- 277 150. Courtship and Marriage.** (2) II. Basic principles and problems which pertain to family life.
- 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.
- 277 260. Introduction to Social Work.** (3) II. A survey of the fields of social work, the relationship of social work to other social developments and vocational opportunities.
- 277 399. Honors Seminar in Sociology.** (1) I, II. Readings and discussion of selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 277 410. Senior Seminar in Sociology.** (2) II. Summarization and integration of courses in sociology. Pr.: Soc. 211 or consent of instructor.
- 277 430. Population and Human Ecology.** (3) I. Theories, policies, growth, composition, spatial aspects, movements, and world population trends. Pr.: Soc. 211 or consent of instructor.
- 277 440. Social Organization and Institutions.** (3) I. The development and character of the major social institutions in contemporary American society; functions, interrelationships, and trends. Pr.: Soc. 211 or consent of instructor.
- 277 450. Group Behavior and Primary Interaction.** (3) I. Modes of group organization, processes that tend to maintain or change these forms of organization, relations between groups, and effects on individual behavior. Pr.: Soc. 211 or consent of instructor.
- 277 460. 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 or consent of instructor.
- 277 530. Community Organization and Leadership.** (3) II. American community organization; special emphasis on community problems and planning. Pr.: Soc. 211 or consent of instructor.
- 277 531. Urban Sociology.** (3) I. 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 or consent of instructor.
- 277 540. Racial and Cultural Minorities.** (3) II, some S. Racial and cultural groups; attitudes, prejudices, and conflicts; approaches to understanding and control of race and minority group relations. Pr.: Soc. 211 or consent of instructor.
- 277 541. Industrial Sociology.** (3) II in odd years. Human relations in industry, interrelationships of industry and the social order. Pr.: Soc. 211 or consent of instructor.
- 277 560. Criminology.** (3) I, II, some S. Nature, extent, and causes of crime; programs for prevention and treatment. Pr.: Soc. 211 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 277 610. Development of Social Thought.** (3) I in odd years. Development of social thought from ancient civilization to the middle of the nineteenth century. Approaches to the study of society; ideas on hu-

man origins and human nature, character and results of associative life, social trends, and social betterment. Pr.: Soc. 211 and junior standing or consent of instructor.

277 620. Methods in Social Research. (3) I, II. Development, use, and interpretation of findings of the case method, social survey, and other techniques of social investigation. Pr.: Soc. 211 or consent of instructor and junior standing.

277 630. Advanced Rural Sociology. (3) II. The development of rural sociology; comparative rural life in the United States and other countries through the use of case studies of rural social organization and cultures. Pr.: Soc. 130.

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.

277 643. Sociology of Occupations and Professions. (3) II in even years. The social nature of work and related phenomena; occupational structure, recruitment and training, adjustment problems, and the interpersonal relationships at work. Pr.: Soc. 211 or consent of instructor and junior standing.

277 650. Sociology of Mass Communications. (3) I in even years. Social organization and change as influenced by the control, structure, and function of mass communications. Pr.: Soc. 211 or consent of instructor and junior standing.

277 660. Juvenile Delinquency. (3) I. Nature, extent, and causes of delinquency; characteristics of delinquents; means of prevention and treatment. Pr.: Soc. 211 or consent of instructor and junior standing.

277 701. Problems in Sociology. Credit arranged. I, II, S. Pr.: Soc. 211 and junior standing.

277 710. Recent and Contemporary Social Thought. (3) I. A survey and appraisal of Western social thought in the late nineteenth and twentieth centuries; explanations of human origins and potentialities, socialization and control of behavior, character and results of associative life, social trends, and methods of social analysis. Pr.: Soc. 211 and junior standing.

277 740. Social Systems. (3) I in odd years. Comparison of social systems in the Orient, Middle East, Europe, and the Americas. Pr.: Soc. 211 and junior standing.

277 741. Social Differentiation and Stratification. (3) I. Analysis of societal organization based on age, sex, residence, occupation, community, class, caste, and race. Pr.: Soc. 211 and junior standing.

277 750. Social Control. (3) II. How social groups control the behavior of their members through the socialization process, sanctions, norms, rewards, and punishments; the effect that size and kind of group have on social control. Pr.: Soc. 211 and junior standing.

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 and junior standing.

277 760. Correctional Communities and Their Administration. (3) II. The world of the prisoner; an analysis of the society of captives and their captors within the total correctional process. Pr.: Soc. 211 and junior standing.

FOR GRADUATE CREDIT

277 811. Seminar in Sociological Theory. Credit arranged. I or II in odd years. 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. 620 and 710 or equiv.

- 277 820. Seminar in Sociological Research.** Credit arranged. II. Application of scientific techniques to the design and execution of research. Pr.: Soc. 620 or equiv.
- 277 830. Seminar in Community Analysis.** Credit arranged. I or II in even years. Various aspects of the structural and functional analyses of communities: demographic, ecological, organizational, institutional. Pr.: Soc. 530 or equiv.
- 277 831. Seminar in Demographic Analysis.** Credit arranged. I or II in even years. Demography as a professional scientific discipline with intensive analysis of demographic techniques. Pr.: Soc. 430 or equiv.
- 277 840. Seminar in Social Organization.** Credit arranged. I. Detailed discussion of a selected approach to organizational analysis, aspect of organizational phenomena, or type of organization. May be repeated once. Pr.: Consent of instructor.
- 277 850. Seminar in Primary Group Structure and Process.** Credit arranged. I or II in odd years. Longitudinal and cross-sectional analyses of the basic elements in social interaction. Pr.: Soc. 450 or equiv.
- 277 851. Seminar in Societal and Institutional Dynamics.** Credit arranged. 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.
- 277 862. Seminar in Deviant Behavior and Social Disorganization.** Credit arranged. I. Analysis in detail and depth of selected forms of deviant behavior and their relevance to social disorganization. Pr.: Consent of instructor.
- 277 900. Research in Sociology.** Credit arranged. I, II, S. Research for thesis or master's report.
- 277 901. Research in Rural Sociology.** Credit arranged. I, II, S. Research for thesis or master's report.

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, e. g., 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 in the Curriculum in Social Science with a major in anthropology (X, p. 120) are: Anthro. 200, 260, 460, 280, 610, 620, an area ethnography course (630-659), an area archaeology course (500; 700-719), and three additional hours elected by the student.

COURSES IN ANTHROPOLOGY

FOR UNDERGRADUATE CREDIT

- 278 200. Introduction to Cultural Anthropology.** (3) I, II, S. Introduction to basic anthropological concepts; technological, social and religious characteristics of nonliterate cultures.
- 278 260. Introduction to Archaeology.** (3) I. 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.
- 278 280. Introduction to Physical Anthropology.** (3) 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.
- 278 399. Honors Seminar in Anthropology.** (1) Offered on demand. Readings and discussion of selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 278 400. Culture and Personality.** (3) II. 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.
- 278 430. Folk Cultures.** (3) I, some S. Culture as a concept for understanding human behavior; comparative study of technological, economic, kinship, associational, political, religious, aesthetic, and ideological customs of several nonliterate or folk cultures.
- 278 460. Linguistic Anthropology.** (3) I. 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.
- 278 500. Archaeology of the Old World.** (3) II. 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.
- 278 530. Race and Culture.** (3) II. 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 278 600. Cultural Dynamics.** (3) II. Cultural processes and their conditions and consequences; mechanisms by which customs originate and become culturally significant; development, modification, and decline of customs and cultures; processes and consequences of intercultural contact; applied anthropology. Pr.: Anthro. 200 or consent of instructor.
- 278 602. Ethnological Theory.** (3) I. Investigation and evaluation of major theoretical approaches in anthropology; evolutionism, historicalism, diffusionism, functionalism, configurationalism, philosophical and psychological approaches; contemporary methodology and theory. Pr.: Anthro. 200 or consent of instructor.
- 278 610. Social Organization in Nonliterate Cultures.** (3) I. 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.: One of Anthro. 200, 430, Soc. 211, or consent of instructor.

- 278 620. Senior Seminar.** (3) II. Review and integration of the several aspects of anthropology. Pr.: Senior undergraduate standing and 15 hours of anthropology.
- 278 625. Independent Reading and Research in Anthropology.** (1-3) I, II, S. 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.
- 278 630. Indians of North America.** (3) II. Aboriginal cultures of Canada and the United States; culture contact and change among surviving groups.
- 278 632. Indians of Middle America.** (3) I. 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.
- 278 650. Cultures of Negro Africa.** (3) II. Description and comparison of the aboriginal cultures of Africa south of the Sahara. Culture contact and change.
- 278 705. Archaeology of North America.** (3) I. 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, 260, or consent of instructor.
- 278 710. Archaeology of Middle America.** (3) II. Early man, the beginnings of agriculture; the rise of civilization; the classic empires of the Maya, Aztec, Tarascans, and their neighbors; relationships with the Southeastern and Southwestern United States. Pr.: Anthro. 200, 260, or consent of instructor.
- 278 720. Archaeological Field Methods.** (3) I. Archaeological site survey, site excavation, and laboratory analysis of sites and artifacts from the Manhattan, Kansas, region. Field work on Saturday, 8:00-5:00, while weather permits, laboratory work thereafter. Pr.: Consent of instructor.
- 278 740. Human Paleontology.** (3) I. 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, 280, or consent of instructor.

SPEECH

NORMA D. BUNTON,* *Head of Department*

Professors Bunton, Given* and Howe;* Associate Professors Dace,* Engler* and Flanagan; Assistant Professors Barnes,* Brooks,* Burke,* Denning,* Hannah,* Hilyard,* Rainbolt, Welden* and Workman;* Instructors Cleary, Hinriehs,* Reed and Smith; Emeritus: Professor Hill**

UNDERGRADUATE

Speech, as an academic discipline, integrates the study of oral communication from the mass media through interpersonal behavior. The Department of Speech offers study in the areas of General Speech and Speech Education, Linguistics, Theater and Interpretation, Speech Pathology, and Radio and Television.

The student may major in any of the above areas or a combination of these areas. The major course work will be planned by the student in conference with a member of the Speech staff serving as adviser. The undergraduate major requires 30 hours of course work in Speech. All majors must complete the following core: Spch. 145, 135 or 210, 360, 608 or 652 and 690. Alternatives where noted will be selected in consultation with an adviser.

Students interested in being speech correctionists or hearing conservationists in the Kansas public schools must meet the State Department requirements for teachers of exceptional children:

1. A valid Kansas teaching certificate.
2. Eight to 12 semester hours of course work in special education.
3. A minimum of 12 semester hours of related fields of anatomy, clinical psychology, and physiology.
4. A minimum of 30 semester hours in speech and hearing.
5. Two hundred clock hours of supervised clinical practice.

Completion of the undergraduate speech pathology concentration includes: Spch. 210, 260, 370, 622, 630, 635, 645, preferably in that order.

GRADUATE

In the Department of Speech major work is offered leading to the degree Master of Arts in three fields: General Speech (includes Speech Pathology and Linguistics), Radio-Television, and Theater.

The General Speech degree may include work in speech education, Rhetoric, public address, small group communication, pathology, and linguistics.

A student majoring in any of the above areas must 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.

Facilities for graduate work in these fields include laboratories, studios, workshops, and clinical equipment. Cooperative relationships with departments offering work related to the two areas assist in developing research and study.

All graduate students in speech are required to take Spch. 800, Introduction to Graduate Study in Speech, in their first semester of graduate work or in the earliest subsequent semester the course is offered.

Specific requirements for research, advising and program planning are available in the departmental office.

COURSES IN GENERAL SPEECH, SPEECH EDUCATION, AND LINGUISTICS

FOR UNDERGRADUATE CREDIT

- 281 070. Spoken English for International Students.** (0) Semi-intensive aural-oral familiarization in American English as a second language.
- 281 080. Speech Seminar.** (0) Special topics and lectures for speech majors. Required of all majors each semester.
- 281 105. Oral Communication I.** (2) Selection and outlining of speech material, with emphasis on content, organization, and oral presentation.
- 281 106. Oral Communication Ia.** Alternate to Spch. 105, permitting greater emphasis on preparation and delivery of speech material. Credit not granted for both Spch. 105 and 106.
- 281 107. Oral Communication Ib.** (3) Speaking, reading, and writing for international student 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.
- 281 108. Oral Communication I.** (2) Honors—Participation in and analysis of oral message situations, with emphasis on communication purposes, message design and presentations.

- 281 109. Oral Communication IA.** (3) Honors—Speech preparation and delivery; a survey of topics basic to rhetoric, communication and linguistics.
- 281 120. Speech and Drama Participation.** (1 or 2) Pr.: Consent of director of the activity.
- 281 135. Voice and Diction.** (2) Self-improvement in voice and diction through study and drill. Understanding of the vocal mechanism and its relationship to tone, range, rate, and articulation.
- 281 176. Argumentation and Debate.** (3) Basic theories of argumentation, with emphasis on their application in academic debate. Pr.: Spch. 105 or 106.
- 281 200. 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.
- 281 235. Survey of the Mass Media.** (3) I, II. 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. (Same as Journ. 235.)
- 281 360. Language and Communication.** (3) The study of the concept of meaning through models of communication, learning theories, and methods of measurement. The placement of meaning and definition in a communication context through a consideration of psychological and linguistic points of view.
- 281 398. Junior Honors Colloquium.** Variable credit. I, II. Open only to juniors in the Arts and Sciences Honors Program.
- 281 399. Honors Seminar in Speech.** (1) Readings and colloquia on selected topics. For non-speech majors in the Honors Program. Pr.: Honors students only.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 281 608. Persuasion.** (3) The study of communication as persuasion. Analysis of contemporary use of persuasion through the study and practice of various modes of proof. Pr.: Junior standing.
- 281 616. Group Discussion Methods.** (3) Principles and techniques of discussion in face-to-face groups. Study of the role of empathy in interpersonal communication through practice in group decision making.
- 281 618. Discussion and Conference Leadership.** (3) Principles and functions of leadership in decision-making groups. Development of a theoretic approach to decision making through a consideration of communication behavior within organizations. Pr.: Spch. 616 or consent of instructor.
- 281 652. Introduction to Linguistics.** (3) Study of the basic concepts of modern descriptive linguistics. (Same as Engl. 652 and Mod. L. 652.)
- 281 655. 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.
- 281 664. Topics in Applied Linguistics.** (3) Principles of contrastive structural analysis, especially English/French, English/Spanish, and English/German. Course on another topic may be repeated for credit. Pr.: Spch. 652 or Mod. L. 652 or Engl. 652. (Same as Engl. 664 and Mod. L. 664.)
- 281 665. History of Rhetorical Theory and Criticism.** (3) History of the development of rhetorical theory and criticism from early Greek to modern times. Pr.: Junior standing and consent of instructor.
- 281 669. Language Typology.** (3) Presentation and discussion of the languages of the world and the variant methods of their classification.

Pr.: Engl. 652 or Mod. L. 652 or Spch. 652 or consent of instructor and junior standing. (Same as Engl. 669 and Mod. L. 669.)

281 673. 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. 673, Mod. L. 673.)

281 674. 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.: Twelve hours of a modern language, including English, and Spch. 652 or Mod. L. 652 or Engl. 652. (Same as Engl. 674 and Mod. L. 674.)

281 676. Phonetics and Phonemics of English. (3) Detailed study of the speech sounds of English, their production, functions as signals, and realizations in the stream of speech in English. Pr.: Spch. 210 and Engl. 652 or Mod. L. 652 or Spch. 652 or consent of instructor and junior standing. (Same as Engl. 676 and Mod. L. 676.)

281 677. Morphology and Syntax of English. (3) Consideration of current theories of grammar, with emphasis on morphemics and tagmemics. Pr.: Engl. 451. (Same as Engl. 677 and Mod. L. 677.)

281 799. Problems in Speech. Credit arranged. Open to students in any speech area. Pr.: Junior standing and consent of instructor.

FOR GRADUATE CREDIT

281 800. Introduction to Graduate Study in Speech. (2) Methods of research and investigation in speech; nature of research. Required of all graduate speech majors. Pr.: Graduate standing.

281 999. Research in Speech. Credit arranged. Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor.

COURSES IN THEATER AND INTERPRETATION

FOR UNDERGRADUATE CREDIT

281 145. Introduction to Theater. (3) Consideration of theater organization and production; principal emphasis on college and secondary school practice, with some attention to Broadway and European Theater activity. Pr.: Spch. 105.

281 245. Acting I. (3) Theory and practice in the fundamentals of acting for the theater. One hour rec. and three hours lab. a week.

281 255. Technical Production I. (3) An introduction to the technical problems of theater production, including planning, painting and mounting scenery as well as other aspects of backstage organization. One hour rec. and three hours lab. a week.

281 350. Techniques of Makeup. (2) Techniques of makeup for stage, movies, and television.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

281 472. 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.

281 526. 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, non-fictional prose, scenes from plays, and selected short stories.

281 555. Acting II. (3) Study of acting as an art form and a method of personal development. Investigation of acting styles in outstanding periods of dramatic literature; study of individual acting styles of great actors. Pr.: Spch. 245 for students with drama concentration.

FOR UNDERGRADUATE AND GRADUATE CREDIT

281 600. Directing. (3) A lecture-laboratory course covering the principles and techniques of directing for theater; investigation into the

historical emergence of the director; study of current theories. Pr.: Consent of instructor.

- 281 605. Development of the Theater I.** (3) Greek to modern times. An integration of the theory, literature, and physical conditions of the theater as they relate to the total development of dramatic art. Pr.: Junior standing.
- 281 610. Costuming for the Theater.** (3) Studies in stage costuming: history, characterization, fabrics, construction. A lecture-laboratory course including student planning and construction of costumes for university productions. Pr.: Junior standing.
- 281 611. Children's Theater I.** (3) Introductory course in theory and practice for Children's Theater. 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 instructor.
- 281 615. Development of the Theater II.** (3) The theater in modern times. Cont. of Spch. 605. Pr.: Junior standing.
- 281 624. Greek Drama.** (3) A survey of Greek drama and stagecraft from Aeschylus through Menander; principal emphasis on the Greek writers of tragedy and Aristotle's *Poetics*. Pr.: Junior standing.
- 281 626. Modern Drama.** (3) A survey of the work of leading playwrights, critics, directors and designers in the modern theater, with emphasis on the founding of experimental theaters in Russia, Germany, France and England. Pr.: Junior standing.
- 281 640. Playwriting.** (3) Theoretical study and practical application of fundamentals of playwriting with regard to plot, characters, and production; adaptation of drama for the medium of television. Pr.: Junior standing.
- 281 663. Scene Design.** (3) Principles and styles of design for the stage, utilizing sketches, diagrams, plates, and models. Pr.: Spch. 255 for students with drama concentration.
- 281 667. Stage Lighting.** (3) History and techniques of lighting for the stage and television. Pr.: Junior standing.
- 281 680. Technical Production II.** (3) A lecture-laboratory course in advanced technical theater problems of organization, planning and execution of scenery, costumes and lighting. Pr.: Spch. 255.
- 281 682. History of the Physical Stage.** (3) A survey course in the emergence and development of the theater building as a distinct architectural form, with particular emphasis on the effect of the physical environment on the play. Pr.: Spch. 255.

COURSES IN SPEECH PATHOLOGY

FOR UNDERGRADUATE CREDIT

- 281 090. Remedial Instruction in Speech.** (0) Remedial instruction in individual problems of voice and diction. Open to students upon recommendation of any faculty member.
- 281 210. Elements of Phonetics.** (2) Analysis of sounds which make up human speech; consideration of how sounds vary phonetically, physically, and physiologically. The student will become familiar with the International Phonetic Alphabet (IPA) through coding and transcription.
- 281 260. Speech and Language Development in Children.** (2) Consideration of speech and language in children, with primary emphasis on development between birth and 5 years.
- 281 370. Anatomy and Physiology of Speech.** (3) Study of the structure and function of the head, the oral cavities (mouth and nose), larynx (throat), and the chest. The structure of the ear. Pr.: Spch. 260.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 281 622. Hearing Problems and Hearing Testing.** (2) Etiology and diagnosis of deafness and hardness of hearing; anatomy and physiology of the ear; social, emotional, and educational problems of deafness; audiometry and use of psychoacoustic equipment. Pr.: Spch. 210 or consent of instructor.
- 281 623. Audiology.** (3) Theory and practice of audiometry; screening and complete audiometry; speech and pure tone; speech discrimination; determination of hearing loss and social adequacy of hearing; use of hearing in diagnosis. Pr.: Spch. 622.
- 281 630. Speech Correction for the Classroom Teacher.** (3) General orientation to the speech correction field and the principles, methods, and attitudes in dealing with speech disorders; the development of a team approach within the school system. Pr.: Spch. 210 for students with speech pathology concentration.
- 281 635. Functional Speech Disorders.** (3) Understanding of types of a functional (non-organic) origin; understanding of the problems of speech and language as relating to learning theory, cybernetics (feedback), and environmental factors. Pr.: Spch. 630 for students with speech pathology concentration.
- 281 636. Organic Speech Disorders.** (3) Symptoms and underlying causes of organic speech disorders; principles of therapy, differential diagnosis and basic diagnostic procedures; emphasis in this course is in pathology and diagnosis rather than therapy. Pr.: Spch. 635.
- 281 641. Stuttering.** (2) Principal theories concerning the causes and dynamics of stuttering; study of accepted therapeutic procedures to overcome stuttering. Pr.: Spch. 630, 635, or consent of instructor.
- 281 645. Speech Therapy Methods.** (2) Methods and materials employed in the treatment of speech, voice, and language problems; special emphasis on articulation, stuttering, foreign language, and hearing problems. Pr.: Spch. 635 or consent of instructor.
- 281 646. Voice and Articulation Rehabilitation.** (3) Emphasis on diagnostic and remedial techniques applied to vocal pathologies and articulatory dysfunctions. Pr.: Spch. 635 and 636 or consent of instructor.
- 281 647. Topics in Speech Pathology and Audiology.** (3) A critical study of experimental research in speech, hearing and language disorders and consideration of remedial procedures related to them. Pr.: Spch. 635 and 645 or consent of instructor.
- 281 668. Speech Reading and Auditory Training.** (3) Methods of instructing the hard-of-hearing and the deaf in the principles and techniques of speech reading (lip reading and auditory training). Pr.: Spch. 630 or consent of instructor.
- 281 710. Hearing Conservation and Rehabilitation.** (3) Principles and practices involved in the conservation, preservation, and rehabilitation of hearing. Pr.: Spch. 622 or 630 or consent of instructor.
- 281 761. Clinical Practice.** (2) Supervised practice in clinical training and therapy with speech-handicapped clients (singly and in groups); a minimum of three clinic case-hours per credit; one-hour seminar with instructor per week. This course may be repeated for a maximum of six hours credit. Pr.: Consent of instructor.
- 281 765. Cerebral Palsy and Other Neurological Disorders.** (3) Concentration on the problems related to neurological dysfunction, with emphasis on cerebral palsy and mental retardation. Pr.: Spch. 370 and 636 or consent of instructor.

FOR GRADUATE CREDIT

- 281 802. Aphasia and Related Disorders.** (3) Consideration of the problems and rehabilitation of central language disorders in children and adults, whether congenital or traumatic. Pr.: Spch. 636.

COURSES IN RADIO AND TELEVISION

FOR UNDERGRADUATE CREDIT

- 281 132. KSDB-FM Participation.** (1) Supervised performance in the various departments of the campus FM station.
- 281 152. Radio-Television Speech and Procedures.** (3) Basic training in speech and operational procedures of broadcasting. Three hours lec. and two hours lab. a week. Required of all radio-television majors.
- 281 160. Survey of Broadcasting.** (2) Survey of the radio industry; economic, political and social significance of broadcasting. Required of students with radio-television concentration.
- 281 225. Radio-Television Continuity.** (3) Study of the forms and the preparation of non-dramatic scripts for all types of broadcast programs. Required of majors. Pr.: Spch. 160 for students with radio-television concentration.
- 281 326. Introduction to Television.** (2) Study of the development of TV; its codes and control; its relation to other media; economic and social implication. Required of majors. Pr.: Spch. 160 for students with radio-television concentration.
- 281 392. Television Film.** (2) Study of the principles and techniques of motion picture film production for television; theory of television film production and practical use of film equipment. Pr.: Spch. 160, 225, 326 for students with radio-television concentration; consent of instructor for non-majors.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 281 660. Radio-Television Production.** (3) Cont. of Spch. 390, with emphasis on television. Pr.: Spch. 326 for students with radio-television concentration; consent of instructor for non-majors.
- 281 662. Instructional Television.** (3) The principles of instructional television: its development, programming, techniques, and application. See Educ. 662. Pr.: Junior standing and consent of instructor.
- 281 670. Radio-Television Programming.** (3) Study of the principles of planning and the development of radio and television programs and schedules. Pr.: Spch. 225 and 326 for students with radio-television concentration.
- 281 672. Television Direction.** (3) Study of visual and dramatic principles in television from the point of view of directors, producers, and performers. Pr.: Spch. 326 for students with radio-television concentration.
- 281 675. Radio-Television Advertising.** (3) Study of the principles and practices in broadcast advertising. Pr.: Journ. 320 for students in Technical Journalism, Spch. 225 for students with radio-television concentration.
- 281 685. Radio-Television Writing I.** (3) Study of the principles and the preparation of dramatized, broadcast programs. Pr.: Spch. 225 for students with radio-television concentration.
- 281 690. Broadcasting Criticism.** (3) Study of the principles and criteria of mass media criticism, with emphasis on those considerations unique to broadcasting. Pr.: Consent of instructor.
- 281 692. Broadcasting Law.** (3) A study of the major laws and legal decisions which affect broadcasting. Primary attention given to the Communications Act and the Federal Communications Commission's Rules and Regulations; other laws relating to broadcasting and broadcast management considered. Pr.: Junior standing and consent of instructor.
- 281 695. Radio-Television Writing II.** (3) Cont. of Spch. 685. Pr.: Spch. 685 or consent of instructor.
- 281 726. Radio-Television Station Management.** (3) Study of the principles and the problems of broadcast station management. Pr.: Junior standing.

281 745. Broadcasting of Women's Programs. (3) Principles of writing, production, and criticism of radio and television programs presented by women, and those prepared for an audience of women and/or children. Required of women majors. Pr.: Spch. 225 for students with radio-television concentration.

281 750. Broadcast Research. (3) Study of research in broadcasting; its literature and methodology. Pr.: Junior standing.

STATISTICS

HOLLY C. FRYER,* *Head of Department*

Professors Feyerherm, Fryer* and Zacks;* Associate Professors Marcus* and Yadin; Assistant Professors Conover,* Dayton, Koh and Nassar; Instructors Berger and Park*

UNDERGRADUATE

Statistics is a combination of classical mathematics, the theory of probability and some new concepts related to inductive reasoning which have developed during the last 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, 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 requirements of the Curriculum in Humanities (p. 117) and completing Math. 222 or 232, 240, Stat. 320, either 321 or 510, 410-411 and 520-521; or the student may seek a bachelor of science degree by satisfying the requirements of the Curriculum in Physical Science (p. 119) and completing the aforementioned courses in mathematics and statistics. The student should consult someone in the Department of Statistics about this choice before enrolling.

A person wishing to major in computer science may (1) for the Bachelor of Arts degree undergraduates fulfill requirements in the Curriculum in Humanities and complete Math. 240; Comp. Sci. 301, 302, 420, and 530; six additional hours in computer science, logic, linguistics, and/or statistics, or (2) for the Bachelor of Science degree undergraduates fulfill requirements of the Curriculum in Physical Science plus the additional course requirements for the Bachelor of Arts degree as indicated above.

GRADUATE

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 colleges and universities, but it is preferable to plan to obtain the doctorate if the student plans to enter the teaching profession at the college or university level. Excellent fellowships and assistantships are always available for persons receiving the master's degree in statistics and wishing to study toward the doctorate.

FOR UNDERGRADUATE CREDIT

- 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 or 110.
- 285 321. Business and Economic Statistics.** (3) I, II, S. Application of statistical principles to business and economic studies and decisions; sources of data; index numbers; time series; business cycles; market research; seasonal variation; forecasting. Pr.: Stat. 320.
- 285 399. Honors Seminar in Probability and Statistics.** (1) I, II, S. Selected topics of general interest and importance. Open to non-majors in the Honors Program. Pr.: One course in statistics or probability.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 285 400. Introductory Biometrics.** (3) I. Application of statistical concepts and methods to problems of population dynamics and forest mensuration; interpretation and presentation of quantitative measurements, with recognition of biological principles. Pr.: Stat. 320.
- 285 410. Introductory Probability and Statistics I.** (3) I, S. Permutations, combinations, and principle of choice; random events and variables, sample spaces; simple measures and concepts of probability; marginal, conditional, and joint probability laws; mathematical expectation and moments; probability density and distribution functions for one or more discrete variables; normal distribution; moment generating functions; some concepts of sampling; applications. Pr.: Math. 222 or conc. enrollment.
- 285 411. Introductory Probability and Statistics II.** (3) II, S. Law of Large Numbers, Chebycheff's Inequality; continuation of continuous random variables; uniform, exponential, gamma, and beta distributions; Central Limit Theorem; sampling distributions for normal sampling; introduction to statistical inference. Pr.: Stat. 410, Math. 222.
- 285 510. Statistical Quality Control.** (3) II. Elementary, practical methods of estimating the uniformity of manufactured products; control charts; sampling acceptance procedures. Pr.: One previous course in statistics.
- 285 520. Statistical Methods I.** (3) I, II, S. Development of concepts and techniques appropriate to experimental research; methods for estimating parameters and testing hypotheses about them; linear correlation and regression; introduction to analysis of variance. Pr.: Math. 100 and junior standing.
- 285 521. Statistical Methods II.** (3) II, S. Analysis of variance and covariance; multiple linear regression methods; partial correlation; curvilinear regression; orthogonal comparisons; simple experimental designs. Pr.: Stat. 520.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 285 610. 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. 410 and 411. Pr.: Math. 222.
- 285 611. 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 and discrimination. Pr.: Stat. 610.
- 285 625. Digital Statistical Analysis.** (3) I, II. Program languages; programming for analysis of variance and covariance, missing data, least-squares analysis, multiple regression and correlation, and chi-square. Pr.: Stat. 521 or conc. enrollment.

- 285 630. Multivariate Statistical Methods.** (3) I, S. 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. 521, Math. 505.
- 285 710. Sample Survey Methods.** (3) II in alt. years. Design, conduct, and interpretation of sample surveys in the social sciences. Pr.: Stat. 520.
- 285 716. Non-parametric Statistics.** (3) II. Testing hypotheses when the form of the parent population is unknown; rank and sign tests. Pr.: Stat. 520 or 610.
- 285 720. Design of Experiments I.** (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. 521.
- 285 721. Design of Experiments II.** (3) II, S. Incomplete block designs; theory of the construction and analysis of experimental design. Pr.: Stat. 720 and Math. 505 or equiv.
- 285 731. Statistical Population and Quantitative Genetics I.** (3) I, S. Equilibrium law of gene frequencies; forces that change gene frequency; gene frequency distributions; prediction equations for selection. Pr.: Stat. 521 and six semester hours of genetics.
- 285 732. Statistical Population and Quantitative Genetics II.** (3) II. Estimation of genetic parameters; inbreeding, heterosis, level of dominance; epistasis, genetic load, linkage; experimental approaches to statistical genetics. Pr.: Stat. 731.
- 285 734. Bioanalysis.** (3) I in alt. years. Purposes and types of bioassays; direct assays; quantitative dosage-response relationships; efficiency, reliability, and sensitivity; composite responses; quantal responses; time responses. Pr.: Stat. 521 or 611.
- 285 760. Discrete Probability Theory.** (3) I. Occupancy problems; conditional probability and statistical independence; laws of large numbers; generating functions; recurrent events; runs and renewal theory; random walk. Pr.: Stat. 610.
- 285 765. Applied Stochastic Processes.** (3) II. Study of types and applications of stochastic processes; Wiener, Poisson, renewal counting, generalized and compound Poisson, Markov chains. Pr.: Stat. 610.
- 285 799. Topics in Statistics.** Credit arranged. I, II, S. Pr.: Consent of instructor.

FOR 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.
- 285 850. 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, and other advanced topics. May be repeated. Pr.: Stat. 611 and consent of instructor.
- 285 860. Linear Models I.** (3) I in alt. years. 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. 521, 611; Math. 507 or 701.
- 285 861. Linear Models II.** (3) II. Generalized inverses; polynomial regression; experimental design, variance-component, and mixed models. Pr.: Stat. 860.
- 285 865. Multivariate Analysis.** (3) II in alt. years. Likelihood estimates, vectors of random variables; Hotelling's T^2 ; distribution of

simple, partial, and multiple correlation coefficients; classification and discrimination; distribution of the sample covariance matrix and generalized variance; testing multivariate hypotheses. Pr.: Stat. 830, Math. 621.

285 890. Foundations of Probability I. (3) I. Distribution functions, characteristic function, sums of independent random variables, central limit theorem. Pr.: Math. 726.

285 891. Foundations of Probability II. (3) II. Conditional random variables, martingales, ergodic theorems. Pr.: Stat. 890.

285 895. 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, best invariant; asymptotic optimal maximum likelihood procedures—minimax; procedures. Pr.: Stat. 861, Math. 622.

285 896. Advanced Inference II. (3) II. Testing hypotheses: Neyman-Pearson Lemma; monotone likelihood ratio and exponential families; method of least favorable distribution; uniformity best unbiased and best invariant procedures; confidence sets and uniformly best test procedures. Pr.: Stat. 895.

285 999. Research in Statistics. Credit arranged. I, II, S. Pr.: Consent of instructor.

COURSES IN COMPUTER SCIENCE

286 301. Introduction to Algorithmic Processes. (3) I, II, S. Introduction to algorithms; iterative and recursive algorithms; characteristics of a procedure-oriented language; description of a computer; relationship between the computer and the algorithmic language; uses of functions, sub-routines, and iterative procedures in computations. Pr.: Math. 220 or 340.

286 302. Computer Organization and Planning. (3) I, II, S. Logical organization of computers; limitations of procedure-oriented languages; functional basis of computer structures; control units and instruction sequencing; machine instruction; registers; addressing; input-output instructions; various routines; editing procedures. Pr.: Comp. Sci. 301.

286 420. Non-numeric Programming. (3) I, S. Use of computers in problems not involving numerical analysis; combinatorial problems; learning mechanisms, heuristic programs, and pattern recognition. Pr.: Comp. Sci. 302.

286 530. Algorithmic Languages and Compilers. (3) II. Formal description of procedure-oriented languages; translation of algorithms to languages; description of languages in terms of alphabet and syntax; application to languages such as ALGOL and FORTRAN; compilers; procedures; storage, syntactic decomposition; hierarchies. Pr.: Comp. Sci. 420, Math. 222.

286 535. Computer and Programming Systems I. (3) I. Computer-oriented programming systems; design of assembly systems, macro-instructions, program libraries, intercommunication, linking, debugging, languages for writing software, batch processing, concept of a demand system. Pr.: Comp. Sci. 530.

286 536. Computer and Programming Systems II. (3) II. Multi-programming and multi-processor systems: interrupt systems, sequential multi-programming, storage protection, dynamic allocation and reallocation of storage, time sharing, bulk memory devices; multiple processors, programming systems and language requirements in multi-programming and multi-processor systems. Pr.: Comp. Sci. 535.

286 612. Data Reduction and Control Programming. (3) II. Data collection from running processes and experiments; editing; analog to digital conversion; deterministic and statistical models of a process; information display; feedback to the system; simulation of a process; time-dependent control mechanisms; time-sharing. Pr.: Course in numerical methods.

- 286 615. Computer Logic.** (3) II. Propositional calculus, axiomatics; turning machines; unsolvable problems; quantification theory; satisfiability and validity; models, first-order theories, completeness theorems, Meta theorems, extension of first-order theories; foundational considerations. Pr.: Comp. Sci. 530, Stat. 611.
- 286 701. Automata Theory.** (3) I. Finite automata; synchronous sequential circuits; Kleenes' Theorem; semi-groups; monomorphisms; generator systems; algebraic linguistics; potentially infinite machines; theory of computability, recursive functions; programming systems. Pr.: Comp. Sci. 615, Math. 512.
- 286 712. Seminar in Computer Science.** (1) I, II, S.
- 286 798. Topics in Computer Science.** Credit arranged. I, II, S.
- 286 815. Special Topics in Computer Science.** (2-4) I, II, S. Study in selected areas of artificial intelligence, computational linguistics, linear and non-linear programming, theorem proving by computer, models of intelligent processes, and the like. Pr.: Comp. Sci. 536.
- 286 820. Advanced Studies.** (3) I, II, S. Advanced topics in computer science, each semester course being on one general topic. May be taken more than once but on different topics. Pr.: Comp. Sci. 701, Math. 622.
- 286 998. Research in Computer Science.** Credit arranged. I, II, S.

TECHNICAL JOURNALISM

RALPH R. LASHBROOK,* *Head of Department*

*Professors Ellis and Lashbrook; * Associate Professor Macy; Assistant Professors Applegate, Backer, Brinkman and Eaton; Emeritus: Professors Hostetter and Medlin; Associate Professor Amos*

UNDERGRADUATE

Students who major in journalism can qualify for either the Bachelor of Science degree or the Bachelor of Arts degree, depending upon which curriculum they follow in the College of Arts and Sciences. The Biological Science Curriculum (page 108) and the Physical Science Curriculum (page 119) lead to the Bachelor of Science degree; the Social Science Curriculum (page 120) leads to the Bachelor of Arts degree.

The requirements for a journalism major are identical in the three curriculums: Journ. 050 each semester, 105, 300, 306, 310, 316, 320, 330, 600 or 610, and journalism electives (13). (See pages 108, 119, 120.)

Students interested in Agricultural Journalism should note requirements on page 50; those interested in Home Economics and Journalism should note requirements on page 298.

GRADUATE

Advanced work leading to the degree Master of Science is offered in the field of journalism. Prerequisite to advanced work in this field is the completion of a four-year college curriculum. Those who have not had the necessary undergraduate journalism training must expect to take 9 to 12 hours of courses as a prerequisite to or in conjunction with their graduate study, unless they have had equivalent professional journalism experience.

Graduate students in journalism draw upon the applied sciences, the social sciences, and the professional skills of journalism for assistance in the solution of problems which relate to the supplying of information to the public or to the training of those who supply such information. They enjoy the cooperation of the research, teaching, and service units of the University as a whole. Thus, the services and information of the agricultural and engineering experiment stations, the Bureau of Research in Home Economics, the Extension Service, the Department of English, the College of Education, and the facilities of the library and the radio station are available and form the basis for application of

research in journalism to economically, socially, and esthetically important relationships.

The Department of Technical Journalism is one of 49 members of the American Association of Schools and Departments of Journalism.

FOR UNDERGRADUATE CREDIT

- 289 050. Technical Journalism Lecture.** (0) Required. I, II. Addresses by practicing communications workers and members of the department. Required of all students majoring in journalism.
- 289 105. Graphic Arts Survey.** (2) I, II. History and art of printing; typography of advertisements and headline display; principles of effective makeup. Pr.: Sophomore standing and conc. enrollment in Journ. 300.
- 289 235. Survey of the Mass Media.** (3) I, II. 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. (Same as Spch. 235.)
- 289 300. Typography Laboratory.** (1) I, II. Typesetting, proofreading, correction of forms as a background for journalism. Three hours lab. a week. Pr.: Sophomore standing and conc. enrollment in Journ. 105.
- 289 306. Reporting I.** (2) I, II. Introduction to the field of journalism; news gathering and writing. Pr.: Sophomore standing and ability to type 30 words a minute.
- 289 310. Reporting Laboratory.** (1) I, II.
- 289 316. Reporting II.** (3) I, II. Two hours rec. and six hours reporting for the *Kansas State Collegian* each week. Pr.: Journ. 306.
- 289 320. Principles of Advertising.** (3) I, II. Study of goods to be advertised, analysis of the market, psychology of advertising, preparation of advertising copy. Pr.: Junior standing.
- 289 326. Advertising Copy and Layout.** (3) II. The writing of effective copy, testing the pulling power of ads, and the principles covering preparation of copy and layout are stressed. A study is made of current advertising.
- 289 330. Editing.** (2) I, II. Six hours lab. a week. Pr.: Journ. 316.
- 289 335. News Photography.** (2) I, II, S. Planning and taking news and feature pictures; writing and editing cutlines.
- 289 350. Agricultural Journalism.** (3) I, II, S. Survey of agricultural information techniques, with emphasis on principles of news and feature writing.
- 289 355. Advertising Salesmanship.** (2) I. Application of principles of space selling and layout to specific lines of business by work with advertising clients of a newspaper. Pr.: Junior standing and consent of instructor.
- 289 358. Publications Management.** (1) I, II, S. Practical work in writing, editing, advertising, business practices, and photography on the *Royal Purple* or the *Collegian* under supervision of an instructor. Three hours lab. a week. Pr.: Consent of instructor.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 289 400. Radio and Television News.** (2) II. Processing and broadcasting of radio news. Pr.: Journ. 306. For non-journalism students.
- 289 406. Yearbook Editing and Management.** (2) I. Planning, editing, layout, financing, and management of a yearbook, with special emphasis on the problems of *The Royal Purple*. One hour lec. and three hours lab. a week. Pr.: Journ. 316 and junior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 289 600. Public Affairs Reporting.** (3) I. Reporting news of local, state, and national affairs. Two hours rec. and three hours lab. a week. Pr.: Journ. 316 or consent of instructor.

- 289 606. History of Journalism.** (3) I. Pr.: Junior standing and Hist. 165, 170 or consent of instructor.
- 289 610. The Home Page.** (3) I, II, S. Writing and editing materials for a woman's page in a local newspaper, supervision of photography for that page. Pr.: For students in journalism, Journ. 330; for other students, consent of instructor.
- 289 615. Magazine Article Writing.** (2) II, S. Study of technical, trade, and general publications; writing for general magazines, agricultural and business publications, and women's departments. Pr.: For students in journalism, senior standing or consent of instructor; for students in Home Economics and Journalism, Journ. 610; for other students, consent of instructor.
- 289 617. Magazine Production.** (3) I. The practical application of theory in the fields of writing, editing, graphic reproduction, layout, and management of magazines. Pr.: Journ. 105, 300, and 330.
- 289 620. Interpretation of Contemporary Affairs.** (3) II. Critical questions regarding recent developments in state, national, and international affairs; editorials and interpretative articles which document and analyze the news; introduction to research in public affairs. Pr.: For students in journalism, Journ. 660 or consent of instructor.
- 289 626. Formation of Public Opinion.** (3) II in alt. years. Role of the press and communication agencies in formation of public opinion, work of propagandists and pressure groups. Pr.: Junior standing and consent of instructor; for graduate credit, eight hours of social science.
- 289 630. Public Information Methods.** (2) I. Pr.: Journ. 316.
- 289 635. Public Relations.** (3) II. Media, methods, principles, and practices of public relations. Pr.: Junior standing or consent of instructor.
- 289 640. Law of the Press.** (3) II. Study of laws which guarantee and protect privileges and define duties and responsibilities of mass media; law, libel, privacy, and governmental regulations pertinent to the press. Pr.: Senior standing or consent of instructor.
- 289 645. Readings in Journalism.** (2) I, II. Investigation of the literature of journalism. Pr.: Junior standing and consent of instructor.
- 289 652. Workshop in School Publications.** Credit arranged. S. Supervision of high school yearbooks and newspapers. Pr.: Graduate standing or consent of instructor.
- 289 660. The Journalist in a Free Society.** (3) I. A consideration of influences and controls that define the role of the journalist in American society, including law as it relates to the press. Open to non-majors. Pr.: Senior standing or consent of instructor.
- 289 665. Newspaper Management.** (2) II in alt. years. Relations of departments of a newspaper to one another; costs, statistics, advertising, news, and business methods in publishing. Pr.: Journ. 320.
- 289 799. Problems in Technical Journalism.** Credit arranged. I, II, S. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 289 999. Research in Technical Journalism.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

ZOOLOGY

DONALD J. AMEEL,* *Head of Department*

Professors Ameel, Gier,* Goodrich,* Guhl,* Hansen,* Tiemeier* and Wimmer;* Assistant Professors Eleftheriou,* Lockhart,* Marzolf,* Robel,* Summerfelt,* Wilson* and Zimmerman;* Instructor Johnson; Emeritus: Professor Ackert**

UNDERGRADUATE

Students majoring in zoology should enroll in the Curriculum in Biological Science (See page 108). The requirements for a major in

zoology include Zool. 205, 510, and 660; two of the following three courses: 405, 410, and 415; in addition five hours of zoology courses chosen from the 400 to 799 group exclusive of 425. For requirements for a major in fisheries and wildlife, see page 214.

GRADUATE

Advanced work leading to the degree Master of Science is offered in the fields of ornithology, parasitology, cytology, embryology, ecology, physiology, endocrinology, animal behavior, limnology, and wildlife conservation.

Major work leading to the degree Doctor of Philosophy is offered in the fields of endocrinology, embryology, parasitology, and ecology.

Prerequisite to major graduate work in these fields is the completion of a four-year curriculum substantially equivalent to that required of students in general arts and science curriculums, but including also foundational work in the physical and biological sciences such as to prepare the student for the advanced field selected. Deficiencies may be made up after enrollment.

Equipment for advanced studies and research includes rooms with cages and pens for small animals and birds; microscopes, ovens and other equipment, and a trained technician are available as aids in teaching and research in parasitology, endocrinology, embryology, ecology, physiology, and animal behavior.

FOR UNDERGRADUATE CREDIT

293 205. General Zoology. (4) I, II, S. Two hours rec. and six hours lab. a week.

293 210. Human Anatomy. (5) I. General anatomy studies by means of dissectible models, skeletons, and charts. Three hours rec. and six hours lab. a week. Pr.: Zool. 205.

293 240. Human Anatomy and Physiology. (5) S. For students in Home Economics and Nursing. Three hours rec. and six hours lab. a week. Pr.: Zool. 205.

293 399. Honors Seminar in Zoology. (1) I, II. Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

293 405. Comparative Anatomy of Vertebrates. (4) II. Two hours rec. and six hours lab. a week. Pr.: Zool. 205.

293 410. Embryology. (4) II, S. Developmental anatomy and physiology of reproduction of domestic birds and mammals. Three hours rec. and three hours lab. a week. Pr.: Zool. 205.

293 415. Histology. (3) II. Microscopic anatomy of the organs and tissues of the mammal as a basis for understanding diversity of function and malfunction. Two hours rec. and three hours lab. a week. Pr.: Zool. 205.

293 425. Human Physiology. (4) I, II, S. Functions of various organ systems of the body. Not to be taken by zoology majors. Three hours rec. and two hours lab. a week. Pr.: Zool. 205 or equiv.

293 430. Wildlife Conservation. (3) I. Methods and techniques in the management and propagation of wildlife. Pr.: Zool. 205 or equiv.

293 441. Human Parasitology Recitation. (3) II. Pr.: Zool. 205 or equiv.

293 442. Human Parasitology Laboratory. (1) II. Two hours lab. a week. Pr.: To be taken concurrently with Zool. 441.

293 445. Zoological Microtechnique. (2) I, II, S. Methods and processes in preparation of microscopical slides and whole mounts; principles of photomicrography. Six hours lab. a week. Pr.: Zool. 205.

293 510. Principles of Zoophysiology. (4) II. Selected topics in physiology of cells, organ systems, and organisms. Three hours rec. and three hours lab. a week. Pr.: Zool. 205; Chem. 230 or equiv., and junior standing or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 293 600. Comparative Embryology.** (3) II in odd years. Comparative vertebrate embryology and histogenesis, with emphasis on the mechanics of development. One hour lec. and six hours lab. a week. Pr.: Zool. 410.
- 293 605. Cytology.** (3) I in odd years. Structure and function of cells, with introduction to cytogenetics and modern techniques of cell study. Pr.: Zool. 445 and Chem. 351 or equiv.
- 293 610. Ornithology.** (3) II, S. Lecture, laboratory, and field studies in identification and adaptation of birds. Two hours rec. and three hours lab. a week. Pr.: Zool. 205 or equiv.
- 293 615. Physiology of the Sense Organs.** (2) I. Offered on demand. Functions of the special sense organs of man as well as a comparison of the physiology of these organs with those of other animals. One hour rec. and two hours lab. a week. Pr.: Zool. 510 or consent of instructor.
- 293 621. Endocrinology.** (3) I, S. Survey of the glands of internal secretion and of their physiological and biochemical role in growth, development, metabolism, regulation and reproduction of animals. Pr.: Zool. 205 or equiv., course in organic chemistry or biochemistry, or consent of instructor.
- 293 625. Animal Parasitology.** (3) I. Biology, pathology, and prophylaxis of the principal external and internal parasites of domestic animals. Two hours rec. and two hours lab. a week. Pr.: Zool. 205 and junior standing.
- 293 630. Invertebrate Zoology.** (4) I. Structure, function, development, phylogeny and classification of invertebrates. Two hours rec. and six hours lab. a week. Pr.: Zool. 205 and junior standing.
- 293 640. Protozoology.** (3) II. Taxonomy, morphology, and biology of the free-living and parasitic protozoa. Two hours rec. and three hours lab. a week. Pr.: Zool. 205.
- 293 646. Heredity and Evolution.** (2) I. A study of human genetics and a survey of the principles of evolution of animals including man. Pr.: Zool. 205 or equiv.
- 293 660. Animal Ecology.** (3) II. Structure and dynamics of animal populations in relation to the physical, edaphic, and biotic environment. Two hours rec. and three hours lab. a week. Pr.: Zool. 205 or equiv.
- 293 661. Special Topics in Animal Ecology.** Variable credit. I. Review of ecological research; works of North American and foreign ecologists. Aspects of trophic dynamics, population dynamics, structure, movements, dispersal, behavior, and other factors are presented. Pr.: Zool. 660 and consent of instructor.
- 293 671. Ichthyology.** (3) I. Taxonomy, morphology, physiology, behavior, ecology and distribution of fishes. Two hours rec. and three hours lab. a week. Pr.: Zool. 205 and junior standing.
- 293 675. Mammalogy.** (3) I in odd years. Classification, distribution, and natural history of mammals; collecting of specimens and preparation of study skins. Two hours rec. and three hours lab. a week. Pr.: Zool. 205.
- 293 685. Wildlife Management Techniques.** (3) I in even years. Ecology and management of game birds and mammals, including field studies of research and management techniques. Two hours rec. and three hours lab. a week. Pr.: Zool. 430 and 660 or consent of instructor.
- 293 691. Fisheries Management.** (4) II in odd years. Methods of fishery biology; populations, aging and growth rates, productivity, survey methods, planning and improvement, physiochemical conditions of fresh-water and fish-pond management. Three hours rec. and three hours lab. a week. Pr.: Zool. 670 or consent of instructor.
- 293 693. Limnology.** (2) I in even years. Studies of fresh-water lakes and streams, with stress on the physical, chemical, and biological fac-

tors which determine their biological productivity. Two hours lec. a week. Pr.: One lab. course in science, Chem. 110 or 210, or consent of instructor.

293 694. Limnological Methods. (2) I in even years. Field and laboratory methodology involved in resolving the biological productivity of lakes and streams; emphasis on physical, chemical, and biological factors of fresh-water ecosystems. Six hours lab. a week. Pr.: Zool. 693 or conc. enrollment, two lab. courses in biology, Phys. 112 or equiv., or consent of instructor.

293 695. Social Behavior in Vertebrates. (2) II or S. Animal behavior from the viewpoint of social dominance and group organization; contributions of social behavior in the classes of vertebrates. Pr.: Zool. 205 or equiv. and junior standing.

293 796. Cellular Physiology. (4) I. An experimentally oriented course emphasizing the mechanisms by which cells maintain a steady state, exchange materials across cell membranes, transform energy, and generate bioelectric potentials. Three hours rec. and three hours lab. a week. Pr.: Zool. 510 or equiv., a course in physics, Chem. 351 or consent of instructor.

293 799. Problems in Zoology. Credit arranged. I, II, S. Work is offered in animal behavior, ornithology, cytology and embryology, ecology, endocrinology, histology, parasitology, physiology, protozoology, wildlife conservation, and zoological technic. Pr.: Background of courses needed for problem undertaken and consent of department head.

FOR GRADUATE CREDIT

293 802. 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.: Zool. 625 and consent of instructor.

293 806. Experimental Endocrinology. (3) II. Experimental approach to endocrine research; isolation, quantitative determination and characterization of hormones by means of chemical techniques such as chromatography, fluorimetry, spectrophotometry; interrelationships of hormones and enzymes *in vivo* and *in vitro* systems. One hour rec. and six hours lab. a week. Pr.: Zool. 621 or consent of instructor.

293 810. Comparative Physiology of Animals. (3) II. Offered on demand. A resume of function in the entire animal kingdom, with emphasis on a detailed comparison between phyla of body fluids, nutrition, respiration and respiratory pigments and excretion. Five hours combined rec. and lab. a week. Pr.: Zool. 425 or 510 or equiv.

293 815. Advanced Endocrinology. (2) I in even years. Biochemical and physiological effects of hormones; hormones influencing behavior, neuroendocrine principles and interrelationships; brain stimulation and hormonal secretion. Pr.: Zool. 621 or consent of instructor.

293 999. Research in Zoology. Credit arranged. I, II, S. Work is offered in animal behavior, ornithology, cytology, embryology, ecology, endocrinology, parasitology, physiology, and wildlife conservation. Pr.: Sufficient training to carry on the line of research undertaken and consent of department head.

The College of Commerce

C. CLYDE JONES,* *Dean*

BLAIR J. KOLASA, *Associate Dean*

MILDRED E. BUZENBERG, *Assistant Dean*

Professors Clark, Jones* and Kolasa; Associate Professors Eriksen,* Gugler,* Hoeke, Laughlin,* Mulanax* and Swisher; Assistant Professors Barton-Dobenin, Coleman, Eubanks, Gilkison,* Gudgell, Richards, Tidwell and Tuxbury; Instructors Buzenberg, Jenkins, Rapp, Swanson and Wise; Emeritus: Professor Williams*

The main objective of the College of Commerce is to provide a challenging opportunity for professional study and development in accounting and business administration. 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 critically examined as a key social, economic and political institution of our time. To equip the prospective executive and specialist for future professional responsibilities, the College orients instructional activities around two themes: one, the businessman as a manager and executive, decision-maker, planner, organizer and controller of operations in a particular firm; and the other, the businessman as an analyst of, and adapter to the larger economic and political environment of which he 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 Commerce recognizes its responsibilities and opportunities to work closely with the business community. It provides to business, through the general faculty, professional services in accounting, finance, marketing and management. In cooperation with the Division of Extension, the College of Commerce sponsors numerous short courses and conferences for business and management groups.

THE UNDERGRADUATE PROGRAM

At the undergraduate level, the College of Commerce seeks to produce a university graduate with: (1) a broad education in the Arts, Sciences and Humanities; (2) a solid knowledge and appreciation of the functioning of the business world; (3) sufficient knowledge and skill in a field of specialization to permit him to obtain a position in business; and (4) the proven ability to think creatively and analytically so that he may 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 in its students the 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. Required "core" courses in accounting, administration, business law, economics, finance, management, marketing and personnel administration provide the fundamentals of business administration. Seven fields of specialization are available for selection by advanced Business Administration majors.

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

Major in Business Administration

The major in Business Administration is designed from a general management viewpoint. During the junior and senior years, students, in consultation with faculty advisers, will select approximately 12 credit hours in a special area of interest. These fields of specialization include: Finance, General Business, Management, Marketing, Personnel Administration, and Secretarial Training. Students preparing to teach commercial subjects in high school normally enroll in the College of Commerce dur-

ing their first two undergraduate years, then transfer into the College of Education at the beginning of their junior year.

Effective for all students entering the College of Commerce after September 1, 1964, and all students graduating after September 1, 1969.

COMMUNICATIONS

Engl.	229 100	English Composition I	3	
Engl.	229 120	English Composition II	3	
Spch.	281 106	Oral Communication Ia	3	
		One of:		
		Engl. 229 200 English Composition III	(3)	} 2-3
		Engl. 229 416 Scientific Report Writing	(2)	
		Engl. 229 430 Narrative Writing I	(3)	
		Engl. 229 436 Narrative Writing II	(3)	
		Spch. 281 200 Oral Communication II	(2)	
		Spch. 281 608 Persuasion	(3)	
		Spch. 281 616 Group Discussion Methods	(3)	
		Spch. 281 618 Discussion and Conference Leadership	(3)	
Engl.	229 090	English Proficiency	0	
			11-12	

QUANTITATIVE

Math.	245 100	College Algebra	3		
Stat.	285 320	Elements of Stat.	3		
Math.	245 220	Anal. Geom. & Calc. I or	4 or		
Math.	245 340	Intro. to Analytic Proc.	3		
Stat.	285 321	Bus. & Econ. Statistics	12-13		
			12		
			15		
			12		

NATURAL SCIENCES*

SOCIAL SCIENCES

P. Sci.	269 444	American Democ.	3 or
P. Sci.	269 220	American Government .	3
Psych.	273 110	General Psychology	3
Soc.	277 220	Intro. to Soc.	3
		Geog., Hist., Pol. Sci., Psych., and/or Soc. .	6
			15
			6

HUMANITIES

BUSINESS ADMINISTRATION AND ECONOMICS

B. A.	305 105	Elem. of Business Administration	2
B. A.	305 272	Introd. Accounting	5
B. A.	305 305	Managerial Accounting	3
Econ.	225 110	Economics I	3
Econ.	225 120	Economics II	3
B. A.	305 325	Business Law I	3
B. A.	305 326	Business Law II	3
B. A.	305 400	Administration	3
B. A.	305 405	Business Finance	3
B. A.	305 431	Personnel Admin.	3
B. A.	305 440	Marketing	3
B. A.	305 600	Business Policy	3
B. A.	305 602	Business and Society	3

Economics Electives (selected in consultation with faculty adviser) 6

One course of the six hours in economics must be taken from the following courses offered by the Department of Economics:

Econ.	225 430	Money and Banking	(3)
Econ.	225 686	Business Fluctuations and Forecasting	(2)
Econ.	225 710	Intermediate Economic Analysis	(3)
Econ.	225 720	Income and Employment Theory	(3)

Field of Specialization (see "Fields of Specialization" below) 12

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OTHER

Phys. Educ. (two semesters)	0
Free Electives	10-12
Total credit hours required of all students	126

* Students must take at least one scientific laboratory. No distinction will be made between the Biological and Physical Sciences for purposes of satisfying this requirement.

Fields of Specialization

During the junior and senior years, each student will select, in consultation with his faculty adviser, one Field of Specialization from the following:

FINANCE

Required

Cr. Hrs.

B. A.	305 505	Investments	3
B. A.	305 615	Financial Mngt.	3

PLUS

Six Credit Hours Selected from the Following Course Work

B. A.	305 312	Insurance	3
Econ.	225 430	Money and Banking* ..	3
Econ.	225 610	Public Finance	3
Econ.	225 681	International Trade	3
Econ.	225 690	Monetary, Cr., Fis.	3
		Pol.	2

GENERAL BUSINESS

Required

Twelve credit hours to be selected from the following courses, with a minimum of three groups being represented:

Cr. Hrs.

GROUP I

B. A.	305 601	Advanced Mngt.	3
B. A.	305 610	Bus. Meas. & Forecast. ..	3

GROUP II

B. A.	305 631	Organ. Behav. & Admin.	3
Psych.	273 515	Personnel Psychology ..	3
B. A.	305 502	Independ. Read. in Bus. ..	2

GROUP III

B. A.	305 505	Investments	3
B. A.	305 615	Financial Mngt.	3

GROUP IV

B. A.	305 540	Retailing or	
B. A.	305 542	Sales Management	3
B. A.	305 640	Marketing Analysis	3

MANAGEMENT

Required

Cr. Hrs.

B. A.	305 601	Advanced Mngt.	3
B. A.	305 610	Bus. Measure. & Fore'g ..	3

PLUS

Six Credit Hours Selected from the Following Course Work

B. A.	305 502	Independ. Read. in Bus. ..	2
B. A.	305 615	Financial Mngt.	3
B. A.	305 617	Controllershship	3
B. A.	305 631	Organ. Behav. & Admin.	3
B. A.	305 640	Marketing Analysis	3
Econ.	225 620	Labor Economics	3
Econ.	225 636	Economic Systems	2
Econ.	225 710	Intermed. Econ. Anal.*....	3
Econ.	225 740	Managerial Economics .	3
P. Sci.	269 610	Pub. Pol. Toward Bus.	3

* Unless taken to satisfy the six hours of economics requirement under the "Economics Electives" section.

MARKETING

Required

Cr. Hrs.

B. A.	305 343	Sales Commc.	3
B. A.	305 540	Retailing or	
B. A.	305 542	Sales Management	3
B. A.	305 640	Marketing Analysis	3

PLUS

Four Credit Hours Selected from the Following Course Work

B. A.	305 540	Retailing or	
B. A.	305 542	Sales Management	3
Journ.	289 320	Prin. of Advertising ..	3
Psych.	273 505	Consumer Psychology .	3

PERSONNEL ADMINISTRATION

Required

Cr. Hrs.

B. A.	305 631	Organ. Behav. & Admin.	3
Psych.	273 515	Personnel Psychology ..	3

PLUS

Six Credit Hours Selected from the Following Course Work, with a Minimum of Two Groups Being Represented.

GROUP I

Psych.	273 435	Social Psychology	3
Psych.	273 505	Consumer Psychology ..	3
Psych.	273 531	Occupational Infor.	3
Psych.	273 532	Use of Tests in	

Counsel. 3

Psych.	273 550	Group Dynamics	3
Psych.	273 625	Indus. & Engg. Psych. .	3

GROUP II

Econ.	225 620	Labor Economics	3
Econ.	225 626	Collec. Bargain. and Labor Relations Law	3

GROUP III

Soc.	277 602	Indus. Sociology	3
P. Sci.	269 635	Pub. Personnel Admin. ..	3
B. A.	305 502	Independ. Read. in Bus. ..	2

SECRETARIAL TRAINING

Required

Cr. Hrs.

B. A.	305 236	Transcription I	3
B. A.	305 237	Office Prac. & Tech. ..	3
B. A.	305 238	Office Machines Lab. .	0
B. A.	305 301	Office Management	3
B. A.	305 302	Data Processing	2

PLUS

Credit must be earned in the following course work. Such course work, however, will not be counted toward satisfying the "Field of Specialization" requirement of 12 credit hours.

B. A.	305 230	Typewriting I	3
B. A.	305 231	Typewriting II	3
B. A.	305 235	Shorthand I	4

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION**Major in Accounting**

Students majoring in Accounting have an opportunity to prepare for careers in public, industrial or governmental accounting. Satisfactory completion of the degree requirements qualifies the graduate to take the Certified Public Accounting examination. The College has an internship program for qualified seniors in Accounting which provides valuable practical experience with recognized public accounting firms.

Effective for all students entering the College of Commerce after September 1, 1964, and all students graduating after September 1, 1969.

COMMUNICATIONS

Engl.	229 100	English Composition I	3	
Engl.	229 120	English Composition II	3	
Spch.	281 106	Oral Communication Ia	3	
		One of:		
Engl.	229 200	English Composition III	(3)	} 2-3
Engl.	229 416	Scientific Report Writing	(2)	
Engl.	229 430	Narrative Writing I	(3)	
Engl.	229 436	Narrative Writing II	(3)	
Spch.	281 200	Oral Communication II	(2)	
Spch.	281 608	Persuasion	(3)	
Spch.	281 616	Group Discussion Methods	(3)	
Spch.	281 618	Discussion and Conference Leadership	(3)	
Engl.	090	English Proficiency	0	
				11-12

QUANTITATIVE

Math.	245 100	College Algebra	3
Stat.	285 320	Elements of Stat.	3
Math.	245 220	Anal. Geom. & Cal. I or	4 or
Math.	245 340	Intro. to Analytic Proc.	3
Stat.	285 321	Bus. & Econ. Statistics	3

SOCIAL SCIENCES

P. Sci.	269 444	American Democ.	3 or
P. Sci.	269 220	American Government ..	3
Psych.	273 110	General Psychology	3
Soc.	277 220	Intro. to Soc.	3
		Geog., Hist., Pol. Sci.	
		Psych., and/or Soc. .	3

12-13**12****NATURAL SCIENCES*****12****HUMANITIES****6****BUSINESS ADMINISTRATION AND ECONOMICS**

B. A.	305 105	Elem. Business Admin.	2
B. A.	305 272	Intro. Accounting	5
Econ.	225 110	Economics I	3
Econ.	225 120	Economics II	3
B. A.	305 325	Business Law I	3
B. A.	305 326	Business Law II	3
B. A.	305 400	Administration	3
B. A.	305 405	Business Finance	3
B. A.	305 431	Personnel Admin.	3
B. A.	305 440	Marketing	3
B. A.	305 600	Business Policy	3
B. A.	305 602	Business and Society ..	3

Economics Electives (selected in consultation with faculty adviser): 6

One course of the six hours in economics must be taken from the following courses offered by the Department of Economics:

Econ.	225 430	Money and Banking	(3)
Econ.	225 686	Business Fluctuations and Forecasting	(2)
Econ.	225 710	Intermediate Economic Analysis	(3)
Econ.	225 720	Income and Employment Theory	(3)

43**ACCOUNTING**

B. A.	305 371	Intermed. Accounting .	3
B. A.	306 361	Cost Accounting	3
B. A.	305 461	Adv. Cost Acctg.	2
B. A.	303 472	Valuation Accounting .	3
B. A.	305 481	Taxation I	3
		Accounting Electives (selected in consulta- tion with faculty adviser)	6

20**OTHER**

Phys. Educ. (two semesters)	0
Free Electives	12-14
Total credit hours required of all students	130

* Students must take at least one scientific laboratory. No distinction will be made between the Biological and Physical Sciences for purposes of satisfying this requirement.

A Suggested Freshman Year Program for the Degree, BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

FIRST SEMESTER				SECOND SEMESTER					
			<i>Cr. Hrs.</i>				<i>Cr. Hrs.</i>		
Engl.	229	100	Engl. Comp. I	3	Engl.	229	120 Engl. Comp. II	3	
Math.	245	100	College Algebra	3	Spch.	231	106 Oral Comm. Ia	3	
P. Sci.	269	220	American Government .	3	Psych.	273	110 General Psych. <i>or</i>		
			Nat. Sci. and/or		Soc.	277	220 Intro. to Sociol.	3	
			Humanities	4-5				Nat. Sci. and/or	
Ph. Ed.	261	011	Basic Phys. Educ.	0				Humanities	6-7
B. A.	305	105	Elem. of Bus. Ad.	2	Ph. Ed.	261	011 Basic Phys. Educ.	0	
Total			15-16	Total			15-16

DUAL DEGREE IN BUSINESS ADMINISTRATION

The dual degree program allows a student to acquire the Bachelor of Science in Business Administration degree in addition to his non-business degree. Ordinarily, the program must be commenced during a student's junior year, or at the latest, during the first semester of his senior year. The program is not generally intended for students who have completed their non-business degree.

The following requirements are effective for all students entering the Dual Degree Program offered by the College of Commerce after September 1, 1964, and all students graduating after September 1, 1969. To qualify for the business degree, a student must take a minimum of 30 hours of course work not counted toward the first degree. The following list of courses must be completed, either as part of the student's non-business degree, or in addition to it:

				<i>Cr. Hrs.</i>
B. A.	305	272	Introd. Accounting	5
B. A.	305	305	Managerial Accounting	3
Econ.	225	110	Economics I	3
Econ.	225	120	Economics II	3
B. A.	305	325	Business Law I	3
B. A.	305	326	Business Law II	3
B. A.	305	400	Administration	3
B. A.	305	405	Business Finance	3
B. A.	305	431	Personnel Admin.	3
B. A.	305	440	Marketing	3
B. A.	305	600	Business Policy	3
B. A.	305	602	Business and Society	3

Business Electives, including at least one of the following courses

Business Electives, including at least one of the following courses offered by the Department of Economics				6
Econ.	225	430	Money and Banking	(3)
Econ.	225	686	Business Fluctuations and Forecasting	(2)
Econ.	225	710	Intermediate Economic Analysis	(3)
Econ.	225	720	Income and Employment Theory	(3)

Total credit hours required 44

ACADEMIC PROBATION AND DISMISSAL POLICY

In addition to the University probation and dismissal policy that is applicable to students entering Kansas State University after June 1, 1964, the following probation and dismissal policy is applicable to all students in the College of Commerce who enter Kansas State University after June 1, 1964:

A. Probation and Dismissal Policy

1. This policy shall apply to all students in the College of Commerce who enter Kansas State University after June 1, 1964.
2. A student will be placed on probation when his cumulative and/or the previous semester's grade point average is below 2.000.
3. A student who is admitted to the College of Commerce from another administrative unit of the University will be placed on probation if his academic record fails to meet the provisions of item 2 above.
4. A student will be dismissed when his cumulative grade points fall 16 points or more below the total grade points required for a 2.000 cumulative grade point average, but only if he was on probation during any previous semester in the College of Commerce.

5. When a student has attempted from 90 through 99 credit hours for which letter grades were received, he will be dismissed if his cumulative grade point average falls below 1.850, but only if he was on probation during any previous semester in the College of Commerce.
6. A student will be dismissed if his cumulative grade point average is below 2.000 upon completion of 20 credit hours (for which letter grades were received) in excess of the number required for his baccalaureate degree.
7. A student will be dismissed, providing he has been on probation during any previous semester in the College of Commerce, if his cumulative grade point average falls below the following minimum University level:

<i>Hours attempted (including courses for which WD's are reported)</i>	<i>Cumulative grade point average</i>
30-59	1.500
60-89	1.750
90 or more	1.850

B. Readmission Policy

1. A student who has been dismissed, either under the "old levels" or because of an accumulated deficit exceeding 15 grade points under the "new policy," and who has remained out of K. S. U. for at least one semester may be reinstated by the College of Commerce Academic Standards Committee.
2. Students dismissed under "old levels," either at the end of the spring 1964 term or at some time in the future, may be reinstated immediately only by the University Academic Standards Committee upon recommendation or referral by the College of Commerce Academic Standards Committee.
3. A reinstated student will be placed on probation.
4. a. A reinstated student must make a minimum grade point average of 2.000 during his first semester or summer session after readmission, or be subject to dismissal at that time.
b. He will be allowed a maximum of one year (two semesters and a summer school) to raise his grade point average (under "old levels") or his grade point deficit (under "new policy"), whichever is applicable, to a point at which he is no longer subject to dismissal. If the applicable level is not attained, he will be dismissed.
c. If he is not subject to dismissal upon completion of the maximum time, as defined above, the probation and dismissal rules applicable to students who have never been dismissed will apply in future semesters.
5. It is recommended that the College of Commerce Academic Standards Committee not reinstate a student unless it appears reasonably possible for the student to avoid dismissal at the end of the first semester or year following readmission.

C. Advising of Students on Probation

1. The College of Commerce Academic Standards Committee will set general policy as to any restrictions to be placed on students on probation regarding:
 - a. Maximum credit hour load permitted for the ensuing semester or summer session;
 - b. Inclusion in assignment of courses previously failed but required for the degree;
 - c. Curtailment of non-academic activities whether on-campus, inter-collegiate, or off-campus; and
 - d. Any other measures which might aid the student in returning to good standing.
2. All faculty advisers should be informed of this policy, and be charged with the responsibility for counseling the student and approving his

program of study for the following semester. Each faculty adviser should be supplied with a list of his advisees who are on probation, and such students should be required to obtain the signature of their faculty adviser on their program of study prior to the regular enrollment period.

D. Graduation Requirements for Dual Degree Candidates

A dual-degree candidate must earn a cumulative grade point average of 2.000 or above for the 44 credit hours specified for the B. S. in Business Administration.

THE GRADUATE PROGRAM

The College of Commerce provides graduate training and research for qualified students that leads to the conferring of two degrees: Master of Science in Business Administration, and Master of Science in Accounting. For admission to graduate study in the College of Commerce, applicants must take the Admission Test for Graduate Study in Business (the ATGSB) administered by the Educational Testing Service. Applicants should register for the test direct with the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey. All questions concerning details of the admission test, including the time and place at which the test is given, should be addressed to the Educational Testing Service. This test should be taken as far in advance of admission as possible. Those taking the test should notify the Educational Testing Service to report their test scores to the Associate Dean, College of Commerce, Kansas State University, Manhattan, Kansas 66502.

Program Leading to the Degree,

MASTER OF SCIENCE IN BUSINESS ADMINISTRATION

The program leading to the degree of Master of Science in Business Administration is designed to provide general training in business management. Specialization is not possible under this program. The candidate is assumed to have completed an undergraduate program in business administration substantially similar to that offered at Kansas State University.

Admission Requirements: In addition to the general admission requirements set forth in the Graduate Bulletin, the student must have completed a minimum of 20 credit hours of course work in business and economics, including at least one course in accounting, economics, business finance, marketing, and management. In addition, a student may be required to make up any deficiencies in prerequisites for graduate courses.

Courses Required: Generally, each candidate must complete the following courses, or their reasonable equivalent:

		<i>Cr. Hrs.</i>
B. A.	610 Business Measurements and Forecasting	3
B. A.	617 Controllershship	3
B. A.	800 Seminar in Business Management	3
B. A.	810 Business Finance Seminar	3
B. A.	831 Seminar in Personnel Administration	3
B. A.	840 Seminar in Marketing	3

In addition to the above courses, each candidate must complete at least three credit hours of course work in advanced economics (courses numbered 600 or above) plus a report (two credit hours) or a thesis (six credit hours). Each student must also select work in a minor field or supporting courses in consultation with his major professor. Normally, the minor or supporting course work will consist of six to nine hours of work in a subject(s) related to business administration. Such subjects include, but are not limited to, accounting, the behavioral sciences (psychology and sociology), economics, history, mathematics, political science and statistics.

Program Leading to the Degree, MASTER OF SCIENCE IN ACCOUNTING

The graduate program in accounting 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 in the Graduate Bulletin, the student must have completed a minimum of 14 credit hours in accounting, eight hours in economics, five hours in business law, and three hours in business finance. Candidates, however, need not have completed a baccalaureate degree in accounting.

Courses Required: While the program in accounting is adapted to the background and needs of the individual student, certain minimum requirements must be met. Each candidate shall complete at least 20 hours in accounting, including a thesis (six hours) or a report (two hours), plus the Business Finance Seminar (three hours). In addition, each student must select courses in a minor field or supporting area in consultation with his major professor. Normally, the minor field or supporting area will consist of six to nine hours of work in a subject(s) related to accounting. Such subjects include, but are not limited to, business administration, economics, mathematics and statistics.

Each candidate must take at least four of the following accounting courses:

		<i>Cr. Hrs.</i>
B. A.	617 Controllership	3
B. A.	681 Auditing II	3
B. A.	815 Advanced Accounting Problems	3
B. A.	816 Corporation Accounts and Statements	3
B. A.	870 Accounting Theory Seminar	3

Remaining courses will be selected with the advice of the major professor.

COURSES IN BUSINESS ADMINISTRATION

FOR UNDERGRADUATE CREDIT

305 105. Elements of Business Administration. (2) I, II. An introductory study of business administration from a managerial viewpoint. Topics include: The management process; interrelationship of functional areas of a business; and exposure to principles of business organization and operation. Required of freshmen and sophomores once during the first year of enrollment in the College of Commerce, but not open to students with junior or senior standing.

305 201. Fundamentals of Business for Professional People. (2) I. The course covers business topics selected to acquaint students in professional curriculums with the business problems involved in establishing and maintaining a professional practice; topics include accounting, insurance, law, investments, and finance. Not open to students in College of Commerce.

305 210. Personal Finance. (2) I, II. 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 Commerce. Pr.: Sophomore standing.

305 230. Typewriting I. (3) I, II, S. The technique of touch typewriting, care of the machine, and skill in operation. Pr.: Ability to type 25 words per minute.

305 231. Typewriting II. (3) I, II. Cont. of Typewriting I. Pr.: B. A. 230.

305 235. Shorthand I. (4) I, II, S. Fundamentals of Gregg Shorthand. Meets five hours each week. Pr.: B. A. 231.

305 236. Transcription I. (3) II. Advanced shorthand with speeds of 100 to 120 or higher. Setting up of business letters in various styles—gaining of speed in transcription of letters and manuscripts. Pr.: B. A. 235.

305 237. Office Practice and Technique. (3) I. Training for the executive secretary. The course work covers dictation and transcription, secre-

tarial functions and responsibilities, and the use of office machines. Pr.: B. A. 236 and conc. enrollment in B. A. 238.

305 238. Office Machines Laboratory. (0) I, II. Instruction and practice covering the various calculators, ten-key adding machines, voice writers and duplicators. One hour per week.

305 273. Principles of Accounting. (3) I, II. Principles of accounting; use of accounting records and statements for individual and corporate business organizations. Not open to students in College of Commerce. Pr.: Sophomore standing.

305 301. Office Management. (3) I, II. 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.

305 302. Data Processing. (2) II. The application of data processing and punched card machines and systems to the operation of a business enterprise, including capabilities, limitations, system design, and operation. Pr.: Math. 100 or 110.

305 305. Managerial Accounting. (3) I, II, S. Development and use of accounting information as an instrument of management control. Coverage includes analysis of financial statements, cost accounting applications, internal controls, budgeting, fundamentals of income tax, and accounting reports to management. Pr.: B. A. 272 or equiv.

305 312. Insurance. (3) II. A study of life, property, casualty, and health insurance from a business point of view. Pr.: Econ. 110.

305 325. Business Law I. (3) I, II, S. A study of law related to practical business problems. Coverage includes contracts, bailments, agency, partnership, corporations and negotiable instruments in order. Pr.: Sophomore standing.

305 326. Business Law II. (3) I, II, S. Cont. of Business Law I. Pr.: B. A. 325.

305 343. 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.: Sophomore standing or consent of instructor.

305 350. Small Business Operation. (3) II. Opportunities in business ownership, principles governing the starting of a small enterprise; importance, status, problems, and management of small business. Pr.: Econ. 110. Not open to students in College of Commerce.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

305 400. Administration. (3) I, II, S. Fundamental principles and techniques of management of business activities. The course provides a basic understanding of administrative problems through the study of organization, planning control, and communications. Pr.: Junior standing.

305 405. Business Finance. (3) I, II, S. Emphasis on the corporation, corporate securities, capital structure, security markets, marketing securities, dividend policy, working capital, failure and reorganization. Pr.: Econ. 120 or 430 and B. A. 305 or 371; junior standing.

305 431. Personnel Administration. (3) I, II, S. Development and use of principles of management as applied to administration of personnel. Planning, organizing, and controlling the labor force of a firm, including consideration of the problems of employee selection, training, compensation, supervision, and separation. The effect of collective bargaining on personnel administration. Pr.: Junior standing.

305 440. Marketing. (3) I, II, S. A general survey 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.: Econ. 110 and junior standing.

- 305 502. Independent Reading in Business.** (2) I. Summer reading program of selected literature in business administration, with a minimum of three seminars and an examination in early fall. Pre-registration during the previous May. Pr.: Junior standing and consent of instructor.
- 305 505. 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.: B. A. 405.
- 305 540. Retailing.** (3) I, S. 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.: B. A. 440.
- 305 542. Sales Management.** (3) II. 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.: B. A. 440.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 305 600. Business Policy.** (3) I, II, S. Integration of the subject matter of required courses in business administration and economics, through study of the problems of top management organization, administrative techniques, and policy formulation. Cases are used as the basis of class discussion and written reports. Pr.: Open only to graduating seniors and graduate students; B. A. 400, 405, 431, and 440.
- 305 601. Advanced Management.** (3) II. A study of the application of managerial decision-making methodology to specific business activities along with the top-level leadership, organization, and business policies. Pr.: B. A. 400.
- 305 602. Business and Society.** (3) I, II. 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.
- 305 603. Contemporary Business.** (2) II. Exploration in depth of current and anticipated business issues and problems through selected readings and lectures by adjunct faculty members from business and public organizations. The nature and content of the specific issues and problems investigated will vary from semester to semester. Pr.: Junior standing in the College of Commerce, or consent of instructor.
- 305 610. Business Measurements and Forecasting.** (3) I. Function and methods of analysis of business data, with emphasis on the use of data for executive decision in analyzing planning and control in the operations of a business. Topics include tables, charts, time series analysis, index numbers, current economic indicators, forecasting techniques, quality control, and sampling applications. Pr.: Stat. 320 or consent of instructor.
- 305 615. Financial Management.** (3) II. Analysis of problems in advanced financial planning and control. Pr.: B. A. 405.
- 305 617. Controllership.** (3) I. The work of the accounting executive, with emphasis on control of operations, internal and external reporting, and accounting administration. Pr.: B. A. 305, or 361 and 371.
- 305 631. Organizational Behavior and Administration.** (3) II. An interdisciplinary study of basic organizational factors within the business firm. Emphasis on authority relationships, line-staff relationships, employee motivation and managerial decision-making. Instruction by the case method. Pr.: B. A. 400 or 431 or consent of instructor.
- 305 640. Marketing Analysis.** (3) I. A study of market analysis and research methods. Pr.: B. A. 440 and consent of instructor.

- 305 798. Problems in Business Administration.** Credit arranged. I, II, S. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 305 800. Seminar in Business Management.** (3) I. The topics in business management examined through current literature and research. Pr.: B. A. 600 or consent of instructor.
- 305 810. Business Finance Seminar.** (3) II. An examination of the literature in the area of business finance covering recent developments in money markets, government regulations, and current finance. Pr.: Consent of instructor.
- 305 831. Seminar in Personnel Administration.** (3) I. An examination of the current literature and research in personnel administration. Pr.: B. A. 431 or consent of instructor.
- 305 840. Seminar in Marketing.** (3) II. A study of current literature and research in marketing theory. Pr.: B. A. 440 or consent of instructor.
- 305 998. Research in Business Administration.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

COURSES IN ACCOUNTING

FOR UNDERGRADUATE CREDIT

- 305 272. Introductory Accounting.** (5) I, II, S. The fundamentals of accounting for business administration and accounting majors. Pr.: Sophomore standing.
- 305 361. Cost Accounting.** (3) I, II, S. Allocation of production costs to determine unit costs of goods manufactured and sold, and the utilization of such data by management. Pr.: B. A. 170 or 272.
- 305 371. Intermediate Accounting.** (3) I, II, S. Application of accounting principles to corporations. Working papers, statement analysis, and basic accounting theory. Pr.: B. A. 272.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 305 461. Advanced Cost Accounting.** (2) I, II. Budgetary control with standard costs. Cost and profit analyses for decision-making purposes. Pr.: B. A. 305 or 361.
- 305 471. Advanced Accounting.** (3) II. Home office and branch accounting, consolidated statements, receiverships, and other special topics. Pr.: B. A. 371.
- 305 472. Valuation Accounting.** (3) I, II, S. Valuation of balance sheet accounts. Pr.: B. A. 371.
- 305 481. 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.: Junior standing.
- 305 482. Taxation II.** (3) II. Intensive examination of specific problems encountered in federal and state income tax regulations, with emphasis on research and preparation for the Certified Public Accounting examination. Designed for those anticipating careers in accountancy. Pr.: B. A. 481.
- 305 570. Specialized Accounting.** (3) I. Partnership accounting, installment sales, consignment sales, insurance, mergers, estates and trusts. Pr.: B. A. 472.
- 305 575. Accounting Internship.** (3) I. Provides six weeks of practical diversified public accounting experience for accounting majors. The course objective is a broader educational experience for participating students. Pr.: B. A. 471, 480, 680, and consent of instructor.
- 305 580. Governmental Accounting.** (2) II in even years. State and municipal accounts and accounts for public institutions. Pr.: B. A. 361 or 371.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 305 670. C. P. A. Problems.** (3) I. A study of problems in various C. P. A. examinations. Pr.: B. A. 471 and consent of instructor.
- 305 671. C. P. A. Review.** (3) II. Study of theory of accounts and commercial law as given in C. P. A. examinations and review of current literature. Pr.: B. A. 471 and consent of instructor.
- 305 680. Auditing I.** (3) I, II. Theory and procedure used in simple balance sheet audits. A short audit case will be used. Pr.: B. A. 472.
- 305 681. 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.: B. A. 680 and consent of instructor.
- 305 799. Problems in Accounting.** Credit arranged. I, II, S. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 305 815. Advanced Accounting Problems.** (3) I on demand. A study of the more complex problems in various areas of accounting, with emphasis on theoretical background and presentation. Pr.: Consent of instructor.
- 305 816. Corporation Accounts and Statements.** (3) I. An intensive treatment of problems related to corporation accounting and reporting, with emphasis on income determination and balance sheet valuation. Pr.: Consent of instructor.
- 305 870. Accounting Theory Seminar.** (3) II. A critical examination of accounting literature, with emphasis upon accounting theory and intensive study of current issues in accounting theory. Pr.: Consent of instructor.
- 305 999. Research in Accounting.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

The College of Education

WILLIAM H. COFFIELD,* *Dean*

FLOYD H. PRICE,* *Assistant to the Dean*

Professors Agan, DeMand,* Green,* Littrell,* Moggie,* O'Fallon* and Olson;* Associate Professors Bradley,* McAnarney,* Peccolo,* Trennepohl* and Trent;* Assistant Professors Albracht, Bartel,* Champoux,* Coppedge, Craig, Friesen,* Hause, Kaiser,* Loeb,* Price,* Schell, Swaim,* Teague and Weinstock;* Instructors Hudson, Miller and Sullivan; Emeritus: Professors Baker,* Rust* and Strickland;* Associate Professors Baxter* and Hall**

UNDERGRADUATE

The College of Education is charged with the over-all professional leadership in the area of teacher education at Kansas State University. Specifically, the work of the College gives primary consideration to: (1) preparing teachers for elementary schools and secondary schools; (2) preparing elementary school principals, secondary school principals and school superintendents; (3) preparing guidance counselors and directors of guidance programs; (4) providing preparation in the selected areas of special education of exceptional children; (5) providing consultative services to the public schools; and (6) cooperating in placement services. A central feature of the Teacher Education Program involves cooperation between the College of Education and other university colleges and departments.

Students who plan to receive a degree in elementary education or secondary education are placed in a pre-education curriculum in the College of Arts and Sciences for their freshman and sophomore years. All sophomores *must* make application for admission to Teacher Education.

Freshmen and sophomores who are enrolled in the pre-education curriculum are advised by a College of Education adviser in the dean's office of the College of Arts and Sciences. This adviser is available for the purpose of advising and counseling students concerning the courses essential for entry into the Teacher Education program. Secondary education students are assigned two advisers. One adviser is the College of Education adviser; the second is the adviser in the teaching field.

Upon admission to Teacher Education in the junior year, the elementary education major is assigned an adviser from the College of Education faculty. The secondary education major is assigned an adviser from the College of Education faculty and continues with his adviser in the teaching field.

CURRICULUM IN EDUCATION

Bachelor of Science in Elementary Education

Bachelor of Science (Secondary Education)

Hours required for graduation, men and women 126

ELEMENTARY EDUCATION

A student preparing to teach in the elementary school is enrolled in a pre-elementary education curriculum in the College of Arts and Sciences for the freshman and sophomores years. When the student is admitted to the College of Education he is assigned an education adviser for the junior and senior years in the elementary education curriculum. The major in elementary education meets the requirements for the degree Three-Year Elementary certificate as established by the State Board of Education.

I. GENERAL EDUCATION REQUIREMENTS:

- A. Communications: English Composition I and II, six (6) hours; Oral Communication, two (2) hours; English Proficiency.
- B. Social Sciences (economics, geography, government, history, sociology): Twelve (12) hours.
- C. Literature or Language: Six (6) hours.
- D. Natural Science: Sixteen (16) hours including eight (8) hours of biological science and eight (8) hours of physical science. Must include one laboratory course. No mathematics may be included.
- E. Mathematics: Three (3) hours.
- F. General Psychology: Three (3) hours.
- G. Personal and Community Health: Three (3) hours.
- H. Physical Education: Two semesters required.
- I. Electives.

II. PROFESSIONAL EDUCATION REQUIREMENTS:

- A. Educational Psychology I and II: Six (6) hours.
- B.

	<i>Hours</i>
Principles of Elementary Education	3
Science for Elementary Schools	3
Mathematics for Elementary Schools	3
Language Arts for Elementary Schools	3
Social Studies for Elementary Schools	3
Elementary School Reading	3
Educational Sociology	3
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- C. Teaching Participation in Elementary Schools: Eight (8) hours.
- D. Additional Requirements: Nine (9) hours.

	<i>Hours</i>
Literature for Children	3
Music for Elementary Teachers	3
Art for Elementary Schools	3

III. OTHER REQUIREMENTS:

- A. Fifteen (15) hours selected from the field of concentration. Courses excluding those taken to meet other requirements are to be taken from one of the following fields:
 - Biological Sciences English and Speech
 - Home Economics Modern Foreign Language
 - Music and Art Physical Science and Mathematics
 - Social Science
- B. Remaining hours selected in General Education.

ADMISSION TO TEACHER EDUCATION:

All sophomores intending to qualify to teach in the elementary schools must have an approved application for admission to Teacher Education on file in Room 111, Holton Hall. Admission to Teacher Education is a prerequisite for enrollment in Educational Psychology II and the Student Teaching Block.

- A. Dates:
 - 1. Students must apply before **March 1** of the sophomore year but not later than the semester in which they take Educational Psychology I.
 - 2. Transfer students must apply by November 1 to be admitted for the second semester.
- B. Academic Standards Committee:

The Academic Standards Committee of the College of Education must approve the application for admission to Teacher Education before the student may enroll in Educational Psychology II.

C. Requirements for Admission to Teacher Education:

1. Over-all grade-point average of 2.2 in all resident work attempted at Kansas State University.
2. 2.0 or better in either English Composition I or II.
3. 2.0 or better in one of the following speech courses: 105, 106, 135, 200, 472, or 526.
4. Recommendation by the elementary adviser.
5. Recommendation by the Student Health Center.
6. Clearance by the Dean of Students.

ELEMENTARY EDUCATION BLOCK:

The Elementary Education Block is used to denote that semester of the senior year in which student teaching will be done. During this semester the student is enrolled in Teaching Participation for the Elementary School; Educational Sociology and Elementary School Reading.

ADMISSION TO STUDENT TEACHING

An application for student teaching is made through the education adviser. The form must be filed with the Coordinator of Student Teaching prior to March 1 of the year preceding student teaching. Prerequisites for elementary student teaching are:

1. Admission to Teacher Education.
2. Educ. 302 (Educational Psychology II).
3. Engl. 090 (English Proficiency).
4. Clearance by Student Health.
5. Clearance by Dean of Students.
6. Recommendation by the adviser.
7. A minimum grade-point average of 2.2 in all resident work completed.
8. Completion of September Observation.
9. Completion of a minimum of 90 semester hours.

SECONDARY EDUCATION

The student interested in the program leading to the degree Bachelor of Science (Secondary Education) is enrolled in pre-secondary education in the College of Arts and Sciences for the freshman and sophomore years. Application for admission to Teacher Education must be made no later than the second semester of the sophomore year (See page 110).

Dual advisement is provided during the entire four years of education for all prospective secondary teachers: one adviser from the major teaching field and the other from the College of Education. The major adviser is responsible for the teaching field while the education adviser has the responsibility of assisting the student in the professional education area. The pre-education adviser in the College of Arts and Sciences is a member of the College of Education faculty.

There are 19 subject fields (See page 233) applicable to teaching at the secondary level. The program in secondary education, which includes a departmental major in the teaching field and the professional education courses, meets the certification requirements as established by the State Board of Education. Special curriculums exist in Agricultural Education, page 53; Home Economics Education, page 240; Music Education, page 111; and Physical Education, page 111.

I. GENERAL EDUCATION REQUIREMENTS:

- A. Communications: English Composition I and II, six (6) hours; Oral Communication, two (2) hours; English Proficiency.
- B. Social Science (economics, geography, government, history, and sociology): Twelve (12) hours.
- C. Literature or Language, six (6) hours.
- D. Natural Science: Sixteen (16) hours (must include one laboratory

course); must include at least one course in biological science and one course in physical science; may not include more than four (4) hours of mathematics.

E. General Psychology: Three (3) hours.

F. Electives.

II. PROFESSIONAL EDUCATION REQUIREMENTS:

A. Educational Psychology I and II: Six (6) hours.

B. Principles of Secondary Education: Three (3) hours; Educational Sociology, three (3) hours.

C. Methods of Teaching in the Secondary Schools, two or three (2 or 3) hours, and Teaching Participation in the Secondary School, six (6) hours.

ADMISSION TO TEACHER EDUCATION

All sophomores intending to qualify to teach in the secondary schools must have an approved application for admission to Teacher Education on file in Room 111, Holton Hall. Admission to Teacher Education is a prerequisite for enrollment in Educational Psychology II and the Student Teaching Block. These requirements for admission to Teacher Education are applicable to all students whether enrolled in a curriculum in the College of Education or in curriculums of other colleges in the University.

A. Dates:

1. Students must apply before **March 1** of the sophomore year but not later than the semester in which they take Educational Psychology I.
2. Transfer students must apply by November 1 to be admitted for the second semester.

B. Academic Standards Committee:

The Academic Standards Committee of the College of Education must approve the application for admission to Teacher Education before the student may enroll in Educational Psychology II.

C. Requirements for Admission to Teacher Education:

1. Over-all grade-point average of 2.2 in all resident work attempted at Kansas State University.
2. Grade-point average of 2.5 in all resident work attempted at Kansas State University in the major teaching field (as defined by the Certificate Handbook of the State of Kansas or in a specially designed block of courses in the major teaching field, e. g., Music).
3. 2.0 or better in English Composition I or II.
4. 2.0 or better in one of the following speech courses: 105, 106, 135, 200, 472 or 526.
5. Recommendation by both major and education advisers.
6. Recommendation by Student Health Center.
7. Clearance by the Dean of Students.

SECONDARY EDUCATION BLOCK:

The Secondary Education Block is used to denote that semester of the senior year in which student teaching will be done. During this semester the student is enrolled in Principles of Secondary Education, three (3) hours; Educational Sociology for Secondary Schools, three (3) hours; Methods of Teaching in the Secondary Schools, two or three (2 or 3) hours; and Teaching Participation in the Secondary School, six (6) hours.

ADMISSION TO STUDENT TEACHING

An application for student teaching on the secondary level is made through the education adviser. The form must be filed with the Coordinator of Student Teaching prior to March 1 of the year preceding student teaching. Prerequisites for secondary student teaching are:

1. Admission to Teacher Education.
2. Educ. 302 (Educational Psychology II).
3. Engl. 090 (English Proficiency).
4. Clearance by Student Health.
5. Clearance by Dean of Students.
6. Recommendations from the major adviser and education adviser.
7. A minimum grade-point average of 2.2 in all resident work completed.
8. A grade-point average of 2.5 in all resident work completed in the teaching field.
9. Completion of September Observation.
10. Completion of a minimum of 90 semester hours.

SECONDARY EDUCATION MAJOR FIELDS

ART EDUCATION: Art 100, 190, 195, 196, 200, 205, 210, 222, 224, 235,* 246,* 265,* 270, 290, 496, 600 or 230;* an additional six hours in an area indicated* and two-hour art elective.

BIOLOGICAL SCIENCE: Bact. 220; Bot. 210, 670, or 690; Chem. 110; Entom. 211; Geog. 100; Zool. 205, 425, 440; 12 hours in bacteriology, botany, entomology, and zoology.

BUSINESS EDUCATION: B. A. 105, 230, 231, 235, 236, 237, 238, 272, 301, 302, 305, 323, 326, 405, 440; Econ. 110, 120, 430; Math. 100; P. Sci. 220; Soc. 220.

CHEMISTRY: Bot. 210; Chem. 210, 230, 250, 300, 431, 432, 585; Geol. 100; Math. 100, 150, 220, 221, 222; Phys. 310, 311, 560; Zool. 205.

EARTH SCIENCE: Bot. 210; Chem. 210, 230, 250; Geog. 207; Geol. 100, 110, 420, 430, 460; Math. 100, 150; Phys. 131, 135, 211, 212; Zool. 205.

ECONOMICS: Econ. 110, 120, 430, 710; Math. 100; B. A. 273; P. Sci. 220; Soc. 211; Stat. 320; six hours of history; three hours of sociology; 12 hours of courses numbered 400 or above in economics, agricultural economics, business administration, of which at least six hours should be in economics. Particular courses are to be selected with the advice of the student's adviser.

ENGLISH: Three of the following four: Engl. 420, 425, 440, 445; Engl. 350 or 651; Engl. 406, 451, 475, 599; nine hours in advanced courses in English and American Literature.

GEOGRAPHY: Econ. 110; Geog. 105, 115, 207, 215, 685; Geol. 100, 110, 420; Phys. 135; P. Sci. 220; three hours of American history and 12 hours of geography.

HISTORY: Hist. 111, 112, six hours (100-399), P. Sci. 220 and three hours elective; economics, three hours; sociology, three hours; three hours elective each in economics, sociology, and geography; 15 hours in courses numbered 400 and above distributed in three of the four fields of a) Ancient, Medieval and Early Modern Europe, b) Modern Europe including Britain, c) Russia and Asia, d) the Americas including Latin America (including Senior Colloquium 795).

INDUSTRIAL ARTS: A minimum of 30 semester hours, including basic courses to consist of at least six semester hours in three areas to be chosen from drawing, woodworking, metal work or auto mechanics.

JOURNALISM: Engl. 270; Geog. 125; Hist. 258; Phil. 165; P. Sci. 220; Journ. 050, 105, 300, 306, 310, 316, 330, 345, 405; three hours in English, three hours in American history, nine hours in a modern language or three hours in English and six hours in social science; five hours in technical journalism.

MATHEMATICS: Math. 220, 221, 222, 240; Stat. 320 or 410; and 12 hours of mathematics numbered 400 or above, including Math. 512, and 475 if possible.

MODERN LANGUAGES: Thirty hours in one language and 18 hours in a second language or a second teaching field (24 hours).

PHYSICAL SCIENCE: Bot. 210; Chem. 210, 230, 250, 350, 351; Geol. 100, 430; Math. 220, 221; Phys. 310-311 or 211-212-407, also 560; Zool. 210.

PHYSICS: Bot. 210; Chem. 210, 230, 250; Geol. 100; Math. 220, 221, 222, 240; Phys. 310-311 or 211-212-407, also 410, 432, 472, 473, 500, 501, 560, 740; Zool. 210.

POLITICAL SCIENCE: Hist. 111, 112, 251, 252; P. Sci. 220 (freshman, sophomore), 444 (junior, senior); three hours each in economics and sociology, plus 21 hours in political science.

PSYCHOLOGY: Math. 100, Psych. 110, 420, 435, 440; nine hours psychology electives (excluding Educational Psychology I and Educational Psychology II); Stat. 320 or 410; completion of a second teaching field.

SOCIOLOGY: Soc. 211, 410, 620, 710; two of the following courses: Soc. 430, 440, 450, 460. Ten hours of elective in sociology are to be taken, all at or above the 500 course level. Also, three hours in college mathematics, logic or philosophy of science; three hours in economics; three hours in geography; three hours in political science; six hours in history.

SPEECH: Thirty hours of speech courses, including Spch. 135 or 210, 145, 360, 608 or 652.

COURSES IN EDUCATION

FOR UNDERGRADUATE CREDIT

- 405 202. 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.
- 405 300. Principles of Elementary Education.** (3) I, II, S. An over-all view of the elementary school: organization, management, purpose, curriculum trends, and pupil characteristics. Pr.: Junior standing.
- 405 302. 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.: Educ. 202, junior standing, and admission to Teacher Education.
- 405 414. Methods of Teaching Industrial Arts.** (3) I. Methods of teaching, lesson planning, organization of subject matter, and class projects; applies to general shop work, woodworking, sheet metal, arc and oxy-acetylene welding, machine shop practice, motor mechanics, and other industrial arts subjects. Pr.: Educ. 302 and admission to Student Teaching.
- 405 417. Teaching Participation in Elementary Music.** (3) I, II, S. Observation in teaching under the direction of selected teachers in elementary music school programs. Pr.: Music 412 and admission to Student Teaching.
- 405 418. Teaching Participation in Secondary Music.** (3) I, II, S. Observation in teaching under the direction of selected music teachers in junior and senior high schools. Pr.: Music 413 and admission to Student Teaching.
- 405 450. 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 Kansas legal status and practice. Pr.: Educ. 302.
- 405 451. Principles of Secondary Education.** (3) I, II (Secondary Education Block). For description see Educ. 450.

- 405 461. School Music I.** (3) I, II, S. (See Music 412.)
- 405 462. School Music II.** (3) I, II, S. (See Music 413.)
- 405 470. 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.
- 405 471. 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.
- 405 472. 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.
- 405 473. 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.
- 405 475. Teaching Participation in the Elementary School.** Credit arranged. I, II. Observation and teaching participation under the direction of selected elementary teachers. Pr.: Educ. 300, 470, 471, 472, 473, and admission to Student Teaching.
- 405 476. 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.
- 405 477. Teaching Participation in the Secondary School.** Credit arranged. I, II. Observation and teaching participation under direction of selected teachers in junior and senior high schools. Pr.: Admission to Student Teaching.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 405 601. Principles and Practices of Guidance.** (3) I, II, S. Need and nature of guidance; functions; personnel, their duties and relations; programs and evaluation of results. Pr.: Educ. 475 or 477, or consent of instructor.
- 405 602. 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.: Educ. 478 or 476, or 550 or conc. enrollment.
- 405 603. Junior High School.** (2 or 3) I, II, S. Origin, objectives, program, and administration of the junior high school, and relations with lower and higher education units. Pr.: Teaching experience.
- 405 604. 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 schools. Pr.: Educ. 450, senior standing, or consent of instructor.
- 405 605. Extension Organization and Policies.** (3) II. Development and objectives of extension work; organization and administration of extension service, with special emphasis on extension service in Kansas. Pr.: Senior standing, juniors by consent of instructor.
- 405 608. Special Education.** (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 in the study of administration of special services at the national, state, and local levels. Pr.: Educ. 202 and 300 or 450.

- 405 609. Psychology of Exceptional Children.** (3) (See Psych. 425.)
- 405 611. Occupational Information.** (2) I, S. A study of the competencies and skills and demands on persons in various occupations, with attention to the collection, evaluation, filing, and use of occupational information. Pr.: Senior standing and consent of instructor.
- 405 612. Use of Tests in Counseling.** (3) II, S. Training in the selection and administration of psychometric instruments and in their practical application in the counseling setting; the validation and interpretation of results obtained with them. Pr.: Psych. 110, Stat. 320, or conc. enrollment. Senior standing and consent of instructor.
- 405 613. Elementary Mathematics Curriculum.** (2) S. A study of the recent curricular developments in elementary school mathematics, research in the field and program evaluation are stressed. Limited to students in Institute in Mathematics for Elementary School Personnel. Pr.: Graduate standing and consent of instructor.
- 405 615. Reading Programs for Secondary Schools.** (3) On sufficient demand. A study of the organization and implementation of reading programs for secondary schools. Consideration will be given to materials, methods of instruction, and the reading skills needed for secondary school subjects. Pr.: Senior standing and consent of instructor.
- 405 616. 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.
- 405 620. The Junior College.** (3) I, II, S. The philosophy, organization, curriculum, and personnel of the junior college; the role of the junior college in the community and in higher education. Pr.: Educ. 302 and consent of instructor.
- 405 621. Elementary School Reading.** (3) I, II, S. Reading as a developmental process; problems in reading as problems in total pupil development; reading readiness and interest at succeeding levels of development; diagnosis and prevention of reading difficulties. Pr.: Educ. 471, teaching experience or consent of instructor.
- 405 622. Elementary School Reading.** (3) I, II. For the teaching block. See description of Educ. 621.
- 405 630. Band Administration and Percussion Techniques.** (3) II, S. (See Music 630.)
- 405 662. Instructional Television.** (3) On sufficient demand. The principles of instructional television; its development programming, techniques, and application. Pr.: Junior standing and consent of instructor. (See Spch. 662.)
- 405 680. Kindergarten Education.** (3) I, II, 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.: Educ. 202, 300 and junior standing.
- 405 752. Methods of Extension Teaching.** (3) II. Recommended methods of extension teaching; application to agriculture and home economics programs. Pr.: Senior standing, juniors by consent of instructor.
- 405 795. Problems in Education.** Credit arranged. I, II, S. Work is offered in agricultural education, educational administration, educational measurement, educational psychology, educational sociology, elementary education, extension education, guidance, home economics education, statistical methods, and teaching methods. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 405 800. Statistical Methods in Education.** (3) On sufficient demand. Nature of measurement in education, organization of data, computa-

- tion and interpretation of basic statistics, sampling methods and theory. Pr.: Nine hours of education, Stat. 320 or 620 and consent of instructor.
- 405 801. Educational Measurement and Evaluation.** (3) On sufficient demand. The role of measurement and evaluation in the educational process, the selection and use of standardized tests, and the development of classroom tests and other evaluative procedures. Parts of the course are differentiated to meet the particular needs of either elementary or secondary teachers. Pr.: Nine hours of education or consent of instructor.
- 405 802. 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.
- 405 803. Curriculum Development.** (3) I, II, S. An over-all 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.
- 405 804. 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.: Educ. 803 and teaching experience.
- 405 805. Extension Program Development.** (2-3) On sufficient demand. Nature and importance, basis, objectives and procedures of Extension Program Development. Pr.: One year of Extension experience; consent of instructor.
- 405 806. Philosophy of Education.** (3) I, II, S. Distinctive functions or purposes of education in a democracy. Philosophy of education is analyzed in terms of the what, the why, and the how of education. Pr.: Twelve hours of education and consent of instructor.
- 405 807. General School Administration.** (3) I, II, S. Basic philosophy and objectives of education and their application to national, state, and local organization, including problems of policy making and general administration. Intended primarily for school administrators. Pr.: At least one year of teaching experience.
- 405 808. School Business and Finance.** (3) I, II, 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.
- 405 809. Supervision and Improvement of Instruction.** (3) I, II, S. A course designed for administrators, supervisors, and classroom teachers who wish to help themselves and others isolate and analyze teaching problems. Pr.: At least one year of teaching experience.
- 405 810. Elementary School Administration.** (3) I, II, S. Aims and objectives of elementary education; organization and administration of the elementary school; pupil accounting duties and qualifications of staff; community relations and articulation with other schools. Pr.: Educ. 300 and teaching experience.
- 405 811. Curriculum Construction for Elementary Schools.** (2 to 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 and individual curriculum problems. Pr.: Educ. 803 and teaching experience.
- 405 812. The School Plant.** (3) I, II, S. Determination and provision of building and other plant needs by the local public school district, in-

cluding planning, financing, construction, and utilization. Pr.: At least one year of teaching experience.

- 405 813. School-Public Relations.** (2 or 3) I, II, S. Interrelationships that should exist between the school and the community and the role of the teacher and administrator in such relationships; agents, media, and administration needed to bring about school-community understanding and cooperation. Pr.: At least one year of teaching experience.
- 405 814. Secondary School Administration.** (3) I, II, S. Aims and functions of junior and senior high schools and junior colleges; problems in the progress of studies, extra-class activities, pupil accounting, community relations, and articulation with other schools. Pr.: At least one year of teaching experience.
- 405 815. Audio-Visual Programming.** (3) I, II, S. The qualifications and duties of program directors, review of related programs, analysis of needs for audio-visual materials, in-service education, and evaluation of program. Pr.: Educ. 602 or consent of instructor.
- 405 816. Adult Education.** (3) On sufficient demand. Objectives, program, facilities, procedures, and problems of adult education in a community, emphasizing the relation of school administrators and extension staff to this work. Pr.: Psych. 110 or one year of field experience; approval of the instructor.
- 405 817. Organization and Administration of the Guidance Services Program.** (2 or 3) I, 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.
- 405 818. 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.
- 405 820. Public School Law.** (1 or 3) On sufficient demand. 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.: Educ. 807 or consent of instructor.
- 405 821. Guidance in the Elementary School.** (3) On sufficient demand. 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.: Educ. 475, 601 and consent of instructor.
- 405 832. Counseling Theory.** (3) II, S. Theories, methods, and problems in counseling, relating the counseling process to dynamics of human behavior. Pr.: Educ. 612 or Psych. 420 or equiv. or conc. enrollment.
- 405 839. Guidance Services Practicum.** (2 or 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.: Educ. 832 and consent of instructor.
- 405 841. Principles of Student Personnel Administration.** (2) On sufficient demand. Principles, administrative organization, procedures, and problems of student personnel work in higher education; analysis of policy formation, staff relationships, finance and controls, and physical plant needs; an introduction to the personnel services: health, housing, food, union, placement, counseling, and activities program. Pr.: Graduate standing and consent of instructor.
- 405 842. 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.

405 843. Principles of College Teaching. (2) I. A consideration of the social, economic, and professional status of "academic man"; analysis of the major functions of the college teacher: instruction (course and curriculum development), policy making, counseling, and research and scholarship; the treatment of the administrative context of teaching: organization, finance and control of student personnel services, and the problems of admission. Pr.: Consent of instructor.

405 844. Problems of College Teaching. (2) II. Focus is upon the instructional function; the source, determination, and formulation of course objectives; the selection of learning experiences (organization of materials, choice of methods); and the principles of evaluation. The general principles involved in these aspects of the instructional process are adapted to the major field and teaching interest of the students enrolled in the class. Pr.: Consent of instructor.

405 849. Vocational Psychology. (3) On sufficient demand. Environment and human factors in occupational adjustment; appraisal of vocational fitness. Pr.: Consent of instructor.

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.

405 851. Agricultural Education.

405 852. Curriculum and Improvement of Instruction.

405 853. Educational Administration.

405 854. Elementary Education.

405 855. Guidance Services.

405 856. Secondary Education.

405 857. Social Foundations.

405 858. Special Education.

405 859. Adult Education.

405 999. Research in Education. Credit arranged. I, II, S. Work is offered in agricultural education, educational administration, educational measurement, educational psychology, educational sociology, elementary education, guidance, home economics education, teaching methods, and statistical methods. Pr.: Sufficient training to carry on the line of research undertaken.

COURSES IN AGRICULTURAL EDUCATION

FOR UNDERGRADUATE CREDIT

405 319. Agricultural Education Colloquium. Credit arranged. Discussion, assigned readings, and lectures over the selected trends, developments, and problems which are peculiar to the over-all 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.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

405 500. Methods of Teaching Agriculture. (3) I, II. Lesson plans; organization of materials and directions 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.: Educ. 302 and admission to Student Teaching.

FOR UNDERGRADUATE AND GRADUATE CREDIT

405 700. Seminar in Agricultural Education. Credit arranged. 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 need. Pr.: Consent of instructor.

- 405 701. Administration and Supervision of Vocational Education.** (2) On sufficient demand. Objectives, curriculum organization and content, administrative and supervisory problems from the viewpoint of the city superintendent; leadership needs which must be met in a school system that offers vocational education. Problem basis of treatment is used. Pr.: Educ. 450 and one year of teaching experience.
- 405 702. Vocational Education.** (3) I, II, S. Provision for vocational education in Kansas and other states and countries; principles underlying such education; relation of vocational education to the community, county, state, and nation. Pr.: Educ. 302.
- 405 703. Teaching Adult Classes in Agriculture.** (2 or 3) On sufficient demand. Organization and preparation of materials, and methods used in teaching adult classes in vocational education in agriculture for young farmers and adults. Departments are visited for evaluation of programs and results. Pr.: Educ. 702.
- 405 704. Technics in Agricultural Education.** (3) On sufficient demand. Teaching in the field of vocational education in agriculture; the agricultural curriculum; course of study; farming programs and supervision; laboratory and field instruction; sources, selection, preparation, and use of audio-visual instructional material. One hour rec. and six hours lab. a week. Pr.: Educ. 702.
- 405 705. Organization Problems in Teaching Farm Mechanics.** (2) 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.: Educ. 477.
- 405 706. Field Experience in Agricultural Education.** (1 or 2) 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.: Educ. 702 and consent of instructor.

FOR GRADUATE CREDIT

- 405 822. Young Farmer and Adult Farmer Education in Agriculture.** (2 or 3) I, II, S. Organization, objectives, and procedures for conducting Young Farmer and Adult Farmer classes. Designed for teachers in service. Pr.: Experience in teaching vocational agriculture.
- 405 823. 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.
- 405 824. 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.
- 405 825. Curriculum in Agriculture II.** (2 or 3) S. Cont. of Educ. 824. Pr.: Educ. 824 or consent of instructor.
- 405 836. 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.

COURSES IN HOME ECONOMICS EDUCATION

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 405 485. Practicum in Home Economics Extension.** (3) S. Two months experience. Application for admission: State leader, home economics, spring semester. Pr.: Junior standing and consent of instructor.

405 550. 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; Educ. 450 or conc. enrollment; taken semester prior to Educ. 477.

405 551. 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

405 750. Curriculum in Home Economics. (3) I, II, S. Philosophy and principles of home economics education; development of guides for teaching and evaluating reimbursable secondary programs. Pr.: Educ. 450.

405 751. Methods in Adult Homemaking Classes. (1 to 3) S. Principles of teaching applied to adult classes; a demonstration class in one or more phases of homemaking. Pr.: Educ. 550 or equiv.

FOR GRADUATE CREDIT

405 829. Supervision in Home Economics. (3 or 2) I, S. Philosophy and principles of effective supervision related to home economics programs, application of principles to problems met by supervisors. Pr.: Educ. 750 and teaching experience.

405 830. Trends in Home Economics Teaching. Credit arranged. I, II, S. Advanced study of evolving trends and materials for secondary programs; application to teaching and curriculum. Pr.: Educ. 750 and teaching experience.

405 837. Seminar in Home Economics Education. Credit arranged. II, S. Critical analysis of selected issues in home economics education. May be taken more than one semester with consent of advisory committee. Pr.: Teaching experience.

405 838. Research in Organization and Presentation of Home Economics. Credit arranged. I, II, S. Individual research problems in phases of organization and administration of home economics. May be chosen as the basis for thesis for the master's degree. The nature of the problem will depend upon the student's major interest.

405 840. Occupational Home Economics Education. (2 or 3) On sufficient demand. Development of curriculums and teaching materials pertinent to the programs for job training in home and community service occupation. Pr.: Teaching experience.

GRADUATE

Graduate study is offered in the College of Education in the fields of adult education, agricultural education, educational administration, guidance and counseling, home economics education, secondary education, elementary education, and curriculum and supervision.

Application for initial admission to Graduate Education shall be concurrent with application for admission to the Graduate School. Application procedures, periodic review of qualifications, and recommendations to the Dean of the College of Education will be made by the Graduate Selection and Admissions Committee of the College of Education.

The applicant shall have the undergraduate preparation necessary to satisfy the requirements of the graduate program he expects to pursue.

PROCEDURES FOR GRADUATE STUDENTS PREPARING TO WORK FOR AN ADVANCED DEGREE IN EDUCATION

Admission to the Graduate School is required of all students enrolling in graduate courses at Kansas State University. Further information concerning graduate work is found in the Graduate School section, page 35.

Procedures for Initial Admission to Graduate Education

Applicants shall make available the following documents required for initial admission:

1. Two (2) copies completed Graduate School Application form
2. Two (2) copies of official transcript(s)
3. Three (3) statements of qualifications for graduate study
4. Two (2) copies of statement of academic objectives

The qualifications of each College of Education graduate student will be reviewed at the end of the enrollment period in which at least the initial nine (9) hours of graduate work are completed at Kansas State University. The review is for the purpose of determining eligibility to continue in graduate education. All students applying for admission to Graduate Education must complete the initial application requirements at least thirty (30) days prior to the term they expect to next enroll.

Procedures for Retention in Graduate Education

Applicants shall make available the following documents:

1. Completed form of Request for Continuance in Graduate Education
2. Evidence of completion of Graduate English Proficiency Examination
3. Evidence of completion of aptitude test of Graduate Record Examination
4. Two (2) Graduate Rating Scales from Kansas State University professors, one of which must be a College of Education professor
5. Recommendation by major professor
6. Approved Program of Studies
7. Copies of official transcripts of graduate work completed at other institutions if work is to be applied toward completion of degree

Transfer graduate students must meet the same basic requirements outlined above.

All graduate students desiring admission to Graduate Education or requesting review of status must submit the required materials at least thirty (30) days preceding the term they expect to next enroll.

The College of Engineering

PAUL E. RUSSELL, *Dean*

KENNETH K. GOWDY, *Assistant 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 sound theoretical background to meet the new and demanding problems of our rapidly expanding technology. To assure the continued economic and technologic development of this nation, an increasing number of able high school students will wish to select careers in this challenging profession. In the College of Engineering at K. S. U. an outstanding faculty combines with excellent physical facilities to provide a stimulating environment in which to prepare for a professional career.

The College of Engineering offers the Bachelor of Science degree in each of the following curriculums:

Agricultural Engineering—curriculum on page 245

Chemical Engineering—curriculum on page 246

Civil Engineering—curriculum on page 247

Electrical Engineering—curriculum on page 248

Industrial Engineering—curriculum on page 249

Mechanical Engineering—curriculum on page 250

Nuclear Engineering—curriculum on page 251

A general description of each of these curriculums, including a list of the faculty and departmental course offerings, is presented on pages 254 through 285. Also included in this section is a summary of the graduate program of each department. The Master of Science degree is granted by the Applied Mechanics Department and in each of the above areas listed for the Bachelor of Science degree. To round out the graduate program in the College of Engineering, the Doctor of Philosophy degree is offered in five departments: Applied Mechanics, Chemical Engineering, Electrical Engineering, Mechanical Engineering, and Nuclear Engineering. Additional information on the graduate program is included in the section on the Graduate School, page 35.

HONORS PROGRAM

The Honors Program in the College of Engineering offers the academically gifted student an intellectual challenge consistent with his ability. Based upon his University entrance tests, a student from the top five per cent of the entering freshmen in engineering may be invited to participate in the program. Transfer students with superior academic records also are eligible. Final approval to participate is based upon an interview with the Chairman of the Engineering Honors Committee. Acceptance on the part of the student is optional.

Selection to the Honors Program will not shorten the time required for graduation for most students, but should prove to be a stimulating experience. In addition to enrolling in Honors Sections in much of his course work, the student may enroll in a variety of seminars, colloquia, and research problems designed to enrich and challenge the superior student. The Honors Program in Engineering is closely integrated with the Honors Programs of the other Colleges at K. S. U. and provides an excellent opportunity for interdisciplinary study.

SUMMER SCHOOL

Many of the courses appearing in the engineering curriculums, not only those which are offered in the College of Engineering but also 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 session 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.

Curriculum in Agricultural Engineering*B. S. in Agricultural Engineering***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER					
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>		
Engl.	229	100	English Composition	3	Engl.	229	120	English Composition II	3
Chem.	221	210	Chemistry I	5	Chem.	221	230	Chemistry II	3
Math.	245	220	Anal. Geom. & Calc. I .	4	M. E.	560	218	Graphical Comm. II ..	2
M. E.	560	213	Graphical Comm. I	3	Math.	245	221	Anal. Geom. & Calc. II	4
Ph. Ed.	261	011	Physical Education	0	C. E.	525	213	Plane Surveying	3
			Air or Mil. Sci. or El.	1	Spch.	281	105	Oral Communication I	2
G. E.	500	110	Engg. Lectures	0	Ph. Ed.	261	011	Physical Education	0
								Air or Mil. Sci. or El.	1
					G. E.	505	115	Engg. Assembly	0
Total	..... 16			Total	..... 18				

SOPHOMORE

Ag. E.	505	375	Anal. Geom. & Calc. III	4	Math.	245	240	Series & Diff. Equa. ..	4
Phys.	265	310	Engg. Physics I	5	Phys.	265	311	Engg. Physics II	5
Ag. E.	505	375	Agric. Hydrology	3	Ag. E.	505	310	Agric. Machinery	3
Bot.	217	210	General Botany	4	Ap. M.	510	305	Statics	3
			Air or Mil. Sci. or El.	1				Air or Mil. Sci. or El.	1
G. E.	505	115	Engg. Assembly	0	G. E.	505	115	Engg. Assembly	0
Total			17	Total				16	

JUNIOR

Ag. E.	505	440	Func. Req. Agr. Str.	3	Ag. E.	505	446	Tractors	3
Ap. M.	510	412	Dynamics	3	Ag. E.	505	500	Rural Electrification ..	3
E. E.	530	403	Elec. Cir. & Control	4	Ap. M.	510	415	Mech. of Materials	3
G. E.	500	350	Engg. Materials	2	Ap. M.	510	418	Mech. of Matls. Lab. ..	1
G. E.	500	351	Engg. Materials Lab. ..	1	Ap. M.	510	471	Fluid Mechanics	3
M. E.	560	412	Engg. Thermodynam. .	4				Hum. or Soc. Sci. El. ..	5
Engl.	229	090	English Proficiency	0	G. E.	505	115	Engg. Assembly	0
G. E.	505	115	Engg. Assembly	0					
Total			17	Total				18	

SENIOR

Ag. E.	505	435	Design of Farm Mach. .	3	Ag. E.	505	480	Soil & Water Cons.	3
Econ.	225	110	Economics I	3	Ag. E.	505	466	Anal. of Agric. Struc.	3
C. E.	525	422	Soil Mechanics I	3				Hum. or Soc. Sci. El. ..	10
Agron.	015	200	Plant Science	4				Technical Elective	2
			Technical Elective	3	G. E.	505	115	Engg. Assembly	0
G. E.	505	115	Engg. Assembly	0					
Total			16	Total				18	

Number of hours required for graduation, 136.

Electives must be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Chemical Engineering

B. S. in Chemical Engineering

FRESHMAN

FIRST SEMESTER					SECOND SEMESTER				
		<i>Course</i>	<i>Sem.</i>	<i>Hrs.</i>			<i>Course</i>	<i>Sem.</i>	<i>Hrs.</i>
Engl.	229	100	English Composition I	3	Engl.	229	120	English Composition II	3
Chem.	221	210	Chemistry I	5	Chem.	221	230	Chemistry II	3
Math.	245	220	Anal. Geom. & Calc. I .	4	Chem.	221	271	Ch. Equi. & Qual. Anal.	4
Econ.	225	110	Economics I	3	Math.	245	221	Anal. Geom. & Calc. II	4
Spch.	281	105	Oral Communication I	2	M. E.	560	213	Graphical Comm. I	3
			Air or Mil. Sci. or El.	1				Air or Mil. Sci. or El.	1
Ph. Ed.	261	011	Physical Education	0	Ph. Ed.	261	011	Physical Education	0
G. E.	500	110	Engg. Lectures	0	G. E.	520	115	Engg. Assembly	0
Total				18	Total				18

SOPHOMORE

Phys.	265	310	Engg. Physics I	5	Phys.	265	311	Engg. Physics II	5
Math.	245	222	Anal. Geom. & Calc. III	4	Math.	245	240	Series & Diff. Equa. ..	4
Chem.	221	431	Organic Chem. I	3	Ch. E.	520	211	Indus. Stoichiometry ..	4
Chem.	221	432	Organic Chem. I Lab. .	1	Chem.	221	450	Organic Chem. II	3
			Air or Mil. Sci. or El.	1	Chem.	221	451	Organic Chem. II Lab.	1
G. E.	500	350	Engg. Materials	2				Air or Mil. Sci. or El.	1
G. E.	500	351	Engg. Materials Lab. .	1	G. E.	520	115	Engg. Assembly	0
G. E.	520	115	Engg. Assembly	0	Total				18
Total				17	Total				18

JUNIOR

Ch. E.	520	420	Unit Operations I	3	Ch. E.	520	428	Unit Operations II	3
Ch. E.	520	492	Ch. E. Thermo. I	3	Ch. E.	520	422	Ch. E. Lab. I	2
Ap. M.	510	305	Statics	3	Ch. E.	520	496	Ch. E. Thermo. II	3
Chem.	221	585	Physical Chem. I	3	E. E.	530	423	Electron. & Control	3
Chem.	221	586	Physical Chem. I Lab. .	2	Chem.	221	595	Physical Chem. II	3
E. E.	530	419	Elec. Circuits & Mach.	4	Ap. M.	510	412	Dynamics	3
Engl.	229	090	English Proficiency	0	G. E.	520	115	Engg. Assembly	0
G. E.	520	115	Engg. Assembly	0	Total				17
Total				18	Total				17

SENIOR

Ch. E.	520	435	Unit Operations III	2	Ch. E.	520	442	Chem. Engg. Lab. III	2
Ch. E.	520	432	Chem. Engg. Lab. II ..	2	Ch. E.	520	509	Chem. Process Dynam.	3
Ch. E.	520	503	Chem. Reaction Engg. ..	3	Ch. E.	520	517	Chem. Engg. Design II	3
Ch. E.	520	510	Ch. Engg. Design I	3				Technical Elective	3
			Hum. or Soc. Sci. El. ..	8				Hum. or Soc. Sci. El. ..	7
G. E.	520	115	Engg. Assembly	0	G. E.	520	115	Engg. Assembly	0
Total				18	Total				18

Number of hours required for graduation, 142.

Electives must be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Civil Engineering*B. S. in Civil Engineering***FRESHMAN**

FIRST SEMESTER					SECOND SEMESTER				
			<i>Course</i>	<i>Sem. Hrs.</i>				<i>Course</i>	<i>Sem. Hrs.</i>
Math.	245	220	Anal. Geom. & Calc. I .	4	Math.	245	221	Anal. Geom. & Calc. II	4
Chem.	221	210	Chemistry I	5	Chem.	221	230	Chemistry II	3
Arch.	105	207	Arch. Graphics I	2	Engl.	229	120	English Composition II	3
Engl.	229	100	English Composition I	3	Phys.	265	310	Engg. Physics I	5
Spch.	281	105	Oral Communication I .	2				Air or Mil. Sci. or El.	1
			Air or Mil. Sci. or El.	1	Ph. Ed.	261	011	Physical Education	0
Ph. Ed.	261	011	Physical Education	0	G. E.	525	115	Engg. Assembly	0
G. E.	500	110	Engg. Lectures	0					
Total	.....			17	Total	.....			16

SOPHOMORE

Math.	245	222	Anal. Geom. & Calc. III	4	Math.	245	240	Series & Diff. Equa. ..	4
Phys.	265	311	Engg. Physics II	5	Ap. M.	510	412	Dynamics	3
Ap. M.	510	305	Statics	3	Ap. M.	510	415	Mech. of Materials	3
I. E.	550	372	Computers & Data Proc.	2	M. E.	560	400	Elem. of Thermo.	3
Chem.	221	250	Chemistry II Lab.	2	C. E.	525	213	Plane Surveying	3
			Air or Mil. Sci. or El.	1				Air or Mil. Sci. or El.	1
G. E.	525	115	Engg. Assembly	0	G. E.	525	115	Engg. Assembly	0
Total			17	Total				17	

JUNIOR

C. E.	525	331	Anal. Stat. Det. Str. .	3	C. E.	525	332	Anal. Stat. Indet. Str.	3
Ap. M.	510	471	Fluid Mechanics	3	C. E.	525	422	Soil Mechanics I	3
G. E.	500	350	Engg. Materials	2	Geol.	234	100	General Geology	3
G. E.	500	351	Engg. Materials Lab. .	1	C. E.	525	356	Hydrology	2
C. E.	525	214	Route Surveying	3	Econ.	225	110	Economics I	3
E. E.	530	403	Elec. Cir. & Control	4				Hum. or Soc. Sci. El. ..	3
Ap. M.	510	418	Mech. of Materials Lab.	1	G. E.	525	115	Engg. Assembly	0
Engl.	229	090	English Proficiency	0					
G. E.	525	115	Engg. Assembly	0					
Total			17	Total				17	

SENIOR

C. E.	525	443	Struc. Engg. in Metals	3	C. E.	525	444	Struc. Engg. in Conc. .	3
C. E.	525	452	Hydraulic Engg.	3	C. E.	525	465	Sanitary Engg. Design	3
C. E.	525	463	Sanit. Engg. Fund'tls	3	C. E.	525	411	Photogrammetry	3
C. E.	525	426	Foundations	3	C. E.	525	471	Transportation Engg. ..	3
			Hum. or Soc. Sci. El. ..	5				Hum. or Soc. Sci. El. ..	6
G. E.	525	115	Engg. Assembly	0	G. E.	525	115	Engg. Assembly	0
Total			17	Total				18	

Number of hours required for graduation, 136.

Electives must be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Electrical Engineering
B. S. in Electrical Engineering

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	229 100	English Composition I	3	Engl.	229 120	English Composition II	3
Chem.	221 210	Chemistry I	5	Chem.	221 230	Chemistry II	3
Math.	245 220	Anal. Geom. & Calc. I	4	Math.	245 221	Anal. Geom. & Calc. II	4
Econ.	225 110	Economics I	3	Spch.	281 105	Oral Communication I	2
		Air or Mil. Sci. or El.	1			Hum. or Soc. Sci. El.	3
Ph. Ed.	261 011	Physical Education	0			Air or Mil. Sci. or El.	1
G. E.	500 110	Engg. Lectures	0	Ph. Ed.	261 011	Physical Education	0
				G. E.	530 115	Engg. Assembly	0
Total			16	Total			16

SOPHOMORE

Phys.	265 310	Engg. Physics I	5	Phys.	265 311	Engg. Physics II	5
Math.	245 222	Anal. Geom. & Calc. III	4	Math.	245 240	Series & Diff. Equa.	4
I. E.	550 372	Computers & Data Proc.	2	E. E.	530 391	Circuit Theory I	3
G. E.	500 350	Engg. Materials	2	Ap. M.	510 305	Statics	3
		Hum. or Soc. Sci. El.	3	M. E.	560 211	Engg. Graphics I	2
		Air or Mil. Sci. or El.	1			Air or Mil. Sci. or El.	1
G. E.	530 115	Engg. Assembly	0	G. E.	530 115	Engg. Assembly	0
Total			17	Total			18

JUNIOR

E. E.	530 404	Circuit Theory II	4	E. E.	530 405	Circuit Theory III	3
E. E.	530 410	Elec. Engg. Materials	3	E. E.	530 416	Electronics II	3
E. E.	530 415	Electronics I	3	E. E.	530 501	Energy Conversion I	3
E. E.	530 431	Elec. Engg. Lab. I	2	E. E.	530 432	Elec. Engg. Lab. II	2
Ap. M.	510 412	Dynamics	3	M. E.	560 412	Engg. Thermodynamics	4
		Hum. or Soc. Sci. El.	3			Hum. or Soc. Sci. El.	3
Engl.	229 090	English Proficiency	0	G. E.	530 115	Engg. Assembly	0
G. E.	530 115	Engg. Assembly	0				
Total			18	Total			18

SENIOR

E. E.	530 597	Fields & Waves I	3	E. E.	530 520	Control Systems	3
E. E.	530 417	Electronics III	3	E. E.	530 530	Elec. Engg. Seminar	1
E. E.	530 502	Energy Conversion II	3	E. E.	530 434	Elec. Engg. Lab. IV	2
E. E.	530 433	Elec. Engg. Lab. III	2			Technical Elective	6
Phys.	265 560	Atomic Physics or				Soc. Sci. or Hum. El.	3
N. E.	580 410	Intro. to Nuclear Engg.	3	M. E.	560 531	Mech. Engg. Lab. E	1
Ap. M.	510 415	Mech. of Materials	3	G. E.	530 115	Engg. Assembly	0
G. E.	530 115	Engg. Assembly	0				
Total			17	Total			16

Number of hours required for graduation, 136.

Electives must be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Industrial Engineering

B. S. in Industrial Engineering

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	229 100	English Composition I	3	Spch.	281 105	Oral Communication I	2
Math.	245 220	Anal. Geom. & Calc. I	4	Engl.	229 120	English Composition II	3
Chem.	221 210	Chemistry I	5	Math.	245 221	Anal. Geom. & Calc. II	4
Econ.	225 110	Economics I	3	Chem.	221 230	Chemistry II	3
		Air or Mil. Sci. or El.	1	M. E.	560 213	Graphical Comm. I	3
Ph. Ed.	261 011	Physical Education	0			Air or Mil. Sci. or El.	1
G. E.	500 110	Engg. Lectures	0	Ph. Ed.	261 011	Physical Education I	0
				G. E.	550 115	Engg. Assembly	0
Total			16	Total			16

SOPHOMORE

Phys.	265 310	Engg. Physics I	5	Phys.	265 311	Engg. Physics II	5
Math.	245 222	Anal. Geom. & Calc. III	4	Math.	245 240	Series & Diff. Equa.	4
B. A.	305 273	Prin. of Accounting	3	Stat.	285 411	Intro. Prob. Stat. II	3
I. E.	550 221	Indus. Production	2	I. E.	550 401	Indus. Management I	3
Stat.	285 410	Intro. Prob. Stat. I	3	I. E.	550 372	Comput. & Data Proc.	2
		Air or Mil. Sci. or El.	1			Air or Mil. Sci. or El.	1
G. E.	550 115	Engg. Assembly	0	G. E.	550 115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

I. E.	550 451	Work Measurement	3	Ap. M.	510 415	Mech. of Materials	3
I. E.	550 471	Indus. Econ. Studies	3	I. E.	550 571	Oper. Res. in Engg.	3
G. E.	500 350	Engg. Materials	2	M. E.	560 400	Elem. of Thermodynam.	3
G. E.	500 351	Engg. Materials Lab.	1	E. E.	530 419	Elec. Circuits & Mach.	4
Ap. M.	510 305	Statics	3	I. E.	550 441	Engg. Relia. & Qual.	
		Hum. or Soc. Sci. El.	6			Assur. I	3
Engl.	229 090	English Proficiency	0	G. E.	550 115	Engg. Assembly	0
G. E.	550 115	Engg. Assembly	0	I. E.	550 481	Indus. Plant Studies	0
Total			18	Total			16

SENIOR

I. E.	550 552	Job Eval., Wage Incen.	2	Ap. M.	510 471	Fluid Mechanics	3
I. E.	550 511	Produc. & Inven. Cont.	2	I. E.	550 581	Ind. Fac. Layout, Des.	3
I. E.	550 502	Indus. Management II	2	I. E.	550 522	Tool Engineering	3
I. E.	550 521	Metal Mach. & Forming	2			Technical Elective	2
E. E.	530 423	Electronics & Control	3			Hum. or Soc. Sci. El.	6
E. E.	530 424	Electronics & Con. Lab.	1	G. E.	550 115	Engg. Assembly	0
Ap. M.	510 412	Dynamics	3				
		Soc. Sci. or Hum. El.	3				
G. E.	550 115	Engg. Assembly	0				
Total			18	Total			17

Number of hours required for graduation, 137.

Electives must be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Mechanical Engineering
B. S. in Mechanical Engineering

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	229 100	English Composition I	3	Engl.	229 120	English Composition II	3
Chem.	221 210	Chemistry I	5	Chem.	221 230	Chemistry II	3
M. E.	560 213	Graphical Comm. I	3	M. E.	560 218	Graphical Comm. II	2
Math.	245 220	Anal. Geom. & Calc. I	4	Math.	245 221	Anal. Geom. & Calc. II	4
		Air or Mil. Sci. or El.	1			Hum. or Soc. Sci. El.	3
Ph. Ed.	261 011	Physical Education	0			Air or Mil. Sci. or El.	1
G. E.	500 110	Engg. Lectures	0	Ph. Ed.	261 011	Physical Education	0
				G. E.	560 115	Engg. Assembly	0
Total			16	Total			16

SOPHOMORE

Phys.	265 310	Engg. Physics I	5	Phys.	265 311	Engg. Physics II	5
Math.	245 222	Anal. Geom. & Calc. III	4	Math.	245 240	Series & Diff. Equa.	4
Econ.	225 110	Economics I	3	Ap. M.	510 305	Statics	3
Spch.	281 105	Oral Communication I	2	G. E.	500 350	Engg. Materials	2
I. E.	550 221	Indus. Production	2			Hum. or Soc. Sci. El.	3
		Air or Mil. Sci. or El.	1			Air or Mil. Sci. or El.	1
G. E.	560 115	Engg. Assembly	0	G. E.	560 115	Engg. Assembly	0
Total			17	Total			18

JUNIOR

M. E.	560 412	Engg. Thermodynamics	4	M. E.	560 512	Thermo. of Ener. Conv.	4
E. E.	530 419	Elec. Circuits & Mach.	4	E. E.	530 423	Electronics & Control	3
G. E.	500 351	Engg. Materials Lab.	1	E. E.	530 424	Electronics & Con. Lab.	1
Ap. M.	510 412	Dynamics	3	M. E.	560 560	Engg. Economics	3
Ap. M.	510 415	Mech. of Materials	3	Ap. M.	510 471	Fluid Mechanics	3
		Hum. or Soc. Sci. El.	3			Soc. Sci. or Hum. El.	3
Engl.	229 090	English Proficiency	0	G. E.	560 115	Engg. Assembly	0
G. E.	560 115	Engg. Assembly	0				
Total			18	Total			17

SENIOR

M. E.	560 451	Machine Design I	5	M. E.	560 551	Machine Design II	3
M. E.	560 521	Heat Transfer	3	M. E.	560 583	Mech. Engg. Lab. II	2
		Technical Elective	6	M. E.	560 656	Mach. Vibration I or	
M. E.	560 535	Mech. Engg. Lab. I	3	M. E.	560 524	Environm'l Engg. I	3
G. E.	560 115	Engg. Assembly	0	Phys.	265 560	Atomic Physics or	
				N. E.	580 410	Intro. to Nuclear Engg.	3
						Hum. or Soc. Sci. El.	3
						Technical Elective	3
				G. E.	560 115	Engg. Assembly	0
Total			17	Total			17

Number of hours required for graduation, 136.

Electives must be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Nuclear Engineering

B. S. in Nuclear Engineering

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	229 100	English Composition I	3	Engl.	229 120	English Composition II	3
		Hum. or Soc. Sci. El. ..	3	Chem.	221 230	Chemistry II	3
Chem.	221 210	Chemistry I	5	Chem.	221 250	Chemistry II Lab.	2
Math.	245 220	Anal. Geom. & Calc. I .	4	Math.	245 221	Anal. Geom. & Calc. II	4
Ph. Ed.	261 011	Physical Education	0	Phys.	265 310	Engg. Physics I	5
Spch.	281 105	Oral Communication I .	2			Air or Mil. Sci. or El.	1
		Air or Mil. Sci. or El.	1	Ph. Ed.	261 011	Physical Education	0
G. E.	500 110	Engg. Lectures	0	G. E.	580 115	Engg. Assembly	0
Total			18	Total			18

SOPHOMORE

Phys.	265 311	Engg. Physics II	5	Math.	245 240	Series & Diff. Equa.	4
Math.	245 222	Anal. Geom. & Calc. III	4	Ch. E.	520 211	Indus. Stoichiometry ..	4
G. E.	500 350	Engg. Materials Rec. ..	2	N. E.	580 450	Elements of Nuc. Engg.	3
G. E.	500 351	Engg. Materials Lab. ..	1	Phys.	265 560	Atomic Physics	3
Ap. M.	510 305	Statics	3	M. E.	560 213	Graphical Comm. I	3
		Air or Mil. Sci. or El.	1			Air or Mil. Sci. or El.	1
G. E.	580 115	Engg. Assembly	0	G. E.	580 115	Engg. Assembly	0
Total			16	Total			18

SUMMER

Econ.	225 110	Economics I	3	Ap. M.	510 412	Dynamics	3
Ap. M.	510 415	Mech. of Materials	3	Total			9

JUNIOR

N. E.	580 611	Radioiso. Appli. Engg.	3	N. E.	580 500	Applied N. E. Anal.	3
Chem.	221 585	Phys. Chem. I Rec.	3	Chem.	221 595	Phys. Chem. II Rec.	3
E. E.	530 419	Elec. Cir. & Mach. Rec.	4	E. E.	530 423	Electronics & Control .	3
		Hum. or Soc. Sci. El. ..	3	E. E.	530 424	Electron. & Con. Lab.	1
		Option	3 or 4			Option	8 or 7
Engl.	229 090	English Proficiency	0	G. E.	580 115	Engg. Assembly	0
G. E.	580 115	Engg. Assembly	0				
Total			16 or 17	Total			18 or 17

SENIOR

N. E.	580 670	Nuclear Reactor Tech. I	3	N. E.	580 691	Nucl. Reactor Tech. II	3
		Option	5 or 6	N. E.	580 695	Nucl. Reac. Tech. Lab.	2
		Technical Elective	3	N. E.	580 606	Nucl. Engg. Materials	3
		Hum. or Soc. Sci. El. ..	6	Phys.	265 675	Nuclear Physics or	
G. E.	580 115	Engg. Assembly	0	Phys.	265 640	Intro. Quan. Mech.	3
						Option	7 or 6
				G. E.	580 115	Engg. Assembly	0
Total			17 or 18	Total			18 or 17

Number of hours required for graduation, 148.

Option I**JUNIOR**

Ch. E.	520 420	Unit Operations I	3	Ch. E.	520 428	Unit Operations II Rec.	3
				Ch. E.	520 492	Ch. E. Thermodynam. I	3
				Ch. E.	520 422	Chem. Engg. Lab. I	2
Total	.....		3	Total	.....		8

SENIOR

Ch. E.	520 435	Unit Operations III	2	N. E.	580 708	Fuel Processing Lab. ..	1
Ch. E.	520 496	Ch. E. Thermo. II	3			Technical Elective	3
						Soc. Sci. or Hum. El.	3
Total	.....		5	Total	.....		7

Option II**JUNIOR**

M. E.	560 412	Engg. Thermodynam. ..	4	M. E.	560 512	Thermodynam. of Energy Conver.	4
				Ap. M.	510 471	Fluid Mechanics	3
Total	.....		4	Total	.....		7

SENIOR

		Soc. Sci. or Hum. El. ..	3	M. E.	560 535	Mech. Engg. Lab. I	3
M. E.	560 521	Heat Transfer	3			Technical Elective	3
Total	.....		6	Total	.....		6

Electives must be chosen with the advice and approval of the head of the department and the dean.

Dual Degree in Engineering and Business Administration

A student enrolled in engineering may secure two degrees, B. S. in his engineering field and B. S. in Business Administration by completing the courses listed in his particular engineering curriculum and the courses listed below.* Ordinarily, the program must be commenced during a student's junior year.

		<i>Course</i>	<i>Credit Hours</i>			<i>Course</i>	<i>Credit Hours</i>
B. A.	305 272	Introd. Accounting	5	B. A.	305 400	Administration	3
B. A.	305 305	Managerial Accounting	3	B. A.	305 431	Personnel Admin.	3
Econ.	225 110	Economics I	3	B. A.	305 440	Marketing	3
Econ.	225 120	Economics II	3	B. A.	305 405	Business Finance	3
B. A.	305 325	Business Law I	3	B. A.	305 602	Business and Society	3
B. A.	305 326	Business Law II	3	B. A.	305 600	Business Policy	3

Business Electives, 6 hours. Included must be at least one of the following four courses offered by the Department of Economics:

Econ.	225 430	Money and Banking	(3)
Econ.	225 686	Business Fluctuations and Forecasting	(2)
Econ.	225 710	Intermediate Economic Analysis	(3)
Econ.	225 720	Income and Employment Theory	(3)

* Any courses shown above, which also appear in the approved list of Social Science electives, may be used to fulfill elective requirements in the Curriculum in Engineering. A minimum of 30 additional semester hours of credit is required for the second bachelor's degree.

Approved Social Science and Humanities Electives for Students Enrolled in the College of Engineering

Social Science Electives

Department of Economics	Any course above Economics I
Department of Geology and Geography	Any course in Geography
Department of History and Philosophy	Any course in History
Department of Political Science	Any course
Department of Psychology	Any course, excepting courses in Applied Psychology
Department of Sociology and Anthropology	Any course 200 level or above
College of Commerce	Course No. 400—Administration Course No. 440—Marketing

Humanities Electives

Department of Art	Any course
Department of English	Any course, excepting courses in composition
Department of History and Philosophy	Any course
Department of Modern Languages	Six hours of one language
Department of Music	Any course in Theory of Music
Department of Speech	Any course in Theater and Interpretation
College of Architecture and Design	Any course in history or appreciation of architecture

AGRICULTURAL ENGINEERINGGEORGE H. LARSON,* *Head of Department*

Professors Fairbanks, Hodges* and Larson;* Associate Professors Lipper* and Stevenson;* Assistant Professors Funk, Jacobs* and Manges; Instructors Mensch and TenEyck; Emeritus: Professor Fenton*

For Curriculum, See Page 245

Agricultural engineering is the application of the art and science of engineering principles to the agricultural industry. Agricultural engineering includes farm power and machinery, soil and water conservation, irrigation and drainage, farm structures, rural electrification, and processing of agricultural products.

Students completing this curriculum are prepared to do design, research, testing, sales promotion, teaching, and extension work in the various phases of engineering as applied to agriculture. Federal and state agencies, colleges and universities, machinery manufacturers, rural electric power suppliers, and the many enterprises involving agriculture desire and need the services of the agricultural engineer.

The curriculum includes all basic courses such as mathematics, physics, chemistry, and mechanics common to engineering curriculums, as well as engineering courses in each of the areas in the field of agricultural engineering.

Graduate Work:

Major work leading to the degree Master of Science in agricultural engineering is offered in the fields of farm power and machinery, farm structures, soil and water conservation, rural electrification and processing.

Prerequisite to major work in these fields requires the completion of an undergraduate curriculum in agricultural engineering substantially equivalent to that required of undergraduate students at this University.

Work leading to the degree Master of Science is also offered in the field of agricultural mechanization to those students who have completed a bachelor's degree in agriculture with the equivalent of a major in agricultural mechanization.

FOR UNDERGRADUATE CREDIT

505 310. Agricultural Machinery. (3) II. Selection, adjustment, operation, servicing, economics, and application of agricultural machines. Two hours rec. and three hours lab. a week. Pr.: Phys. 310 or equiv.

505 375. Agricultural Hydrology. (3) I. The hydrologic cycle, rainfall, runoff, soil and water relationships affecting crop production, drainage, irrigation, and erosion; watershed surveys. Two hours rec. and three hours lab. a week. Pr.: C. E. 213; Pr. or conc.: Phys. 310 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

505 435. Design of Farm Machinery. (3) I. Functional requirements and principles of operation of farm machinery; analysis of the problems involved in the design and construction of farm machines. Two hours rec. and three hours lab. a week. Pr.: Phys. 311; Pr. or conc.: Ap. M. 415, Ag. E. 310.

505 440. Functional Requirements of Agricultural Structures. (3) I. Requirements for storage of agricultural products and for livestock production systems; selection and use of materials; control of environment; layout of production systems. Two hours rec. and three hours lab. a week. Pr.: Phys. 311, M. E. 213.

505 446. Tractors. (3) II. Theory, design, operation, and adjustment of the internal combustion engine and a comprehensive study of power and its relation to agriculture. Two hours rec. and three hours lab. a week. Pr.: Phys. 311, M. E. 412.

505 466. 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.: Ap. M. 415, Ag. E. 440.

505 480. Soil and Water Conservation. (3) II. Principles and methods of land drainage, soil and water conservation, and irrigation. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 471, Ag. E. 375, C. E. 422.

505 500. Rural Electrification. (3) II. Water supply, sewage disposal, lighting, heating, and ventilation of farm buildings; refrigeration; rural electrification. Two hours rec. and three hours lab. a week. Pr.: E. E. 403, Ap. M. 471, M. E. 412.

505 550. Agricultural Systems Engineering. (2) I, II. Development of plans and specifications for buildings, equipment and controls for selected systems of agricultural production. Six hours lab. a week. Pr.: Ag. E. 435, 466, 500.

FOR UNDERGRADUATE AND GRADUATE CREDIT

505 605. 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.: C. E. 422, Ap. M. 471, Ag. E. 375.

505 620. Problems in Agricultural Engineering. Credit arranged. 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.

505 700. Agricultural Process Engineering. (3) I, II. Theory, equipment, and techniques in processing farm products; application of mechanics, thermodynamics, fluid flow, and heat transfer to problems in size reduction, drying, refrigeration, conveying, and grading products. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 471, M. E. 412.

505 710. Advanced Farm Power and Machinery. (3) I, II. Analytical study of design, construction and operating characteristics of tractors and selected farm machines; application of testing instruments and experimental apparatus. Two hours rec. and three hours lab. a week. Pr.: Ag. E. 435, 446.

FOR GRADUATE CREDIT

505 810. Research in Agricultural Engineering. Credit arranged. 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 and/or furnish material for the master's thesis. Pr.: Approval of department head.

COURSES FOR STUDENTS IN AGRICULTURE

FOR UNDERGRADUATE CREDIT

505 210. Farm Mechanics. (2) I. Shop techniques, including pipe fitting, plumbing repairs, taps and dies, drilling, soldering, use of hand tools, and sharpening; special lathe work and welding, with direct application to the repair of farm machinery. Six hours lab. a week.

505 215. Farm Machinery Repair. (3) II. Construction, repair, operation, and adjustment, calibration, and maintenance of farm machinery and equipment. One hour rec. and six hours lab. a week. Pr.: Ag. E. 210.

505 220. Farm Power. (3) II. Selection, operation and maintenance of engines, tractors, and electric motors; principles of valve timing, ignition, carburetion, cooling, lubrication, and fuels, with special emphasis on repair and reconditioning. One hour rec. and six hours lab. a week.

505 300. 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, 150; Phys. 211.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 505 405. Farm Mechanics Methods.** (3) I, II. Methods of teaching farm mechanics in vocational agriculture, including the organization and equipment of the farm shop; preparation and use of job sheets and instruction sheets; practice in the demonstration of shop techniques and in the construction of farm mechanics projects. One hour rec. and six hours lab. a week. Pr.: Ag. E. 210, 220.
- 505 410. Farm Building Construction.** (3) I. Planning and construction of buildings and equipment for the farm; concrete and masonry, farm carpentry, painting, new building materials; blueprint reading, bills of materials, and cost estimates. One hour rec. and six hours lab. a week. Pr.: Ag. E. 210.
- 505 415. Agricultural Engineering Applications.** (2) I, II. Practical laboratory exercises, surveying, terracing, contouring, drainage, irrigation, fencing, electric wiring, farm water supply, sewage disposal, heating, lighting, refrigeration, etc. Six hours lab. a week. Pr.: Junior standing.
- 505 455. Dairy Mechanics.** (3) I, II. 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 505 600. Advanced Farm Mechanics.** (3) S. For teachers of vocational agriculture and those concerned with teaching farm mechanics in high schools; advanced shop techniques, with special emphasis on welding, machine tool, mechanical drawing, sheet metal work, and farm carpentry. One hour rec. and six hours lab. a week. Pr.: Ag. E. 210, 405 or equiv., plus one year's teaching experience or approval of instructor.
- 505 603. Advanced Farm Power.** (3) S. For teachers of vocational agriculture concerned with teaching farm mechanics in high schools; techniques on problems concerning power units and tractor operation, service, repair and maintenance. Teaching aids and programs will be developed. One hour rec. and six hours lab. a week. Pr.: Ag. E. 220 or equiv.
- 505 607. Electricity in Agriculture.** (3) I, II. The application of electricity to improve farm living and income; problems relating to the production, processing, and storage of agricultural products; motors and controls, heating and lighting, farmstead wiring, water systems, refrigeration and air conditioning. Two hours rec. and three hours lab. a week. Pr.: Ag. E. 300 or 415.
- 505 609. 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. 270, Ag. E. 300 or 415.
- 505 610. Drainage and Erosion Control.** (3) II. Principles and practices of land improvement by drainage and various methods of erosion control. Two hours rec. and three hours lab. a week. Pr.: Agron. 270, Ag. E. 300 or 415.
- 505 615. Problems in Agricultural Mechanization.** Credit arranged. I, II, S. Problems in the application of technical principles to agricultural mechanization, land development and farmstead mechanization. Pr.: Approval of instructor.

APPLIED MECHANICS

PHILIP G. KIRMSEY,* *Head of Department*

Professors Best, Haft,* Kirmsey,* McCormick* and Taylor;* Associate Professors Lindly* and Singleton;* Assistant Professors Crary, Huang,* Kipp* and Knostman; Emeritus: Dean Seaton and Associate Professor Munger*

The Department of Applied Mechanics functions as a service department at the undergraduate level and does not administer a curriculum

leading to a bachelor's degree. The undergraduate courses offered are concerned with fundamental subject matter of an interdisciplinary nature. Some of these courses are common to all undergraduate curriculums.

Graduate Work:

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered in this department.

The completion of an undergraduate curriculum in engineering substantially equivalent to one of those offered at this University is prerequisite to advanced study. Students, at the doctorate level particularly, are expected to develop strength in the physical sciences and to this end are expected to augment their major studies by course work in mathematics, theoretical physics, and sometimes chemistry.

The facilities for advanced study are excellent in both theoretical and experimental fields. These include large-scale digital and analog computers for theoretical studies and data analysis, modern equipment for vibration and experimental stress analysis, and a well-equipped laboratory for materials testing.

510 205. Applied Mechanics A. (3) I, II, S. 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. 211, Math. 220.

510 220. Strength of Materials A. (3) I, II, S. Behavior of materials subjected to tension, compression, shear, and bending; design of beams and columns. Three hours rec. a week. Pr.: Ap. M. 205.

510 224. 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.: Ap. M. 220.

510 305. 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; centers of gravity; moments of inertia. Three hours rec. a week. Pr.: Phys. 310; Pr. or conc.: Math. 222.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

510 412. 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.: Ap. M. 305, Math. 222.

510 415. 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.: Ap. M. 305, Math. 222.

510 418. 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.: Ap. M. 415.

510 421. Highway and Airport Materials and Design. (2) I, II. Pavement thickness design and the examination and testing of materials used in the construction of highways and airports. One hour rec. and three hours lab. a week. Pr. or conc.: Ap. M. 418, or G. E. 351 and C. E. 422.

- 510 471. 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.: Ap. M. 412, M. E. 400 or 411.
- 510 491. Airplane Stress Analysis.** (3) I. Analysis of stress and stability problems in the structural elements of airplanes. Three hours rec. a week. Pr.: Math. 240 or equiv., Ap. M. 415.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 510 601. Advanced Mechanics of Materials.** (3) I, II. 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.: Ap. M. 415, Math. 240 or equiv.
- 510 603. Bituminous Materials and Mixes.** (3) II. Manufacture of bituminous materials; significance of specifications and tests; selection of bituminous materials for various types of construction; aggregate for bituminous surfaces; design and control of bituminous mixes for highway and airport pavements. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 421.
- 510 604. Cement and Concrete Technology.** (3) I. The raw materials and manufacturing processes of portland cement; cementing components; physical and chemical aspects of the hydration reaction; properties of cement paste; concrete aggregates; principles of design, mixing, and placing concrete; properties of hardened concrete. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 418, 421.
- 510 610. Experimental Stress Analysis.** (3) I. Experimental methods of investigating stress distribution. 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.: Ap. M. 601 or approval of instructor.
- 510 615. Intermediate Dynamics.** (3) II. General vector principles of the dynamics of particles and rigid bodies; applications to orbital calculations, gyroynamics and rocket performance; introduction to the energy methods of advanced dynamics. Three hours rec. a week. Pr.: Ap. M. 412, Math. 240 or equiv.
- 510 618. 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.: Ap. M. 412, Math. 240 or equiv.
- 510 620. 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.: Ap. M. 471, Math. 240 or equiv.
- 510 625. Plastics and Plastic Laminates.** (3) II. Formation and structure of polymers; isomerism; relations between structure and engineering properties; modification of structure and properties by external causes; integral reinforcing and plastic concretions; applications. Three hours rec. a week. Pr.: Ap. M. 415; G. E. 350, 351; Ch. E. 492 or M. E. 411.
- 510 701. 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.: Ap. M. 415.
- 510 710. Elastic Stability.** (3) I. 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.: Ap. M. 415, Math. 240 or equiv.

- 510 716. 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, difference, differential, and integral equations. Concepts of characteristic, impedance, transfer and influence functions. Three hours rec. a week. Pr.: Math. 621 or equiv.
- 510 721. Applied Nonlinear Analysis.** (3) II. Study of mechanical or electrical systems governed by nonlinear equations, elliptic integrals, geometry of integral curves, the phase plane, Lienard's graphical construction, Poincare's classification of singular points, stability and instability. Three hours rec. a week. Pr.: Math. 240 or equiv.

FOR GRADUATE CREDIT

- 510 806. Topics in Theoretical and Applied Mechanics.** Credit arranged. I, II, S. Advanced study of special problems in the fields of mechanics. Each spring semester a course based on a previously announced, different, modern, technically advanced book concerning topics applicable to engineering problems will be offered under this course number. Pr.: Approval of instructor.
- 510 810. Research in Applied Mechanics.** Credit arranged. I, II, S. Experimental and/or analytical investigations in the fields of materials of construction, mechanics of materials, fluid mechanics, soil mechanics, dynamics, and vibrations. The results of such investigations may furnish material for graduate theses or reports. Pr.: Approval of instructor.
- 510 821. Theory of Elasticity I.** (3) II. Equations of elasticity in two and three dimensions; two-dimensional problems in rectangular and in polar coordinates; torsion of shafts of non-circular section. Three hours rec. a week. Pr.: Ap. M. 601, Math. 621 or equiv.
- 510 825. Theory of Elasticity II.** (3) I. Three-dimensional problems; thermoelasticity; energy principles and variational methods; numerical methods. Three hours rec. a week. Pr.: Ap. M. 821.
- 510 830. Thermoelasticity.** (3) I. Theory and analysis of thermal stresses in elastic and inelastic systems. Pr.: Ap. M. 821 or consent of instructor.
- 510 842. Theory of Plates and Shells.** (3) II. 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. Introduction to analysis of bending of shells. Three hours rec. a week. Pr.: Ap. M. 601, Math. 621 or equiv.
- 510 850. Vibration of Elastic Bodies.** (3) I. 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. 555; Pr. or conc.: Ap. M. 821.
- 510 862. Plasticity.** (3) I in odd years. 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.: Ap. M. 601, Math. 621 or equiv.
- 510 870. 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. 621 or equiv.
- 510 880. Advanced Fluid Mechanics.** (3) II. Potential flow in three dimensions, vortex motion, the equations of viscous flow, hydrodynamic stability, turbulence. Three hours rec. a week. Pr.: Ap. M. 618 or 620, Math. 551.

CHEMICAL ENGINEERINGWILLIAM H. HONSTEAD,* *Head of Department**Professors Bates,* Fan,* Honstead* and Kyle;* Assistant Professors Akins,* Erickson, Hall* and Mathews;* Instructor Jerome*

For Curriculum, See Page 246

The chemical engineer has the responsibility for the development of new processes and plants for the chemical and allied industries. This involves a knowledge of chemistry, physics, mathematics, and chemical engineering science. The chemical engineer must know how chemical reactors are designed, how automatic controls are used to operate his processes, how materials can be separated and purified by distillation, extraction, or other diffusional operations. He must know how to use computers, how to make material and energy balances, how to make valid engineering judgments based on economic considerations, and how to move liquids, gases and solids from one place to another.

The Chemical Engineering Curriculum is designed to give students the necessary breadth of knowledge, and the necessary scientific tools, to perform these functions. The first two years are devoted to basic chemistry, physics and mathematics, and the essential communication skills. The last two years are spent in learning the applications of these sciences through the study of transport processes, separation techniques, thermodynamics, kinetics, process dynamics and design. Technical and non-technical electives are provided to allow the individual to broaden his education in such directions as he desires. The Chemical Engineering Curriculum is best suited to the highly motivated, intelligent student with strong interests in chemistry, physics, and mathematics. Our graduates are well trained for responsible positions in industry or for continuing their education through M. S. or Ph. D. degrees.

Graduate Work:

The Master of Science and Doctor of Philosophy degrees are offered. Research in transport phenomena, 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 University's Computing Center is used extensively by our graduate students.

FOR UNDERGRADUATE CREDIT

520 211. Industrial Stoichiometry. (4) I, II. Calculation of material and energy balances in industrial processes. Four hours rec. a week. Pr.: Chem. 230, Phys. 310; Pr. or conc.: Math. 240.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

520 420. Unit Operations I. (3) I, II. Class and problem work on fluid flow, heat transfer, and mass transfer. Three hours rec. a week. Pr.: Ch. E. 211, Math. 240.

520 422. 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. Six hours lab. a week. Pr.: Ch. E. 420.

520 428. Unit Operations II. (3) I, II. Cont. of Unit Operations I. Three hours rec. a week. Pr.: Ch. E. 420.

520 432. Chemical Engineering Laboratory II. (2) I, II. Cont. of Chemical Engineering Laboratory I. Six hours lab. a week. Pr.: Ch. E. 422, 428.

- 520 435. Unit Operations III.** (2) I, II. Cont. of Unit Operations II. Two hours rec. a week. Pr.: Ch. E. 428; Pr. or conc.: Ch. E. 496.
- 520 442. Chemical Engineering Laboratory III.** (2) I, II. Cont. of Chemical Engineering Laboratory II. Six hours lab. a week. Pr.: Ch. E. 432.
- 520 480. Problems in Chemical Engineering.** Credit arranged. I, II, S. An introduction to chemical engineering research. Pr.: Approval of department head.
- 520 492. Chemical Engineering Thermodynamics I.** (3) I, II. Development and application of the first and second laws of thermodynamics as applied to chemical engineering problems. Three hours rec. a week. Pr.: Ch. E. 211, Math. 222.
- 520 496. Chemical Engineering Thermodynamics II.** (3) I, II. Application of the three laws of thermodynamics to physical and chemical equilibrium in ideal and non-ideal systems. Three hours rec. a week. Pr.: Ch. E. 492.
- 520 503. Chemical Reaction Engineering.** (3) I. The application of chemical kinetics and transport phenomena to the design of chemical reactors. Three hours rec. a week. Pr.: Math. 240, Ch. E. 496.
- 520 509. Chemical Process Dynamics.** (3) II. The dynamic analysis of processes and equipment in the chemical process industry. Three hours rec. a week. Pr.: Ch. E. 428, 503; Math. 240 or equiv.
- 520 510. Chemical Engineering Design I.** (3) 1. Interrelationships and economics of the chemical industry; cost accounting and economic balances in chemical development and plant location. Three hours rec. a week. Pr.: Ch. E. 428.
- 520 517. Chemical Engineering Design II.** (3) II. Problems in designing processes, equipment and plants for chemical and allied industries. Three hours rec. a week. Pr.: Ch. E. 435, 496, 510.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 520 610. Petroleum Refining Engineering I.** (3) I. Properties of hydrocarbon mixtures; separation by distillation and extraction; cracking, polymerization, hydrogenation, and alkylation. Three hours rec. a week. Pr.: Ch. E. 428, senior standing.
- 520 615. Petroleum Refining Engineering II.** (3) II. Methods for the design and analysis of equipment and processes for the production and utilization of petroleum hydrocarbons. Three hours rec. a week. Pr.: Ch. E. 610.
- 520 635. Chemical Engineering Analysis I.** (3) I, II, S. The mathematical formulation of problems in chemical engineering using differential equations, partial differential equations, vector and tensor notation. Solution of these problems by graphical, numerical, and transform methods. Three hours rec. a week. Pr.: Math. 240; Ch. E. 435, 509, 510.

FOR GRADUATE CREDIT

- 520 810. Research in Chemical Engineering.** Credit arranged. 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.
- 520 815. 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.
- 520 822. 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. 503.
- 520 826. Advanced Unit Operations I.** (3) I, II, S. Advanced study of mass transfer operations. Three hours rec. a week. Pr.: Ch. E. 435.

- 520 832. Advanced Unit Operations II.** (3) I, II, S. Advanced study of the operations involving mechanical separation of materials. Three hours rec. a week. Pr.: Ch. E. 435.
- 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.
- 520 855. 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. 635.
- 520 861. 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. 635.
- 520 866. 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. 861.
- 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. 517, 635.
- 520 875. Graduate Seminar in Chemical Engineering.** (1) I, II. Discussion of current advances and research in chemical engineering and related fields.
- 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.
- 520 910. 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. 866.
- 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.
- 520 920. 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 832 and one course in chemical engineering numbered 851 or higher.
- 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 and to include stochastic as well as deterministic problems. Three hours rec. a week. Pr.: Ch. E. 871.
- 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.

CIVIL ENGINEERINGJACK B. BLACKBURN,* *Head of Department*

Professors Blackburn, Morse and Smith; Associate Professors Rosebraugh, Snell and Williams; Assistant Professors Aguilar, Cooper, Dague, Funk and Haynie; Emeritus: Professors Crawford and Frazier*

For Curriculum, See Page 247

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 participating in, and ultimately assuming responsibility for, the planning, analysis, location and design of the above-named types of civil engineering works.

Graduate Work:

The Master of Science degree is conferred on those who complete the degree requirements in Structural Analysis and Design; Soil Mechanics and Foundations; Hydraulic Engineering, Sanitary Engineering, Highway and Traffic Engineering; Transportation Planning; and Surveying and Mapping.

Laboratory facilities for advanced study and research are available in the areas of Structures, Soil Mechanics, Hydraulics, Sanitary Engineering, Transportation, Photogrammetry, Photo Interpretation, Surveying and Mapping.

FOR UNDERGRADUATE CREDIT

- 525 213. Plane Surveying.** (3) I, II. Elements of plane surveying: Taping, transit, level, stadia, plane table, topographic surveying, public land surveys and elementary astronomical surveying. One hour rec. and six hours lab. a week. Pr.: Math. 150 or equiv.
- 525 214. Route Surveying.** (3) I, II. Curves and earthwork; surveying pertaining to alignment of highways and railways. Two hours rec. and three hours lab. a week. Pr.: C. E. 213.
- 525 331. Analysis of Statically Determinate Structures.** (3) I, II. Stresses and deflections in statically determinate beams, trusses, and framed structures. Three hours rec. a week. Pr.: Ap. M. 415.
- 525 332. Analysis of Statically Indeterminate Structures.** (3) I, II, S. Theory of statically indeterminate structures under static loads. Three hours rec. a week. Pr.: C. E. 331.
- 525 356. Hydrology.** (2) I, II. A study of the sources of supply and movement of underground and surface waters. Two hours rec. a week. Pr.: Ap. M. 471.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 525 411. 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. 213; Pr. or conc.: C. E. 214.
- 525 422. Soil Mechanics I.** (3) I, II. Identification, classification, and engineering properties of soils; compaction, theories of consolidation, slope stability, and ground water flow. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 415, G. E. 350, 351.
- 525 426. Foundations.** (3) I, II. Subsoil investigation, lateral earth pressure and bearing capacity, shallow foundations, piles and pile foundations, and retaining structures. Two hours rec. and three hours lab. a week. Pr.: C. E. 422.

- 525 443. Structural Engineering in Metals.** (3) I, II, S. Theoretical, experimental and practical bases for proportioning metal members and their connections; design of steel structures. Two hours rec. and three hours lab. a week. Pr.: C. E. 332.
- 525 444. 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.: C. E. 332.
- 525 452. Hydraulic Engineering.** (3) I, II. Application of the principles of fluid mechanics to control and utilization of water; river and flood control, dams, power development, pipe networks; laboratory—fluid measuring devices, hydraulic models, and flow in open channels. Two hours rec. and three hours lab. a week. Pr.: C. E. 356.
- 525 463. 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. 250 or equiv.
- 525 465. 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. 356, 452, 463.
- 525 471. 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. 422; Pr. or conc.: C. E. 411.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 525 612. Land Surveying.** (3) I. The Law of Evidence applied to land surveying; systems of describing and of transferring real property, rectangular public land system, simultaneous and sequence conveyances, reversion and riparian rights, and deed descriptions. Two hours rec. and three hours lab. a week. Pr.: C. E. 213 and senior standing.
- 525 614. Advanced Plane Surveying.** (3) I. State coordinate system, control surveys, modern optical tachimetry, resection, trigonometric leveling, and hydrographic surveys. Two hours lec. and three hours lab. a week. Pr.: C. E. 213 and senior standing.
- 525 618. Engineering Photo Interpretation.** (3) I. Photo interpretation techniques, types of aerial photographic film and their uses; applications 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.
- 525 622. Soil Mechanics II.** (3) I. Review of identification, classification, and engineering properties of soil; advanced study of theories of consolidation, lateral earth pressure, bearing capacity, stability of slopes, and ground water flow. Two hours rec. and three hours lab. a week. Pr.: C. E. 422.
- 525 626. Advanced Foundation Engineering.** (3) II. Methods of subsoil investigations; design of sheeting and bracing systems, shallow foundations, piles and pile foundations, bridge abutments, and coffer dams; underpinning, external equilibrium of retaining walls, and control of ground water. Three hours rec. a week. Pr.: C. E. 622.
- 525 632. Advanced Structural Analysis I.** (3) I, II. Application of matrix methods of analysis to complex structures; selected topics in structural analysis. Three hours rec. a week. Pr.: C. E. 332.
- 525 633. Experimental Structural Analysis.** (3) II. Application of Muller-Breslau's Principle and Betti's Law to structural models; principles of similitude. One hour rec. and six hours lab. a week. Pr.: C. E. 332.

- 525 643. Advanced Reinforced Concrete Theory.** (3) I. Advanced theories and methods of design and analysis of reinforced concrete structures. Three hours rec. a week. Pr.: C. E. 444.
- 525 670. Geometric Design of Highways.** (3) II. Criteria controlling geometric design of highways, vehicle requirements, speed volume, capacity safe grades, alignment, and cross-section; intersections and interchanges. Two hours rec. and three hours lab. a week. Pr.: C. E. 471.
- 525 675. 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. 471.
- 525 711. Advanced Photogrammetry.** (3) II. Photogrammetric optics and camera calibrations; distortions, basic analytic photogrammetry, and advanced instrumentation; analytical orientation techniques for vertical and convergent photography over flat and mountainous terrain; aerial triangulation. Two hours rec. and three hours lab. a week. Pr.: C. E. 411, 614.
- 525 712. Aerial Surveying Planning and Estimating.** (2) S. Techniques, specifications, ground control and photographic mission planning, restitution and map production, cost estimating and scheduling; cadastral applications. One hour rec. and three hours lab. a week. Pr.: C. E. 711.
- 525 751. Hydraulics of Open Channels I.** (3) I. Description and classification of open channel flow; properties of open channels, types of open channels, velocity distribution, and pressure distribution; energy and momentum principles; critical and uniform flow and gradually varying flow; design of channels for uniform flow. Three hours rec. a week. Pr.: C. E. 452.
- 525 761. Sanitary Engineering Design.** (4) II. On demand. Development of criteria for sizing individual elements of water supply and sewerage systems; economic comparison of alternative designs. Two hours rec. and six hours lab. a week. Pr.: C. E. 465.
- 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. 471 or consent of instructor.
- 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. 422.
- 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. 471 or consent of instructor.
- 525 780. 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. Three hours rec. a week. Pr.: Senior standing in engineering or graduate standing for non-engineering majors.
- 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. For graduate students in regional planning other than civil engineers.
- 525 790. Problems in Civil Engineering.** Credit arranged. I, II, S. Pr.: Approval of instructor.

FOR GRADUATE CREDIT

- 525 810. Research in Civil Engineering.** Credit arranged. I, II, S. Original investigation or advanced study in some field related to the practice of civil engineering. Pr.: Approval of department head.
- 525 813. Geodetic Surveying.** (3) II. Elements of geometrical geodesy and the universal rectangular coordinate system; geodetic triangulation and position computation, vertical datum and geodetic leveling, and elementary geodetic astronomy. Two hours rec. and three hours lab. a week. Pr.: C. E. 614.
- 525 817. Electronic Surveying.** (2) S. Electronic surveying systems, data reduction, geodetic applications, planning and estimating. One hour rec. and three hours lab. a week. Pr.: C. E. 614.
- 525 818. Adjustment of Surveys.** (3) II. Accidental error theory, error forecasting, adjustment of independent direct observations, principle of least squares, adjustment of unobserved independent parameters, solution of normal equations, matrices in surveying data adjustment. Two hours rec. and three hours lab. a week. Pr. or conc.: C. E. 813 or consent of instructor.
- 525 824. Soil Mechanics Applied to Highway Engineering.** (3) I. On demand. Application of soil mechanics to highway design; subgrade sampling; stability of natural and cut slopes; stability and settlement of embankments and of embankment foundations. Three hours rec. a week. Pr.: C. E. 622.
- 525 825. Advanced Soil Testing for Engineering Purposes.** (3) II. On demand. Subsurface exploration; unconfined, triaxial, and direct shear tests; permeability, consolidation, and field load bearing tests. One hour rec. and six hours lab. a week. Pr.: C. E. 622.
- 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.
- 525 832. Advanced Structural Analysis II.** (3) II. Influence lines for statically indeterminate structural systems such as continuous beams, trusses, arches, and continuous arches; introduction to the analysis of shell structures. Three hours rec. a week. Pr.: C. E. 632.
- 525 834. Numerical Solution of Advanced Structural Systems.** (3) II. Numerical methods of calculating deflections, moments, and eigenvalues; analysis of advanced structural systems by finite difference techniques. Three hours rec. a week. Pr.: C. E. 632, Math. 551 or 761.
- 525 835. Structural Dynamics.** (3) II. Analysis of structures subjected to dynamic loading. Three hours rec. a week. Pr.: C. E. 632, 834.
- 525 843. Prestressed Concrete Design.** (3) II. The study of prestressing methods and their application to the design of concrete structures. Three hours rec. a week. Pr.: C. E. 444.
- 525 844. Plastic Design of Steel Structures.** (3) I. Fundamental principles of plastic design, plastic hinges, methods of analysis of structures for ultimate load; plastic design for axial and shearing forces; stability problems in plastic design; design of the more common continuous structures. Three hours rec. a week. Pr.: C. E. 443.
- 525 845. Analysis and Design of Folded Plate Structures.** (3) I. 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. 632, Ap. M. 601.
- 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. 632; minimum of nine hours graduate credit in structures and approval of instructor.
- 525 849. Design of Shell Structures.** (3) I. The design of reinforced concrete shells of single and double curvature. Three hours rec. a week. Pr.: C. E. 832.

- 525 851. Hydraulics of Open Channels II.** (3) II. Rapidly varied flow; flow over spillways, hydraulic jump, flow in channels with non-linear alignment and of non-prismatic cross section; gradually and rapidly varying unsteady flow; flood routing. Three hours rec. a week. Pr.: C. E. 751.
- 525 854. Analysis of Ground Water Flow.** (3) I. Hydraulics of steady state and transient flow into wells; well discharge and drawdown; artesian, free aquifer; pumping head; combinations of wells; method of images; parallel drains; seepage flow through and under earth dams. Three hours rec. a week. Pr.: C. E. 422, 452; Math. 550 or equiv.
- 525 855. Analysis and Design of Large Dams.** (3) II. Site selection and preliminary investigations; types of large dams and their uses; stability and stress analyses of gravity, arch, and buttress dams; problems related to earth dams. Three hours rec. a week. Pr.: C. E. 632, Ap. M. 601.
- 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.
- 525 872. Highway Planning and Economics.** (3) II. Methods of determining highway travel patterns, highway classification, and highway needs; estimating future highway needs; economic analysis of planned improvements; highway finance and administration. Two hours rec. and three hours lab. a week. Pr.: C. E. 775.
- 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.

ELECTRICAL ENGINEERING

WELLINGTON W. KOEPSSEL,* *Head of Department*

Professors Hunt, Koepsel,* Sitz* and Ward;* Associate Professor Wirtz;* Assistant Professors Cottom,* Harris,* Johnson,* Lenhert,* Malik* and Young;* Instructors Dollar, Gray, Hegler, Toliver and Wakabayashi; Emeritus: Professors Jorgenson, Kerchner and Kloeffer*

For Curriculum, See Page 248

The program of study in electrical engineering is designed to prepare a student for the profession of electrical engineering with career opportunities in research, development, design, operation, technical sales, teaching, consulting, and management. Emphasis is placed on a fundamental understanding of the science and the art of electrical engineering. The first two years of the curriculum are oriented toward mathematics and the physical sciences, while the third year emphasizes principles of analysis and a development of depth of understanding in electrical engineering. The final year broadens the student's understanding of engineering and introduces him to various aspects of design.

Electives in the final year permit an individual to specialize in a particular area for work in such fields as communication systems, solid-state electronics, control systems, radar, power systems, energy conversion, computer systems, microwaves and many others.

Graduate Work:

The Department of Electrical Engineering offers programs of study leading to the Master of Science and Doctor of Philosophy degrees. Areas available for graduate study and research are circuit theory, electromagnetic field theory, communication theory, systems and computer technology. Laboratory facilities and equipment, as well as space, are provided for conducting original research in any of these areas.

Analog computing facilities are also available in the department while digital computing facilities are provided at the Computing Center.

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.

FOR UNDERGRADUATE CREDIT

530 391. Circuit Theory I. (3) I, II, S. An introduction to linear circuit theory; analysis of resistive circuits; natural, step, and impulse response of circuits containing resistive, inductive, and capacitive elements. Pr.: Math. 222; Pr. or conc.: Phys. 311.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

530 400. Electrical Engineering C. (2) I, II. The fundamental principles of direct-current and alternating-current circuits and machinery; for non-electrical students. Two hours rec. a week. Pr.: Phys. 311.

530 402. Electrical Engineering C Laboratory. (1) I, II. Experiments covering characteristics and applications of direct-current and alternating-current machinery. Three hours lab. a week. Pr. or conc.: E. E. 400.

530 403. 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. 311.

530 404. Circuit Theory II. (4) I, II, S. Steady-state and transient analysis of electric circuits using the Laplace transform algorithm and the $j\omega$ formalism. Three hours rec. a week and a three-hour calculating period a week. Pr.: Math. 240, E. E. 391.

530 405. Circuit Theory III. (3) I, II, S. Two-terminal network theory, four-terminal network theory, transmission lines, and filters. Three hours rec. a week. Pr.: E. E. 404.

530 406. Illumination A. (2) I, II. Systems, calculations, and specifications of interior wiring; principles of illumination. Two hours rec. a week. Pr.: Phys. 211 or 311.

530 410. Electrical Engineering Materials. (3) I, II, S. Properties of materials as electrical conductors in electric fields, and in magnetic fields. Three hours rec. a week. Pr.: Phys. 311; G. E. 350; Math. 240; Pr. or conc.: E. E. 391.

530 415. Electronics I. (3) I, II, S. Fundamentals of electronic devices. Three hours rec. a week. Pr. or conc.: E. E. 404, 410.

530 416. Electronics II. (3) I, II, S. Analysis and design of electronic circuits. Three hours rec. a week. Pr.: E. E. 415; Pr. or conc.: E. E. 405.

530 417. Electronics III. (3) I, II. Cont. of Electronics II. Three hours rec. a week. Pr.: E. E. 416.

530 419. Electric Circuits and Machines. (4) I, II, S. Theory of magnetic circuits, direct-current circuits and machines, and alternating-current circuits and machines. Four hours rec. a week. Pr.: Phys. 311; Pr. or conc.: Math. 222 or 232.

530 420. Electric Circuits and Machines Laboratory. (1) I, II, S. Experiments on subject matter in E. E. 419. Three hours lab. a week. Pr. or conc.: E. E. 419.

530 423. Electronics and Control. (3) I, II. Theory and application of electronic rectifiers, amplifiers, oscillators, and control circuits. Three hours rec. a week. Pr.: E. E. 419.

530 424. Electronics and Control Laboratory. (1) I, II. Experiments on the subjects in E. E. 423. Three hours lab. a week. Pr. or conc.: E. E. 423.

530 431. 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.: E. E. 391; Pr. or conc.: E. E. 404, 410, 415.

- 530 432. Electrical Engineering Laboratory II.** (2) I, II, S. Cont. of Electrical Engineering Laboratory I. Three hours lab. a week. Pr.: E. E. 431; Pr. or conc.: E. E. 405, 416, 501.
- 530 433. Electrical Engineering Laboratory III.** (2) I, II. Cont. of Electrical Engineering Laboratory II. Three hours lab. a week. Pr.: E. E. 432; Pr. or conc.: E. E. 417, 502, 597.
- 530 434. Electrical Engineering Laboratory IV.** (2) I, II, S. Cont. of Electrical Engineering Laboratory III. Three hours lab. a week. Pr.: E. E. 433; Pr. or conc.: E. E. 520.
- 530 501. Energy Conversion I.** (3) I, II, S. 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. 404, 410.
- 530 502. Energy Conversion II.** (3) I, II, S. Cont. of Energy Conversion I. Three hours rec. a week. Pr.: E. E. 501.
- 530 520. Control Systems.** (3) I, II. An introduction to the analysis and design of feedback control systems. Three hours rec. a week. Pr.: E. E. 501; Pr. or conc.: E. E. 417.
- 530 530. 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.
- 530 597. Fields and Waves I.** (3) I, II. Vector analysis, electrostatics, magnetostatics, Maxwell's equations, and applications. Three hours rec. a week. Pr.: E. E. 404, 410.
- FOR UNDERGRADUATE AND GRADUATE CREDIT
- 530 607. Fields and Waves II.** (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. 405, 597.
- 530 610. Problems in Electrical Engineering.** Credit arranged. I, II, S.
- 530 620. Analog Computation.** (3) II. Use of analog computers; solution of linear and non-linear algebraic and differential equations—scaling problems into machine units. Two hours rec. and three hours lab. a week. Pr.: Math. 240 or equiv., Phys. 212 or 311, E. E. 416 or consent of instructor.
- 530 630. Transistor Circuitry.** (3) II. A study of transistor circuits. Three hours rec. a week. Pr.: E. E. 417.
- 530 640. Design of Switching Circuits.** (3) I. Boolean algebra applied to design of switching networks, digital calculating circuits, codes, and translating circuits; sequential relay circuits. Three hours rec. a week. Pr.: E. E. 416.
- 530 645. Introduction to Communication Theory.** (3) I, II. An introduction to information, modulation, transmission, demodulation, noise, and communication systems. Three hours rec. a week. Pr.: E. E. 417.
- 530 650. Operational Circuit Analysis.** (3) I. Unit function, transforms, and other methods of Heaviside and Bromwich applied to electric circuits. Three hours rec. a week. Pr.: E. E. 404.
- 530 665. Pulse Techniques.** (3) II. A study of basic pulse circuits and their applications leading to an understanding of radar display circuits, computer components, and pulse modulation methods. Three hours rec. a week. Pr.: E. E. 417.
- 530 680. Power System Stability.** (3) II. The stability problem, physical and analytical concepts, characteristics of power system apparatus from the standpoint of stability, and calculation of steady-state and transient stability. Three hours rec. a week. Pr.: E. E. 502.
- 530 751. Digital Techniques I.** (3) II. Combinational and sequential circuits, counters, adders, accumulators, memory devices, digital differential analyzers, and programming of computers. Three hours rec. a week. Pr.: E. E. 416.

FOR GRADUATE CREDIT

- 530 801. Digital Techniques II.** (3) I. The organization and assembly of computer units into a general purpose computer. Three hours rec. a week. Pr.: E. E. 751.
- 530 805. Advanced Feedback Control Systems.** (3) II. Design by pole-zero methods, sensitivity factors, analysis of control systems with delays, samplers, and essential non-linearities, and approximation of linear and non-linear systems on a digital computer. Three hours rec. a week. Pr.: E. E. 520.
- 530 806. 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. 520.
- 530 808. 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 principle and Bellman's functional analysis. Three hours rec. a week. Pr.: E. E. 805.
- 530 810. Research in Electrical Engineering.** Credit arranged. I, II, S. Special investigation adapted to the needs of individual students. The laboratory work is correlated with the work of the Engineering Experiment Station and may be used as the basis for a master's thesis. Pr.: E. E. 417.
- 530 815. Information Theory.** (3) II. The discrete noiseless channel, the discrete noisy channel, continuous signals theory, and modulation theory from the standpoint of information theory. Three hours rec. a week. Pr.: E. E. 645.
- 530 821. Noise Theory.** (3) I. A 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.: E. E. 645.
- 530 831. 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. 821.
- 530 836. Network Synthesis I.** (3) I. Methods of synthesizing networks to yield specified characteristics. Three hours rec. a week. Pr.: E. E. 405 or consent of instructor.
- 530 837. Network Synthesis II.** (3) II. Synthesis of driving point impedances, transfer functions, transfer impedances, and the synthesis of distributed parameter systems. Three hours rec. a week. Pr.: E. E. 836.
- 530 855. Advanced Electromagnetic Theory I.** (3) I. Mathematical development of electromagnetic wave theory. Three hours rec. a week. Pr.: E. E. 607.
- 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.
- 530 857. Microwave Theory.** (3) On sufficient demand. Wave equation and its solution for rectangular and cylindrical wave guides, wave guide discontinuities and equivalent impedance representation, periodic structures, surface wave guides, microwave resonators, millimeter waves. Three hours rec. a week. Pr.: E. E. 855.
- 530 858. Antenna Theory.** (3) On sufficient demand. Principles of radiation, directivity, and other characteristics of antenna systems; linear, short-wave beam end fire, omnidirectional, wide-band, slot, horn, and parabolic antennas; reflectors and lenses. Three hours rec. a week. Pr.: E. E. 855.
- 530 859. 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.: E. E. 855.

530 860. Matrix Methods Applied to Electrical Engineering. (3) I. Application of matrices to lumped and distributed parameter networks, carrier-frequency servomechanisms, and radar mapping. Three hours rec. a week. Pr.: E. E. 405.

530 865. Advanced Information Theory Seminar. (3) II. Discussion and study of the most recent developments in the field of communication, encompassing noise, modulation, smoothing filters and adaptive systems, and other allied topics. Three hours rec. a week. Pr.: E. E. 815, 821.

530 880. Advanced Electrical Theory. Credit arranged. I, II. Pr.: E. E. 417.

GENERAL ENGINEERING

PAUL E. RUSSELL, *Dean*

500 110. 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.

500 115. 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 lecture a week, sophomore, junior, and senior years. Members of the engineering faculty.

500 200. Kansas State Engineer Journalism. (1) I, II. Editorial and business staff work on the Kansas State Engineer. Pr.: Junior classification and consent of dean.

500 350. 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; effect of radiation on materials. Two hours rec. a week. Pr.: Chem. 230; Pr. or conc.: Phys. 310.

500 351. Engineering Materials Laboratory. (1) I, II. Laboratory experiments supplementing G. E. 350. Pr. or conc.: G. E. 350.

500 399. Honors Seminar in Engineering. (1) I, II. Selected topics of general interest. Open to sophomores in the Engineering Honors Program for two semesters.

500 499. Honors Colloquium in Engineering. (1) I, II. Selected topics of general interest. Open to juniors in the Engineering Honors Program for two semesters.

500 599. 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.

INDUSTRIAL ENGINEERING

GEORGE F. SCHRADER,* *Head of Department*

Professors Hostetter, Schrader* and Smaltz,* Associate Professors Clifton* and Konz,* Assistant Professors Byers, Dietrich, Grosh, Hansen, Hwang, Roth, Smethers, Tillman and Woodard; Instructors Dickey and Nelson; Emeritus: Professors Carlson and Darby*

For Curriculum, See Page 249

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. 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, operations research, and many other areas. In addition, their unique background makes them unusually well fitted for positions in manufacturing management.

The remarkable strides made by the industrial engineering profession during the past several years are reflected in the courses and curriculum. The use of newly developed techniques and fresh interpretations of more traditional approaches to industry's problems helps to keep the offerings current.

Graduate Work:

The Department of Industrial Engineering offers advanced work leading to the degree of Master of Science. Special emphasis is placed on the modern, quantitative approach to industrial engineering problems, as well as on the more traditional areas of specialization. Course work and opportunities for research are offered in operations research and analysis, engineering reliability and quality assurance, production and methods engineering, metallurgy and engineering materials, industrial economics and economic design, computer programming and industrial systems analysis, metal forming and machining, and human factors engineering.

Prerequisite to graduate work in these fields is the completion of an undergraduate curriculum in engineering or science encompassing the major areas of study provided in the undergraduate curriculum in industrial engineering offered at this institution.

Several very strong minor fields are available in the University, including other departments in the College of Engineering, the Human Engineering group in the Department of Psychology, the Business Management group in the College of Commerce, the Labor Economics group in the Department of Economics and Sociology, and the Department of Statistics.

The facilities for advanced work and research in the Department of Industrial Engineering include extensive libraries, excellent laboratory facilities, and complete shops for the construction and calibration of research apparatus and instrumentation. Modern research equipment and instrumentation in the form of analog computers, strain and temperature measuring devices, decade counters, cameras and projectors, card-punch and tape-punch program preparation devices, tape-read devices, and audio-visual, preprogrammed learning devices are available within the department. Majors in the department will have access to digital computers in both College of Engineering and University computing centers. Industrial cooperation is excellent, and makes a valuable contribution to the research effort in the field.

FOR UNDERGRADUATE CREDIT

550 221. Industrial Production. (2) I, II. Technical aspects of modern industrial processes employed in the transformation of engineering materials; basic mechanics of metal machining and geometry of chip formation; flow and solidification of molten alloys; cold and hot form-

ing processes; joining; welding and heat treatment. One hour rec. and three hours lab. a week.

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. Pr.: Math. 221 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

550 401. Industrial Management I. (3) I, II, S. 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.

550 441. Engineering Reliability and Quality Assurance I. (3) II. Quantitative and qualitative controls required by manufacturing industries, with special emphasis on controlling process quality and costs. Three hours rec. a week. Pr.: Stat. 410.

550 451. Work Measurement. (3) I, II. Motion and time study; process analysis and charting; principles of motion economy affecting the design of products, processes or services; micro-motion analysis and an introduction to standard data systems. Two hours rec. and three hours lab. a week. Pr.: I. E. 221; Pr. or conc.: Stat. 410.

550 456. Work Analysis. (2) I. Principles, tools of analysis and techniques of work simplification, work measurements, materials handling and layout. One hour rec. and three hours lab. a week. Pr.: Junior standing. Not open for credit to industrial engineering majors.

550 459. Industrial Decisions. (3) II. Application of mathematical models and quantitative techniques to industrial decision problems. Three hours rec. a week. Pr.: Junior standing. Not open to industrial engineering majors.

550 471. Industrial Economy Studies. (3) I. Analysis of cost and productivity factors in an industrial production system; determination of production alternatives; conceptual models for cost minimization; linear programming. Three hours rec. a week. Pr.: Math. 222, Stat. 410.

550 481. 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.

550 502. Industrial Management II. (2) I. Theory and practice of industrial management planning, execution and evaluation as a basis for coordination of the factors of an industrial system. Two hours rec. a week. Pr.: I. E. 401.

550 511. Production and Inventory Control. (2) I. Principles, techniques and applications of production planning and control, and inventory control. Two hours rec. a week. Pr.: I. E. 451; Pr. or conc.: I. E. 372.

550 521. Principles of Metal Machining and Forming. (2) I. The physical science of metal machining and forming; mechanics and geometry of chip formation; heat and temperature in machining metals; tool life; analysis of high-speed metal removal processes; ultra-sonic, electric discharge and chemical machining processes. One hour rec. and three hours lab. a week. Pr.: Ap. M. 415.

550 522. Tool Engineering. (3) II. Engineering analysis and design of industrial tooling devices, with special attention to problems of economics, dimensional planning, metal forming and shearing tools; introduction to automation and numerically controlled machine tools. Two hours rec. and three hours lab. a week. Pr.: I. E. 521.

550 552. Job Evaluation and Wage Incentives. (2) I. Work measurement as a basis for industrial wage systems; a consideration of work factor analysis, job evaluation and wage incentives for production workers. Two hours rec. a week. Pr.: I. E. 451.

550 571. Operations Research in Engineering. (3) I, II, S. Objectives and methods for engineering research; operation analysis; evaluating

alternatives in decision making; optimal allocations of resources. Three hours rec. a week. Pr.: Math. 222 or equiv.

- 550 581. 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. 511.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 550 601. Industrial Engineering Case Studies.** (2) I, II, S. Case studies of industrial firms and recent developments in the fields of industrial engineering and management. Two hours rec. a week. Pr.: I. E. 401, 571, or consent of instructor.

- 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, 552.

- 550 661. Industrial Metallurgy.** (3) II. The physical behavior of metals while undergoing various industrial fabrication processes; responses involving plastic flow allotropic transformations, 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. 221, G. E. 350 and 351.

- 550 663. 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.: G. E. 350, 351.

- 550 664. 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 combating corrosion. Two hours rec. and three hours lab. a week. Pr.: Chem. 210 and 230, Phys. 310.

- 550 675. Quantitative Techniques in Industrial Engineering.** (3) I, II, S. 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.

- 550 701. 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.

- 550 711. Advanced Production and Inventory I.** (3) II. Analytical and mathematical methods for making decisions on production, inventories, human resources, and shipping in modern industrial plants. Three hours rec. a week. Pr.: I. E. 511.

- 550 712. Advanced Production and Inventory II.** (3) I, S. The theory and design of decision procedures in production and inventory control and the study of data processing as an operating procedure. Three hours rec. a week. Pr.: I. E. 711.

- 550 721. Numerical Control of Machine Tools.** (3) I. Translation of information on engineering drawings through programming to tape preparation; application of computer programs to simplify control operations. Two hours rec. and three hours lab. a week. Pr.: I. E. 372, 522.

- 550 742. 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. 441 or consent of instructor.

- 550 762. Advanced Metallurgy.** Credit arranged. II. Studies in specialized phases and current concepts of metallurgy. Pr.: G. E. 350, 351.

- 550 766. 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.: I. E. 663.
- 550 771. Advanced Industrial Economy Studies.** (3) I. Replacement analysis; decisions under risk and uncertainty; bidding models; value engineering. Three hours rec. a week. Pr.: I. E. 573.
- 550 781. Problems in Industrial Engineering.** Credit arranged. I, II, S. Pr.: Senior or graduate standing in industrial engineering.

FOR GRADUATE CREDIT

- 550 850. Human Engineering I.** (3) I. Human factors affecting work; focus on man: energy requirements, lighting, noise, monotony and fatigue, learning, simultaneous vs. sequential tasks; experimental evaluation of concepts. Two hours rec. and three hours lab. a week. Pr. or conc.: Psych. 625.
- 550 852. Human Engineering II.** (3) II. Focus on man in system: man-man and man-machine communication; design and arrangement of controls and displays; experimental evaluation of concepts. Two hours rec. and three hours lab. a week. Pr.: Psych. 625.
- 550 865. Simulation of Industrial and Management Systems.** (3) II, S. 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. Pr. or conc.: Stat. 611.
- 550 871. Industrial Queueing Processes.** (3) 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.: I. E. 571, Stat. 410.
- 550 873. Industrial Systems Analysis.** (3) I. The systems concept for the industrial engineer; fundamentals of industrial systems analysis and design. Three hours rec. a week. Pr.: I. E. 581.
- 550 874. Operations Research I.** (3) I. The study of stochastic and non-linear models representing problems related to management and engineering. These include queueing theory, dynamic programming, replacement and sequencing models. Pr. or conc.: Stat. 611.
- 550 875. Operations Research II.** (3) II, S. Introduction to linear programming and inventory theory; provides depth in developing and solving decision models related to management and engineering problems which can be expressed principally by linear relationships. Pr.: I. E. 675; Pr. or conc.: Stat. 611.
- 550 880. Linear and Non-linear Programming.** (3) I. A study of extensions to linear programming, integer and non-linear programming; provides the basis for developing decision models that include non-linear relationships. Pr.: I. E. 875.
- 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.
- 550 896. Research in Industrial Engineering.** Credit arranged, I, II, S. Investigations forming the basis for the master's thesis. Topics selected with approval of major professor and department head.

INDUSTRIAL ARTS

Credit received in the following courses may not be counted toward degrees in engineering.

FOR UNDERGRADUATE CREDIT

- 551 212. Woodworking.** (2) I, II. Max. total: six credit hours. Students may enroll in the following divisions: (1) woodworking I. (2) Wood-

- working II. Pr.: Woodworking I. (3) Wood Turning. Pr.: Woodworking I. Six hours lab. a week.
- 551 222. Machine Tool I.** (2) I. Problems in turning, boring, reaming, taper turning, threading on the lathe, chucking, use of forming tools, setup and use of shapers, milling machine work including indexing, study of cutting speeds and feeds. One hour rec. and three hours lab. a week. Pr.: I. E. 221.
- 551 223. Machine Tool II.** (2) II. Work on turret lathes, boring mill, automatic screw machines, grinders, and gear generating equipment; practical work with jigs and fixtures; study of rapid production of duplicate parts. One hour rec. and three hours lab. a week. Pr.: I. E. 221.
- 551 224. Gas Welding.** (2) I. The theory and practice of gas welding including inspection methods and qualification tests, gas cutting, metallizing. One hour rec. and three hours lab. a week. Pr.: I. E. 221.
- 551 225. Electric Welding.** (2) II. The theory and practice of electric welding; inspection and qualification tests; atomic hydrogen, inert gas, submerged arc. One hour rec. and three hours lab. a week. Pr.: I. E. 221.
- 551 226. Foundry I.** (2) II. Bench, floor and pit molding; use of molding and core machines; operating non-ferrous furnaces; study of commercial foundry equipment and the operation and control of the foundries; sand test and control, quality control, costs. One hour rec. and three hours lab. a week. Pr.: I. E. 221.
- 551 250. Sheet Metal.** (2) II. Developments, using of templets, soldering, folding, wiring, flanging, seaming, rolling, and other operations. One hour rec. and three hours lab. a week.
- 551 312. Finishing.** (2) II. Materials, processes, and application methods for wood and metal finishes. Six hours lab. a week. Pr.: I. E. 212-(1).
- 551 314. Auto Mechanics.** (4) I. A study of the automobile, its construction and maintenance. Two hours rec. and six hours lab. a week. Pr.: Phys. 210 or equiv.
- 551 325. 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.
- 551 328. 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, Educ. 202, I. E. 325, a valid driver's license, and good driving record.
- 551 330. 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 technique. A study of organization and administration of driver education. Emphasis on competence in transferring knowledge and skills, as well as inspiring satisfactory attitude in students. Two hours rec. and three hours lab. a week. Pr.: I. E. 328, 21 years of age, and senior standing.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 551 414. Methods of Teaching Industrial Arts.** (3) I. (See College of Education.) One hour rec. and six hours lab. a week. Pr. or conc.: Educ. 201 or approval of instructor.
- 551 462. Shop Practice Teaching.** Credit arranged. I, II. Actual laboratory teaching experience under supervision of instructor; outlining, preparation, presentation, and supervision of assignments. Pr.: Approval of instructor.
- 551 572. Wood Technology.** (3) II. Identification, structure, physical properties, uses, and defects of commercial woods. Three hours rec. a week. Pr.: I. E. 212-(2).

FOR UNDERGRADUATE AND GRADUATE CREDIT

551 690. Advanced Industrial Arts. Credit arranged. I, II. Max. total: eight credit hours. Pr.: The basic undergraduate courses for the appropriate subject and approval of instructor.

FOR GRADUATE CREDIT

551 812. Problems in Industrial Arts. Credit arranged. I, II, S. Pr.: Approval of instructor.

551 820. Research in Industrial Arts. Credit arranged. I, II, S. Investigations forming the basis for the master's thesis. Topics selected with approval of major professor and head of College of Education.

MECHANICAL ENGINEERING

RALPH G. NEVINS,* *Head of Department*

Professors Appl, Bowyer,* Brainard,* Duncan,* Durland,* Flinner,* McNall,* Nevins,* Rohles,* Tripp and Wood; Associate Professors Azer,* Crank,* Lindholm* and Messenheimer; Assistant Professors Gowdy,* Miller, Monday,* Pauli, Swearingen, Turnquist* and Walker;* Instructors Annis,* Ball, Dow, Gorton, Harder, Holm, Schlegel, Sprague, Ward and Wilson*

For Curriculum, See Page 250

Mechanical engineering graduates render professional services that vary from theoretical work in research and development to industrial applications such as design, production, management, sales and operation. The fields in which these services are performed range from energy utilization and conversion to the design and development of machines and the manufacture of goods. Mechanical engineers are found in aircraft, missile, electronics, power, petroleum and atomic energy industries, to name but a few. To provide the mechanical engineer with a broad fundamental base, the first half of the curriculum centers on the basic sciences of mathematics, physics, chemistry, and mechanics, which gives a thorough grounding in fundamentals and develops analytical thinking. The later years include basic courses in thermodynamics, heat transfer, electricity and electronics, fluid mechanics, and strength of materials. The principles developed in these courses are then applied to courses which introduce the student to the concepts of design, including the principles of economic design, and to advanced theories applicable to engineering analysis and design. Selected programs of advanced courses in the senior year provide a degree of specialization in the areas of aerospace engineering, petroleum production, design, propulsion, automatic controls, energy conversion, etc.

Graduate Work:

The Department of Mechanical Engineering offers major work leading to the degrees Master of Science and Doctor of Philosophy. 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 his major studies, is expected to develop strength in the physical sciences and mathematics by taking course work in those fields deemed appropriate by his 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 college's digital and analog computers, and the various engineering laboratories and shops.

FOR UNDERGRADUATE CREDIT

560 211. Engineering Graphics. (2) I, II. Engineering lettering; use of drawing instruments; geometrical constructions; sketching; theory of projections of points, lines, and planes; orthographic projections of

solids on conventional projection planes and auxiliary planes; conventional sections; pictorial representations. Six hours lab. a week. Pr.: Plane geometry.

- 560 213. Graphical Communications I.** (3) I, II, S. Introduction to lettering, use of instruments, and alphabet of lines; freehand and instrument pictorials; basic principles of projective geometry; multiview drawing, including conventional sections and auxiliaries; functional dimensioning; reading and interpreting working drawings; and creative design. Five hours lab. and one hour rec.-lec. a week. Pr.: Plane geometry.
- 560 218. Graphical Communications II.** (2) I, II, S. Cont. of the study of projective geometry; detail and assembly layouts, principally by freehand sketching; functional dimensioning; charts and graphs. Four hours lab. a week. Pr.: M. E. 213.
- 560 230. Elementary Aeronautics.** (3) I, II. Elementary theory of flight, navigation, meteorology, civil air regulations, general discussions of commercial and business flying. Three hours rec. a week.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 560 400. Elements of Thermodynamics.** (3) I, II. Thermodynamic principles and introduction to engineering applications. Three hours rec. a week. Pr.: Phys. 310, Math. 222 or 232.
- 560 406. Air Conditioning A.** (3) I, II. Principles of heating, cooling, and ventilating; heat transmission; equipment used for heating, cooling, and ventilating. Three hours rec. a week. Primarily for students who have not had engineering thermodynamics. Pr.: Phys. 210 or 310.
- 560 412. Engineering Thermodynamics.** (4) I, II, S. Laws of conversion of heat energy into mechanical energy; properties of fluids, gases and vapors; flow and non-flow processes; thermodynamic availability. Four hours rec. a week. Pr.: Math. 222 or 232, Phys. 310.
- 560 451. Machine Design I.** (5) I, II, S. Displacement, velocity, and acceleration analyses of machine elements: statics and dynamic forces; design of cam, gear, and intermittent motion mechanisms. Three hours rec. and six hours lab. a week. Pr.: Ap. M. 412.
- 560 465. Patents and Inventions.** (2) II. A brief consideration of the fundamental principles of U. S. patents and their relationship to the engineer; the inception and development of inventions. Two hours rec. a week. Pr.: Junior standing.
- 560 512. Thermodynamics of Energy Conversion.** (4) I, II, S. Power and refrigeration cycles; combustion and equilibrium; analysis of direct energy conversion. Four hours rec. a week. Pr.: M. E. 412.
- 560 521. Heat Transfer.** (3) I, II. Fundamentals of conduction, convection, and radiation; principles of heat exchanger design and dimensional analysis. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 471, Math. 240 or equiv.
- 560 528. Aerodynamics I.** (4) II. A general introduction to aerodynamics; operation of wind tunnel. Three hours rec. and three hours lab. a week. Pr.: Ap. M. 471, Math. 240 or equiv.
- 560 531. Mechanical Engineering Laboratory E.** (1) I, II. Laboratory course in mechanical equipment for non-mechanical engineering students. Three hours lab. a week. Pr.: M. E. 412.
- 560 535. Mechanical Engineering Laboratory I.** (3) I, II, S. Theory and application of mechanical engineering instrumentation and measurements. Two hours rec. and three hours lab. a week. Pr.: M. E. 412, E. E. 424.
- 560 551. Machine Design II.** (3) I, II, S. 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.: Ap. M. 415, M. E. 451.
- 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. 412.

- 560 571. 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.
- 560 580. Professional Development.** (1) I, II. The social and professional aspect of engineering. One hour rec. a week. Pr.: Senior standing.
- 560 583. Mechanical Engineering Laboratory II.** (2) I, II, S. 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.
- 560 590. Intermediate Thermodynamics.** (3) II. Systems involving electromagnetic, chemical, thermal, and mechanical energies; reactive systems of engineering interest; thermodynamic properties and relations among properties. Three hours rec. a week. Pr.: M. E. 412. (Not open to graduate students majoring in mechanical engineering.)

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 560 612. Systems Dynamics.** (3) I. Analysis of the dynamic behavior of mechanical, thermal, fluid and electrical elements using the basic physical laws, with emphasis on the analogies. Derivation of the steady-state and transient responses of systems composed of linear elements using Laplace transforms and block diagrams. Three hours rec. a week. Pr.: Math. 240, E. E. 419; Pr. or conc.: Ap. M. 471.
- 560 618. Advanced Graphics.** (3) S. Advanced problems in charts, graphs, nomography and graphical mathematics. One hour rec. and four hours lab. a week. Pr.: M. E. 218 or equiv.
- 560 620. Internal Combustion Engines.** (3) II. Analysis of cycles, design and performance characteristics. Three hours rec. a week. Pr.: M. E. 512.
- 560 622. Environmental Engineering I.** (3) I, II. Psychrometry; heat transmission; air-conditioning equipment and systems; design problems. Two hours rec. and three hours lab. a week. Pr.: M. E. 521.
- 560 628. 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. 528.
- 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. 512, Ap. M. 471, Math. 240 or equiv.
- 560 642. Fine Particle Technology.** (3) II. Definition, theory and measurement of particle properties, particle dynamics, size distributions 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.: Ap. M. 471 or consent of instructor.
- 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. 521, 551.
- 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. 451, Math. 240 or equiv.
- 560 657. Kinematics.** (3) I. Geometry of constrained motion applied to point paths, specific input-output relations, function generators, kinematic synthesis. Three hours rec. a week. Pr.: M. E. 451.
- 560 665. Engineering Analysis.** (3) I. The engineering method of analysis employed in the solution of professional-level problems selected

- from various branches of engineering. Three hours rec. a week. Pr.: Math. 240 or equiv. and senior standing in engineering.
- 560 666. Aeronautical Engineering Design.** (2) I. Design problems related to aircraft, missiles, and space vehicles. Six hours lab. a week. Pr.: M. E. 521, 628, 631.
- 560 671. 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. 571, Math. 240 or equiv., Ap. M. 471.
- 560 675. Problems in Mechanical Engineering.** Credit arranged. I, II, S. Pr.: Approval of department head.
- 560 711. 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 of mass, energy, available energy, and entropy. Three hours rec. a week. Pr.: M. E. 512, Ap. M. 471, Math. 240 or equiv.
- 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 or equiv., M. E. 512, Ap. M. 471.
- 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.: Eight hours biological science; Pr. or conc.: M. E. 524.
- 560 725. Combustion.** (3) I. Dynamics and thermodynamics of combustion processes; solid, liquid, and gaseous fuels. Three hours rec. a week. Pr.: M. E. 521.
- 560 731. Automatic Controls.** (3) II. Design and application of control devices, hydraulic, pneumatic and electronic systems, computer control systems. Two hours rec. and three hours lab. a week. Pr.: M. E. 612 or consent of instructor.
- 560 732. Automatic Controls Laboratory.** (2) II. Experimental methods for automatic control systems and components. Six hours lab. a week. Pr. or conc.: M. E. 731.
- 560 735. Fluid Control Systems.** (3) II. 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. 612.
- 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.
- 560 757. Mechanics of Machines.** (3) II. Analysis of inertial effects in rotating discs, gyroscopes, cams and gear trains. Three hours rec. a week. Pr.: M. E. 451.

FOR GRADUATE CREDIT

- 560 810. Research in Mechanical Engineering.** Credit arranged. I, II, S. The laboratory work is correlated with the work of the Engineering Experiment Station. Research in any field pertinent to subjects taught in the Mechanical Engineering Department. Pr.: Approval of department head.
- 560 812. Laboratory Investigations in Thermodynamics, Heat Transfer, Fluid Flow, or Combustion.** Credit arranged. I, II, S. Pr.: Basic undergraduate courses in the area selected and approval of department head.
- 560 814. Laboratory Investigations in Machine Design.** Credit arranged. I, II, S. Pr.: Basic undergraduate courses in machine design and approval of department head.

- 560 816. Advanced Topics in Mechanical Engineering.** Variable credit. I, II, S. A course reserved for study of current topics in mechanical engineering. Topics announced when offered. Pr.: Consent of instructor.
- 560 818. Advanced Thermodynamics II.** (3) II. Cont. of Advanced Thermodynamics I. Three hours rec. a week. Pr.: M. E. 711.
- 560 822. Advanced Air Conditioning.** (3) I. Advanced psychrometric analysis; physiological factors; biotechnology and heat transfer. Two hours rec. a week. Pr.: M. E. 524.
- 560 825. Advanced Machine Design.** Credit arranged. I, II. At the option of the student this course may include a study of some advanced subject related to courses in this area. Pr.: Approval of department head.
- 560 830. 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, Math. 621 or equiv.
- 560 831. Boundary Layer Theory I.** (3) I. 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. 521.
- 560 832. Boundary Layer Theory II.** (3) II. 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 a compressible viscous fluid. Three hours rec. a week. Pr.: M. E. 831.
- 560 835. 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. 521.
- 560 836. Advanced Topics in Heat Transfer.** (3) I. A study of current literature in heat transfer, with particular emphasis on transpiration cooling, aerodynamic heating, thermal stresses, and liquid metal heat transfer. Three hours rec. a week. Pr.: M. E. 835.
- 560 840. Research Methodology.** (2) I. Principles and techniques of engineering research. Two hours rec. a week.
- 560 842. 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. 521.
- 560 843. Radiation Heat Transfer.** (3) I. 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. 521.
- 560 845. Dimensional Analysis and Theory of Models.** (2) II. Basic methods of dimensional analysis, with applications to the theory of models and the planning of experiments; similarity and model laws, dimensional analysis applied to problems in stress analysis, fluid mechanics, heat transfer, electrical engineering. Two hours rec. a week. Pr.: Approval of department head.
- 560 850. Advanced Power Plant Engineering.** Credit arranged. I. An advanced course in the economic problems met with in the design of power plants and in the generation of power; selection of equipment, choice of station heat balances, generation of by-product power in industries, and interconnections between utilities and industrial plants for the economical interchange of power. Pr.: M. E. 651.
- 560 860. Adaptive Control Processes.** (3) II in alt. years. Feedback control and the calculus of variations; dynamical systems and transformations; computational aspects of dynamic programming; two-point boundary value problems; uncertainty and random processes; adaptive control processes; successive approximation. Three hours rec. a week. Pr.: M. E. 731, 732.

560 865. 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. 621, 622.

NUCLEAR ENGINEERING

WILLIAM R. KIMEL,* *Head of Department*

Professors Kimel and Mingle;* Associate Professors Faw* and Meyer;* Assistant Professors Clark* and Spangler;* Visiting Professor Copic;* Instructors Baran, Eckhoff and Hightower*

For Curriculum, See Page 251

The Curriculum in Nuclear Engineering is designed to prepare students for professional positions in nuclear and space engineering. The student may elect an option with special emphasis on either the mechanical or the chemical aspects of the nuclear field.

As a profession, nuclear engineering requires understanding and competence in many and diverse disciplines. Hence, the undergraduate nuclear engineering student at Kansas State University takes courses in atomic physics, nuclear physics, physical chemistry, stoichiometry, thermodynamics, fluid and soil mechanics, electronics, heat transfer, differential equations, analog and digital computer technology, and economics. With the background established by taking these courses, the able student will then be prepared for course work in the Department of Nuclear Engineering, involving reactor theory and analysis, nuclear radiation detection, radiation shielding, radiation effects on materials, nuclear fuel processing, metallurgy of nuclear systems, industrial isotope applications, reactor instrumentation, reactor heat transfer, thermodynamics, radiation safety, and such topics as nuclear energy systems for both terrestrial and aerospace applications, the latter involving both primary and auxiliary power systems. This curriculum is of particular rigor and is recommended only for the able, well-motivated student.

Graduate Work:

The Department offers graduate programs leading to the degrees Master of Science and Doctor of Philosophy.

Applicants for graduate status are expected to have completed preparation equivalent to the required undergraduate program in nuclear engineering at this University. Students majoring in other related fields will also be considered for admission, but preparatory courses without graduate credit may be required if preparation is inadequate. Programs of study will be modified as far as possible to meet the needs of individual students but subject to requirements necessary to insure a proper balance of subject matter. Graduate students in nuclear engineering may select minor courses from such areas as mathematics, physics, chemistry, applied mechanics and other branches of engineering.

Nuclear engineering courses may be selected as a minor in Ph. D. programs in major fields such as mechanics, physics, and electrical, chemical and mechanical engineering.

Laboratory facilities include a hundred thousand watt TRIGA Mark II reactor, with a pulsing capability to two hundred and fifty million watts, the Kansas State University Nuclear Engineering Shielding Facility located in the center of a 160-acre controlled site, experimental shielding structure, 125-curie pumped source for simulating fallout radiation fields, many cobalt-60 sources ranging in source strength from 125 curies down to the millicurie level, positive ion accelerator type neutron source, a graphite subcritical reactor, a water moderated subcritical assembly, four multichannel analyzers with pulse height, time-of-flight, pulsed neutron and multiscaler logics, a kilocurie cobalt-60 gamma irradiation facility, three analog computers with a total of 60 operational amplifiers and pressurized water heat transfer loop. Other miscellaneous items include scalars, ratemeters, high voltage power supplies, scintillation detectors, oscilloscopes, BF₃ detectors, survey meters, calibration sources, gas-flow

proportional detectors, ion chambers, proton recoil detectors and strip-chart recorders.

FOR UNDERGRADUATE CREDIT

580 200. Fundamentals of Nuclear Defense Planning. (2) I. Effects of nuclear weapons—blast, thermal radiation, initial nuclear radiation and fallout; attenuation, detection and biological effects of nuclear radiation; structure of matter and radioactivity; structure shielding against fallout radiation; shelters and environmental engineering; probabilities of destruction from nuclear weapons; chemical and biological warfare considerations. Two hours rec. a week. Pr.: Sophomore standing.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

580 410. Introduction to Nuclear Engineering. (2) I, II. A course to acquaint non-nuclear engineers with introductory aspects of nuclear engineering; a study of nuclear reactions, reactor core calculations, reactor dynamics, shielding, fuels, waste disposal, heat transfer and radioisotopes applications engineering. Three hours rec. a week. Pr.: Phys. 311, Math. 240 or equiv.

580 450. Elements of Nuclear Engineering. (3) 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 and 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. Pr. or conc.: Math. 240, Phys. 560.

580 500. Applied Nuclear Engineering Analysis. (3) II. Methods and applications of analytical, statistical, and numerical analysis as applied to nuclear engineering including computer programming. Three hours rec. a week. Pr.: Math. 240, Phys. 311.

FOR UNDERGRADUATE AND GRADUATE CREDIT

580 606. Nuclear Engineering Materials. (3) II. Investigation of the nuclear properties, metallurgy and processing of nuclear engineering materials. Three hours rec. a week. Pr.: G. E. 350, N. E. 450, Chem. 595.

580 607. Radiation Effects on Materials. (3) I. Mechanisms of interaction of radiation with matter, radiation-induced chemical and physical changes, radiation processing, applications to radiation dosimetry, materials for nuclear reactor systems. Three hours rec. a week. Pr.: Phys. 560; Pr. or conc.: Phys. 675, N. E. 670.

580 609. Radiation Effects on Materials Laboratory. (2) I. Experimental investigations of the mechanisms of radiation effects, techniques of dosimetry and principles of radiation processing. Six hours lab. a week. Pr. or conc.: N. E. 607.

580 611. Radioisotope Applications Engineering. (3) I. A design course in the use of radioisotopes in industrial applications. One hour rec. and six hours lab. a week. Pr.: N. E. 410 or 450.

580 620. Problems in Nuclear Engineering. Credit arranged. I, II, S. Specific studies in current and advanced problems in various phases of nuclear engineering. Pr.: Consult head of department.

580 640. Reactor Operations Planning. (2) I. Siting, licensing, radiation safety and nuclear safety for personnel programs, indemnity, waste disposal, fuel transport and state-federal relations. Two hours rec. a week. Pr. or conc.: N. E. 670.

580 670. Nuclear Reactor Technology I. (3) I. Mathematical methods in reactor physics, including computer applications, diffusion and slowing down of neutrons; theory of subcritical reactors, criticality condi-

- tions, and reactor heat transfer. Three hours rec. a week. Pr.: N. E. 450, 500.
- 580 691. Nuclear Reactor Technology II.** (3) II. Basic theory and problems associated with design, construction, and operation of research and power reactors. Three hours rec. a week. Pr.: N. E. 670.
- 580 695. Nuclear Reactor Technology Laboratory.** (2) II. Analog computation, nuclear electronics, and experiments related to subcritical and critical reactors, including cadmium ratio, diffusion length, Fermi Age, approach to criticality and critical size. Six hours lab. a week. Pr. or conc.: N. E. 691.
- 580 705. Principles of Nuclear Reactor Analysis.** (3) I. Theories of neutron diffusion, slowing down, time dependency, multigroup methods, heterogeneous assemblies, kinetics, perturbation and applications of computers to reactor physics calculations. Three hours rec. a week. Pr.: N. E. 691.
- 580 708. Nuclear Fuel Processing Laboratory.** (1) II. 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. or conc.: Ch. E. 435, N. E. 606.
- 580 710. Nuclear Fuel Processing.** (3) I. Application of unit operations to production and reprocessing of nuclear materials such as uranium, plutonium, graphite, and heavy water. Three hours rec. a week. Pr.: N. E. 606, Ch. E. 435.
- 580 715. Radiation Shielding I.** (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. 670.
- 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, magnetohydrodynamic and electrochemical processes. Three hours rec. a week. Pr.: N. E. 670, Chem. 595.
- 580 760. Nuclear Reactor Instrumentation.** (3) I. Theory of detection of nuclear radiation, applications in radiation dosimetry and spectroscopy, design and analysis of radiation detection and measurement systems for nuclear reactors. Three hours rec. a week. Pr.: N. E. 691, Phys. 675.

FOR GRADUATE CREDIT

- 580 810. Research in Nuclear Engineering.** Credit arranged. I, II, S. Independent investigation of an advanced nuclear engineering problem preparatory to writing a thesis. Pr.: Approval of head of department.
- 580 815. Advanced Nuclear Reactor Heat Transfer.** (3) II. Temperature distributions throughout nuclear reactors; hot channel factors; numerical methods in heat transfer design; interaction of heat transfer and nuclear parameters. Three hours rec. a week. Pr.: N. E. 691.
- 580 820. Control of Nuclear Reactors.** (3) II. Reactor kinetics, measurement of power level and period; temperature effects; servomechanisms and feedback loops. Three hours rec. a week. Pr.: N. E. 705, 760.
- 580 840. Advanced Nuclear Reactor Theory.** (3) II. Solutions and applications of the neutron transport equation; integral transport theory; energy dependent theory; Monte Carlo methods; small source theory and fast reactor theory. Three hours rec. a week. Pr.: N. E. 705.
- 580 845. Radiation Shielding II.** (3) I. Solutions and applications of the transport equation as applied to neutrons, gamma-rays and charged particles. Applications principally in the field of fallout and space shielding. Three hours rec. a week. Pr.: N. E. 715; Pr. or conc.: N. E. 705.
- 580 851. Nuclear Engineering Laboratory.** (2) I, S. Approach to criticality, reactor period determination, rod worth measurements, void

coefficients, reactor simulation, reactor operation, power calibration, multichannel counting, pulse neutron operation and measurements. Six hours lab. a week. Pr. or conc.: N. E. 705.

580 855. 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. 815, 840, 845.

580 860. Advanced Topics in Nuclear Engineering. Variable credit. I, II, S. A presentation of various special topics covering advanced nuclear engineering specialties. Pr.: Consent of instructor.

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.

580 891. Controlled Thermonuclear Reactions I. (3) I. Basic principles of plasma theory and controlled thermonuclear processes based on treatment of Boltzmann equation; plasma phenomena, including confinement, radiation, and stability; energy balance and materials problems. Three hours rec. a week. Pr.: N. E. 705 or consent of instructor.

580 893. Controlled Thermonuclear Reactions II. (3) II. Cont. of N. E. 891; collisionless plasmas; plasma waves and instabilities; plasma diagnostics, experimental approaches. Other topics of current interest. Three hours rec. a week. Pr.: N. E. 891.

580 895. Nuclear Systems Design. (3) I, S. Design analysis of nuclear power reactor systems, including criticality determinations, heat transfer, shielding, change in reactivity with fuel irradiation, fuel cycles, power plant thermodynamics, and economics of nuclear power. Three hours rec. a week. Pr.: N. E. 715, 815, 820.

Engineering Experiment Station

PAUL E. RUSSELL, *Dean*

LELAND S. HOBSON, *Director*

DWIGHT A. NESMITH, *Assistant Director*

In the dynamic state that engineering finds itself today, there is no way to separate research activity and teaching activity—teaching and research are so intermingled as to be virtually inseparable.

The growth of our total research program, due primarily to the growth in outside sponsorship of research, is extremely encouraging, since it reflects greater support for both the graduate and undergraduate students and for faculty research as well. In the past years there has been a threefold increase in research in the College of Engineering. This research not only provides the opportunity to work in the newest, most challenging engineering fields, but makes it possible to reward able educators and retain a first-rate staff.

The Engineering Experiment Station is the division of the College of Engineering responsible for the administration of research. It was established March 24, 1910, by the Board of Regents for the purpose of undertaking 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. The staff of the Engineering Experiment Station is composed of members of all departments in the College of Engineering except Agricultural Engineering, and is supplemented by staff in other departments of the University who work with staff members on joint projects.

Each year new and significant research projects get under way, reflecting shifts in national interests toward such fields as deep-space exploration, water management and transportation. Among the most significant research now under way are projects involving:

Desalination of sea water, including new methods, refinements of traditional methods, and optimization of the resulting system designs;

The development of mathematical models for use in planning highways and urban traffic networks;

Microwave Radiometry studies relative to orbiting research laboratories, primarily directed toward mapping of the earth and studying terrain on other planets;

Environmental studies including such things as the effect of floor temperature on comfort, the effect of carpeting on heat requirements in schools, and flow and heat transfer characteristics which affect the design of equipment for heating and air conditioning;

The scattering of fallout from the ceilings of shelters, and the more positive aspects of nuclear energy, including the studies of radiation effects on materials, including the development of new materials;

The use of lasers as a tool for chemical engineering analysis and research;

Phenomena contributing to head loss in water distribution systems;

Human physiological responses survival shelter environments, including the effects of temperature, humidity and exercise;

A study of preservative coatings for concrete which will inhibit surface damage due to freezing and thawing; and

Applied mathematical studies including optimization, the forces and resulting displacements in straightening teeth, and analysis and synthesis of electronic components and systems.

A complete list of the Engineering Experiment Station research projects and a brief description of each are published in an annual report. A copy of the most recent report will be sent free of charge on request.

Division of Engineering and Industrial Extension

PAUL E. RUSSELL, *Dean*
LELAND S. HOBSON, *Director*

The Division of Engineering and Industrial Extension was established by the Board of Regents in order to coordinate and develop engineering and industrial services rendered by professional staff members of the College of Engineering to communities, engineering groups, industrial management groups and industrial workers. The Division has worked in close cooperation with the Kansas Department of Economic Development, the Kansas State Chamber of Commerce, the Small Business Administration, the Associated Industries of Kansas, local chambers of commerce, local governing bodies, and other groups concerned with industrial growth, economic well-being, and community development within the State of Kansas.

The general areas of activity include community industrial survey programs, city and regional planning programs, special meetings and conferences, and industrial assistance and advisement.

INDUSTRIAL SURVEY SERVICES

PROFESSOR JOHN P. CLIFTON

The Industrial Survey Program of the Division of Engineering and Industrial Extension has, since its inauguration in the fall of 1947, made a significant contribution to industrial development efforts in the state, with the completion of more than 100 surveys for Kansas communities.

The community surveys are engineering studies of the industrial assets and liabilities of a community, aimed at the development of a sound program of industrial growth and expansion for the community. As a general rule, the local Chamber of Commerce is the sponsoring organization, although other civic groups and local governing bodies have acted in that capacity in some instances. The study is conducted under the direction of Division personnel, using local people in the gathering of data and circulation of questionnaires. The report is compiled and published at the University.

Closely related to the survey program is the Industrial Clinic program, sponsored jointly by the Kansas State Chamber of Commerce, the Kansas Department of Economic Development, and the Division of Engineering and Industrial Extension. These clinics, held in each community after the completion of the industrial survey, feature an oral report of the findings of the survey and an open forum discussion. The citizens of the community are thus enabled to formulate the program which is to be undertaken to advertise and enhance the community's advantages and to overcome its shortcomings.

INDUSTRIAL MANAGEMENT DEVELOPMENT SERVICES

PROFESSOR JOHN P. CLIFTON

The Industrial Management Short Course program of the Department of Industrial Engineering and the Division of Engineering and Industrial Extension offers assistance and training to management and supervisory personnel of industrial firms in Kansas. The courses, covering a wide range of subjects, are aimed at increasing efficiency and the effective use of modern management techniques and engineering methods in Kansas industry.

The short courses are conducted primarily by staff members of the

Department of Industrial Engineering, but management instructors from outside Kansas State University, instructors from the College of Commerce, and experienced industrial managers from the state may assist Industrial Engineering staff members in conducting these courses.

As is the case in the Industrial Survey program, the Short Course program is carried on with the cooperation of the Kansas Department of Economic Development, the Kansas State Chamber of Commerce, the Small Business Administration, local chambers of commerce, and other groups interested in the development of manufacturing management in Kansas industry.

The College of Home Economics

DORETTA SCHLAPHOFF HOFFMAN,* *Dean*

RUTH HOEFLIN,* *Associate Dean*

JEAN REEHLING, *Assistant to the Dean*

CAROLE SCHULZE, *Assistant to the Dean*

The objective of the College of Home Economics is for each student to become a well-informed person ready to take advantage of the expanding opportunities for home economists in our world of accelerated change. A degree in home economics provides a broad, liberal education along with a specialty to prepare young people for tomorrow's world. The degree equips graduates to be "professional" consumers and prepares them for expanding career opportunities for immediate use or in the future. The home economics degree enables graduates to earn above-average salaries. Positions of leadership are open to home economists in industry, business, education, and in government.

The Honors Program in the College of Home Economics is planned for those students with a potential for unusual scholastic attainment. To be eligible, students must have an excellent high school record and rank in the upper 10 percent of their university class in the entrance examinations. Students participating in the Honors Program plan individual programs of study including special sections or advanced courses. The aim of the Honors Program in Home Economics is to emphasize enrichment, breadth and depth in each student's program of higher education.

The Home Economics Master's Degree Project identifies potential graduate students early in their college careers. Each semester, students with a minimum of a "B" average are invited to join the project. A student who volunteers to participate in the Master's Degree Project has an adviser who is a member of the graduate faculty who will help her outline her academic program and make plans for graduate study in the future.

Programs of study leading to the degree Bachelor of Science can be planned within the five curriculums offered in the College of Home Economics. These curriculums are designed to meet the needs of students with varying interests. They are listed below and described on the following pages.

1. Curriculum in Home Economics with Options

Home Economics Education—Vocational Teaching
Extension
Radio and Television
Clothing and Retailing
Textile Research
Fashion Design
Interior Design
Community Services
Preschool Education
Consumer Interest
Housing and Equipment
Foods and Nutrition in Business
Foods and Nutrition Research
Dietetics and Institutional Management

2. Curriculum in Home Economics and Journalism

3. Curriculum in Home Economics with Liberal Arts

4. Curriculum in Home Economics and Nursing

5. Curriculum in Restaurant Management

Each student has a faculty adviser under whose guidance a program is planned that will prepare the student for such professional careers as teacher, home economics agent, interior designer, home economist in business or in social welfare, nursery school supervisor, specialist in housing or home management, women's page editor, textile chemist, clothing designer, food and equipment demonstrator, nutritionist, dieti-

tian, restaurant manager, nurse, or research technician. The course requirements for the first year are much the same, so the student has time to study possibilities in all areas in home economics before choosing the one best suited to her individual needs and interests. The Bachelor of Science degree is earned by fulfilling the requirements in the curriculum chosen by the student.

The home economics student takes courses offered by many departments over the entire campus at Kansas State University. Home economics courses are offered by the five departments in the College of Home Economics: Clothing and Textiles, Family and Child Development, Foods and Nutrition, Family Economics, and Institutional Management. Courses in Home Economics Education are offered by the College of Education.

An excellent foundation for graduate study is provided for the student who wishes to continue beyond the bachelor's degree. Courses are offered which lead to the Master of Science and Doctor of Philosophy degrees.

Curriculum in Home Economics with Options

B. S. in Home Economics

This curriculum is designed primarily for preparation in professional home economics fields. Courses are included for general education and home economics together with those needed for specialization. Options, or courses needed for professional proficiency in various areas, are listed on the following pages.

Sufficient flexibility is provided to permit combinations suited to individual needs. Electives may be used to build strong combinations with other fields of interest.

LIBERAL-GENERAL EDUCATION COURSES				34 Hours
COMMUNICATIONS				8
Engl.	229 100	English Composition I	3	
Engl.	229 120	English Composition II	3	
Engl.	229 090	English Proficiency	0	
Spch.	281 105	Oral Communication I	2	
SOCIAL SCIENCE				6
Econ.	225 110	Economics I	3	
Psych.	273 110	General Psychology	3	
ADDITIONAL REQUIREMENTS				20
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				12 Hours
I. Des.	610 101	Design for Contemporary Living	3	
F. C. Dev.	620 250	Human Relations	2	
F. Ec.	630 300	Family Economics	3	
F. & N.	640 133	Food for Man	2	
Gn. H. E.	650 110	Introduction to Home Economics	1	
Gn. H. E.	650 300	Home Economics Seminar	1	
PROFESSIONAL AND SUPPORTING COURSES				58 to 66 Hours
(See specific option)				
UNRESTRICTED ELECTIVES				12 to 20 Hours
(See specific option)				
For men who take Air or Military Science, the credits will be accepted in lieu of unrestricted electives.				
OTHER				0
Physical Education (2 semesters)				
Total for Graduation				124 Hours

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 for approval to teach in a vocational homemaking department.

PROFESSIONAL AND SUPPORTING COURSES									
<i>Sem. Hrs.</i>					<i>Sem. Hrs.</i>				
Bact.	213 200	Public Health Bact.	3		C. & T.	610 131	Socio-Econ. of Clothing	2	
Chem.	221 110	General Chemistry	5		C. & T.	610 210	Pattern Study & Gar-		
Chem.	221 190	El. Org. Chemistry	3				ment Construction	3	
Chem.	221 191	El. Org. Chem. Lab.	2		C. & T.	610 260	Textiles	3	
Educ.	405 202	Educ. Psychology I	3		F. C. Dev.	620 325	The Preschool Child	3	
Educ.	405 400	Educ. Psychology II	3		F. C. Dev.	620 475	The Adolescent	3	
Educ.	405 450	Prin. of Sec. Educ.	3		F. Ec.	630 320	The House	3	
Educ.	405 550	Meth. of Tchg. H. E. ..	2		F. Ec.	630 360	Home Management	2	
Educ.	405 750	Curriculum in H. E.	3		F. Ec.	630 365	Home Management Lab.	2	
Educ.	405 477	Tchg. Part. in Sec. Sch.	6		F. & N.	640 245	Food Science	3	
Zool.	293 205	Gen. Zoology	4		F. & N.	640 402	Principles of Nutrition	3	
					I. Des.	610 240	Interior Design I	2	
Option Requirements									66
Unrestricted Electives									12
Curriculum Requirements*									46
Total									124

* Under Liberal-General Education Additional Requirements, take P. Sci. 269 220 (freshmen and sophomores) or P. Sci. 269 444 (juniors and seniors); six hours of sociology in sequence; six hours of literature or language; and Art 209 100.

Option in Extension

This option is designed for the student who wishes to become a county home economics agent. On graduation the student is prepared to join the Extension service for work in a county in Kansas or another state.

The Assistant to the State Leader, Extension Home Economics, advises with the student who selects this option.

PROFESSIONAL AND SUPPORTING COURSES

			<i>Sem. Hrs.</i>		<i>Sem. Hrs.</i>
Educ.	405 605	Exten. Organ. & Policies	3	Home Economics Courses*	29
Educ.	405 752	Meth. of Exten. Tchg.	3	Two areas in home economics, a minimum of eight credits in each	(20)
Spch.	281 616	Group Discussion Methods	3	Courses selected from areas other than the two used above	(9)
C. & T.	610 131	Socio-Econ. of Clothing ..	2	Basic Disciplines*	22
				Courses selected to support home economics areas	
Option Requirements					62
Unrestricted Electives					16
Curriculum Requirements					46
Total					124

* Selected in consultation with faculty adviser.

Option in Radio and Television

National broadcasting stations are requesting qualified radio and television personnel who understand the viewpoint of homemakers. This option provides opportunities for a specialty in home economics and courses in radio and television.

PROFESSIONAL AND SUPPORTING COURSES

			<i>Sem. Hrs.</i>		<i>Sem. Hrs.</i>
Spch.	281 152	Radio-TV Speech & Procedures	3	Home Economics Courses*	24
Spch.	281 160	Survey of Broadcasting ..	2	Area of Concentration	(14)
Spch.	281 225	Radio-TV Continuity ..	2	Courses selected from two areas other than concentration	(10)
Spch.	281 326	Intro. to Television	2	Basic Disciplines*	10
Spch.	281 660	Radio-TV Production ..	3	Courses selected to support home economics areas	
Spch.	281 745	Broadcasting of Women's Programs ..	3	Speech and/or Social Science**	12
Option Requirements					62
Unrestricted Electives					16
Curriculum Requirements					46
Total					124

* Selected in consultation with home economics faculty adviser.

** Selected in consultation with Radio-TV faculty adviser.

Option in Clothing and Retailing (C. & T.)

Courses prepare students for careers in fashion merchandising in department stores and specialty shops.

PROFESSIONAL AND SUPPORTING COURSES

			<i>Sem. Hrs.</i>				<i>Sem. Hrs.</i>
Art	209 100	Design I	2	C. & T.	610 131	Socio-Econ. of Cloth. ..	2
B. A.	305 273	Prin. of Acctg. or	3	C. & T.	610 210	Pattern Study & Garment Construction ..	3
Math.	245 100	College Algebra		C. & T.	610 230	Fashion Merchandising I	3
B. A.	305 400	Administration	3	C. & T.	610 260	Textiles	3
B. A.	305 440	Marketing	3	C. & T.	610 395	Window Display	3
B. A.	305 540	Retailing	3	C. & T.	610 525	Fashion Store Ser. Lab.	5
Chem.	221 110	Gen. Chemistry and	5	C. & T.	610 630	Clothing Economics	3
Chem.	221 190	El. Org. Chemistry	3	C. & T.	610 635	Fashion Merchandising II	3
		or		C. & T.	610 650	Intermediate Textiles ..	3
Phys.	265 101	Man's Phys. Wld. I & (4) ..		C. & T.	610 730	History of Costume	3
Phys.	265 102	Man's Phys. Wld. II (4) ..		I. Des.	610 240	Interior Design I or	2
Engl.	229 451	Mod. Engl. Grammar or ..	3	C. & T.	610 220	Costume Design I	
Engl.	229 200	English Composition III ..					
Option Requirements							58
Unrestricted Electives							20
Curriculum Requirements*							46
Total							124

* Under Liberal-General Education Additional Requirements, take Hist. 241 111 and Psych. 273 505 or 273 515.

Option in Textile Research (C. & T.)

Courses in science, mathematics, textile testing, and research are combined with those providing a comprehensive background in home economics to prepare students for textile testing and as assistants in textile research. Career opportunities are found in the laboratories of colleges and universities, commercial firms, or government agencies.

PROFESSIONAL AND SUPPORTING COURSES

<i>Sem. Hrs.</i>					<i>Sem. Hrs.</i>				
Art	209	100	Design I	2	C. & T.	610	131	Socio-Econ. of Clothing	2
Chem.	221	190	El. Org. Chemistry	3	C. & T.	610	210	Pattern Study & Gar-	
Chem.	221	191	El. Org. Chem. Lab.	2				ment Construction	3
Chem.	221	210	Chemistry I	5	C. & T.	610	220	Costume Design I or	
Chem.	221	230	Chemistry II	3	I. Des.	610	240	Interior Design I	2
Chem.	221	250	Chemistry II Lab.	2	C. & T.	610	260	Textiles	3
Chem.	221	300	Gen. Quant. Anal. or ..	4	C. & T.	610	630	Clothing Economics	3
Biochem.	020	420	Gen. Biochemistry (5)		C. & T.	610	650	Intermediate Textiles .	3
Math.	245	100	College Algebra	3	C. & T.	610	655	Advanced Textiles	3
Phys.	265	115	Household Physics or .	4	F. Ec.	630	320	The House or	3
Phys.	265	211	General Physics		F. Ec.	630	605	Consumers and the Mkt.	
Stat.	285	320	Elements of Statistics	3	F. & N.	640	245	Food Science	3
Mod. L.	253		Modern Language	6					
Option Requirements									62
Unrestricted Electives									16
Curriculum Requirements									46
Total									124

Option in Fashion Design (C. & T.)

This option provides students with a working knowledge of color, line and sources of fashion inspiration together with experience in sketching, designing and creating garments in suitable fabrics.

PROFESSIONAL AND SUPPORTING COURSES

<i>Sem. Hrs.</i>					<i>Sem. Hrs.</i>				
Art	209	100	Design I	2	C. & T.	610	220	Costume Design I	2
Art	209	190	Drawing I	2	C. & T.	610	260	Textiles	3
Art	209	195	Survey of Art History I	3	C. & T.	610	310	Tailoring	3
Art	209	196	Survey of Art Hist. II	3	C. & T.	610	315	Costume Illustration	2
Art	209	200	Design II	2	C. & T.	610	320	Costume Design II	3
Art	209	210	Drawing II	2	C. & T.	610	325	Fashion Life Sketch. ..	2
Art	209	222	Water Color I	2	C. & T.	610	395	Window Display	3
Art	209	224	Figure Drawing I	2	C. & T.	610	610	Flat Pattern Design	3
Mod. L.	253	131	French I	3	C. & T.	610	615	Design by Draping	3
Mod. L.	253	135	French II	3	C. & T.	610	620	Costume Design III	3
C. & T.	610	131	Socio-Econ. of Clothing	2	C. & T.	610	730	History of Costume	3
C. & T.	610	210	Pattern Study & Garment Construction	3	I. Des.	610	740	History of Fabric Design	3
Option Requirements									62
Unrestricted Electives									16
Curriculum Requirements*									46
Total									124

* Under Liberal-General Education Additional Requirements, take Hist. 241 111 and 241 202 or 241 631; Soc. 277 220; Chem. 225 110 and 225 190, or Phys. 265 101 and 265 102; and at least three hours of biological science.

Option in Interior Design (I. Des.)

This option is designed for students who wish preparation for careers as interior designers.

PROFESSIONAL AND SUPPORTING COURSES

				<i>Sem. Hrs.</i>						<i>Sem. Hrs.</i>	
Arch			Arch. Design	4	Mod. L.	253	131	French I		3	
Art	209	100	Design I	2	Mod. L.	253	135	French II		3	
Art	209	190	Drawing I	2	C. & T.	610	260	Textiles		3	
Art	209	195	Survey of Art History I ..	3	C. & T.	610	365	Weaving I		2	
Art	209	196	Survey of Art Hist. II .	3	C. & T.	610	395	Window Display		3	
Art	209	200	Design II	2	I. Des.	610	240	Interior Design I		2	
Art	209	210	Drawing II or ..		I. Des.	610	245	Contemporary Homes ..		3	
Art	209	222	Water Color I	2	I. Des.	610	340	Interior Design II		3	
Art	209	230	Sculpture I	2	I. Des.	610	345	Home Furnishings		2	
Art	209	260	Design in the Crafts ..	2	I. Des.	610	600	Advanced Design		2	
Art	209	265	Ceramics I	2	I. Des.	610	640	Interior Design III		3	
Art	209	290	Lettering or ..		I. Des.	610	645	Historic Furn. Design ..		3	
Art	209	605	Comm. Illustration	2	I. Des.	610	740	Historic Fabric Design ..		3	
Option Requirements											61
Unrestricted Electives											17
Curriculum Requirements*											46
Total											124

* Under Liberal-General Additional Requirements, take Chem. 221 110 and 221 190 or Phys. 265 101 and 265 102.

Option in Community Services (F. C. Dev.)

This option appeals to students who are interested in family life programs, child welfare with community agencies, or youth leadership in organized groups.

PROFESSIONAL AND SUPPORTING COURSES

<i>Sem. Hrs.</i>				<i>Sem. Hrs.</i>					
P. Sci.†	269	220	American Government .	3	C. & T.	610	131	Socio-Econ. of Clothing	2
Psych.	273	420	Personality Devel.	3	F. & N.	640	132	Basic Nutrition	3
Soc.	277	211	Intro. to Sociology	3	F. C. Dev.	620	325	The Preschool Child	3
Soc.	277	260	Intro. to Social Work ..	3	F. C. Dev.	620	350	Family Relationships ..	2
			Electives in Soc. and/ or Psych.*	6	F. C. Dev.	620	360	Middle Childhood	3
Spch.	281	616	Group Discussion		F. C. Dev.	620	375	Family Health	2
			Methods	3	F. C. Dev.	620	475	The Adolescent	3
Zool.	293	205	Gen. Zoology or Equiv. ..	4	F. C. Dev.	620	600	The Family	3
Zool.	293	425	Human Physiology	4	F. Ec.	630	360	Home Management	2
					F. Ec.	630	605	Consumers and the Market or ..	
					F. Ec.	630	600	Families in Amer. Econ.	3
								Professional Electives*	3
Option Requirements									58
Unrestricted Electives									20
Curriculum Requirements									46
Total									124

† Or P. Sci. 269 444 (juniors and seniors).

* Selected in consultation with faculty adviser.

Option in Preschool Education (F. C. Dev.)

This option is for the student who wishes to work in a pre-kindergarten education program in an administrative or teaching position.

PROFESSIONAL AND SUPPORTING COURSES

<i>Sem. Hrs.</i>					<i>Sem. Hrs.</i>				
P. Sci.†	269	220	American Government .	3	C. & T.	610	131	Socio-Econ. of Clothing	2
Psych.	273	420	Personality Devel.	3	F. C. Dev.	620	325	The Preschool Child	3
Soc.	277	211	Intro. to Sociology	3	F. C. Dev.	620	330	Creative Activities	3
			Electives in Soc. and/or		F. C. Dev.	620	350	Family Relationships ..	2
			Psychology*	6	F. C. Dev.	620	360	Middle Childhood	3
Spch.	281	616	Group Discuss. Methods	3	F. C. Dev.	620	375	Family Health	2
Zool.	293	205	Gen. Zool. or Equiv.	4	F. C. Dev.	620	475	The Adolescent	3
Zool.	293	425	Human Physiology	4	F. C. Dev.	620	655	Parent Education	3
					F. C. Dev.	620	660	The Family	3
					F. C. Dev.	670		Nursery School Proced.	6
					F. & N.	640	132	Basic Nutrition	3
								Professional Electives*	3
Option Requirements									62
Unrestricted Electives									16
Curriculum Requirements									46
Total									124

† Or P. Sci. 269 444 (juniors and seniors).

* Selected in consultation with faculty adviser.

Consumer Interest Option (F. Ec.)

This option prepares students for work as family financial consultants and as consumer education specialists in adult education with commercial companies, in social welfare, or work in areas of government related to family living and consumption.

PROFESSIONAL AND SUPPORTING COURSES

Sem. Hrs.					Sem. Hrs.				
Econ.	225	120	Economics II	3	F. Ec.	630	200	Family Finance	2
P. Sci.‡	269	220	American Government .	3	F. Ec.	630	320	The House	3
Soc.	277	211	Intro. to Sociology	3	F. Ec.	630	340	Household Equipment .	2
			Soc. Sci. Electives	9	F. Ec.	630	360	Home Management	2
Stat.	285	320	Elements of Statistics .	3	F. Ec.	630	365	Home Management Lab.	2
C. & T.	610	131	Socio-Econ. of Cloth. or	2	F. Ec.	630	600	Fam. in Amer. Econ. ..	3
C. & T.	610	260	Textiles (3)		F. Ec.	630	605	Consumers and the Mkt.	3
F. C. Dev.	620	325	Preschool Child or					Professional	
F. C. Dev.	620	660	The Family	3				Electives*	15-16
					F. & N.	640	132	Basic Nutrition	3
Option Requirements									62
Unrestricted Electives (if F. C. Dev. 620 660 is elected, take F. C. Dev. 620 350)									16
Curriculum Requirements†									46
Total									124

‡ Or P. Sci. 269 444 (juniors and seniors).

* Selected in consultation with faculty adviser.

† Under Liberal-General Education Additional Requirements, take Math. 245 100; and if C. & T. 610 260 is elected, take Chem. 221 110, 221 190 or Phys. 265 101, 265 102.

Housing and Equipment Option (F. Ec.)

The required courses are basic. Electives allow for further specialization: in **equipment** for those interested in design, evaluation, and education; in **housing** for those interested in house planning, kitchen designing, or research; and in **home management** for those interested in social work, in developing homemaker services and home management aides for urban renewal and poverty programs, in positions as "home adviser" with commercial companies or press, radio, and TV. This option also provides basic training for those who wish to prepare for research.

PROFESSIONAL AND SUPPORTING COURSES

Sem. Hrs.					Sem. Hrs.				
Chem.	221	110	General Chemistry	5	F. C. Dev.	620	660	The Family or	
Chem.	221	190	El. Org. Chemistry	3	Soc.	277	646	Sociology of the Family	3
Chem.	221	191	El. Org. Chem. Lab.	2	F. Ec.	630	200	Family Finance	2
Phys.	265	211	Physics I and	4	F. Ec.	630	320	The House	3
Phys.	265	212	Physics II	4	F. Ec.	630	340	Household Equipment ..	2
			or		F. Ec.	630	360	Home Management	2
Phys.	265	115	Household Physics	4	F. Ec.	630	605	Consumers & the Mkt. .	3
Stat.	285	320	Elements of Statistics ..	3	F. Ec.	630	620	Housing Requirements	
Zool.	293	425	Human Physiology or					of Families	2
Bact.	213	220	General Microbiology ..	4	F. Ec.	630	640	Adv. Household Equip.	3
C. & T.	610	260	Textiles	3	F. & N.	640	245	Food Science	3
								Prof. Electives*	11-15
Option Requirements									62
Unrestricted Electives (if F. C. Dev. 620 660 is elected, take F. C. Dev. 620 350)									16
Curriculum Requirements†									46
Total									124

* Selected in consultation with faculty adviser.

† Under Liberal-General Education Additional Requirements, take Math. 245 100; and if Phys. 265 211 and 265 212 are elected, take Math. 245 150; if Zool. 293 425 is elected, take Zool. 293 205; if Soc. 277 646 is elected, take Soc. 277 211.

Option in Foods and Nutrition in Business (F. & N.)

Students 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.

PROFESSIONAL AND SUPPORTING COURSES

				<i>Sem. Hrs.</i>					<i>Sem. Hrs.</i>
A. H.	005	280	Meat Selec. & Util.,		C. & T.	610	260	Textiles	3
			H. E.	2	F. Ec.	630	340	Household Equipment ..	2
Bact.	213	220	General Microbiology ..	4	F. Ec.	630	605	Consumers & the Mkt. .	3
Chem.	221	110	General Chemistry	5	F. Ec.	630	640	Adv. Hshld. Equipment.	3
Chem.	221	190	El. Org. Chemistry	3	F. & N.	640	245	Food Science	3
Chem.	221	191	El. Org. Chem. Lab.	2	F. & N.	640	402	Principles of Nutrition	3
Journ.	289	306	Reporting I	2	F. & N.	640	409	Food Purch. & Meal	
Journ.	289	310	Reporting Laboratory ..	1				Mngt.	3
Journ.	289	610	Home Page	3	F. & N.	640	410	Prin. of Food Demon.	2
Phys.	265	115	Household Physics	4	F. & N.	640	605	Experimental Cookery .	3
Zool.	293	205	General Zoology	4	F. & N.	640	680	Sem. in Foods & Nutr.	2
Zool.	293	425	Human Physiology	4	Ins. M.	660	430	Quan. Food Selec. &	
								Prep.	3
Option Requirements									64
Unrestricted Electives									14
Curriculum Requirements†									46
Total									124

† Under Liberal-General Additional Requirements, take Spch. 281 225; two courses in sequence in humanities (six hours); and an additional six hours social science including Soc. 277 220.

Option in Foods and Nutrition Research (F. & N.)

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 government agencies. Many research positions offer opportunity for graduate study.

PROFESSIONAL AND SUPPORTING COURSES

Sem. Hrs.					Sem. Hrs.				
Bact.	213	220	General Microbiology ..	4	Zool.	293	205	General Zoology	4
Biochem.	020	420	General Biochemistry .	5	Zool.	293	425	Human Physiology	4
Chem.	221	210	Chemistry I	5	F. & N.	640	245	Food Science	3
Chem.	221	230	Chemistry II	3	F. & N.	640	402	Principles of Nutrition	3
Chem.	221	250	Chemistry II Lab.	2	F. & N.	640	409	Food Purchas. & Meal	
Chem.	221	300	Gen. Quan. Analysis	4				Mngt.	3
Chem.	221	350	Gen. Org. Chemistry ..	3	F. & N.	640	605	Experimental Cookery ..	3
Chem.	221	351	Gen. Org. Chem. Lab. ..	2	F. & N.	640	680	Sem. in Foods & Nutr.	2
Math.	245	100	College Algebra	3	F. & N.	640	706	Advanced Nutrition I ..	3
Phys.	265	115	Household Physics	4	F. & N.	640	770	Advanced Foods I	3
								Home Ec. Elective	3
Option Requirements									66
Unrestricted Electives									12
Curriculum Requirements*									46
Total									124

* Under Liberal-General Additional Requirements, take six hours modern language and three hours humanities; and an additional six hours social science.

Option in Dietetics and Institutional Management (Ins. M.)

Opportunities are increasing for dietitians or directors of food services in hospitals, college residence halls, school lunch rooms, cafeterias, and tea rooms. Graduates may accept appointments to internships which are accredited by the American Dietetic Association and which lead to membership in that professional organization.

PROFESSIONAL AND SUPPORTING COURSES

<i>Sem. Hrs.</i>					<i>Sem. Hrs.</i>				
A. H.	005	280	Meat Sel. & Util., H. E.	2	F. & N.	640	245	Food Science	3
B. A.	305	430	Personnel Admin. or		F. & N.	640	409	Food Pur. & Meal Mngt.	3
Psych.	273	515	Personnel Psychology ..	3	F. & N.	640	402	Principles of Nutrition .	3
Bact.	213	220	General Microbiology ..	4	F. & N.	640	605	Experimental Cookery ..	3
Biochem.	020	420	General Biochemistry .	5	F. & N.	640	706	Advanced Nutrition I ..	3
Chem.	221	110	General Chemistry	5	F. & N.	640	712	Dietary Therapy	3
Chem.	221	100	El. Org. Chemistry	3	Ins. M.	660	430	Quan. Food Sel. & Prep.	3
Chem.	221	191	El. Org. Chem. Lab.	2	Ins. M.	660	605	Food Production Mngt.	4
Educ.	405	551	Meth. of Tehg. for		Ins. M.	660	635	Food Serv. Equip. &	
			Diet. Stu.	3				Layout	3
Zool.	293	425	Human Physiology	4	Ins. M.	660	640	Org. & Mngt. of Food	
								Services	3
Option Requirements									62
Unrestricted Electives									16
Curriculum Requirements*									46
Total									124

* Under Liberal-General Education Additional Requirements, take Zool. 293 205.

Curriculum in Home Economics and Journalism

B. S. in Home Economics and Journalism

Opportunities for graduates in this curriculum include writing for national magazines, editing home pages on newspapers, or writing promotional material for businesses and other organizations. The curriculum includes technical journalism courses as well as a concentration in one field of home economics.

LIBERAL-GENERAL EDUCATION COURSES

34 Hours

Communications

8

Engl.	229 100	English Composition I	3
Engl.	229 120	English Composition II	3
Engl.	229 090	English Proficiency	0
Spch.	281 105	Oral Communication	2

Social Science

6

Econ.	225 110	Economics I	3
Psych.	273 110	General Psychology	3

Additional Requirements

20

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 two courses in sequence plus one additional course 8-12.)

HOME ECONOMICS CORE

12 Hours

I. Des.	610 101	Design for Contemporary Living	3
F. C. Dev.	620 250	Human Relations	2
F. Ec.	630 300	Family Economics	3
F. & N.	640 133	Food for Man	2
Gn. H. Ec.	650 110	Intro. to Home Economics	1
Gn. H. Ec.	650 300	Home Economics Seminar	1

PROFESSIONAL AND SUPPORTING COURSES

62 Hours

Journ.	289 105	Graphic Arts Survey	2	Home Economics Courses*	24
Journ.	289 300	Typography Lab.	1	Area of Concentra-	
Journ.	289 306	Reporting I	2	tion (14)	
Journ.	289 310	Reporting Lab.	1		
Journ.	289 316	Reporting II	3	Courses selected from	
Journ.	289 320	Prin. of Advertising	3	two areas other than	
Journ.	289 330	Editing	2	concentration (10)	
Journ.	289 335	News Photography	2		
Journ.	289 400	Radio-TV News or	2	Basic Disciplines*	9
Spch.	281 152	Radio-TV Speech		Courses selected to sup-	
		and Procedures	3	port home economics	
Journ.	289 610	The Home Page	3	areas	
Journ.	289 050	Tech. Journalism Lec. .	0		
		(four semesters)		Journalism Electives**	8

* Selected in consultation with Home Economics faculty adviser.

** Selected in consultation with Technical Journalism faculty adviser.

UNRESTRICTED ELECTIVES

16 Hours

For men who take Air or Military Science, the credits will be accepted in lieu of unrestricted electives.

OTHER

Physical Education (two semesters)	0
Total for Graduation	124

Curriculum in Home Economics with Liberal Arts

B. S. in Home Economics

This curriculum is for the student who wishes to combine a broad cultural education with home economics essentials. Maximum flexibility is provided for the selection of courses best suited to her abilities and interests. The student in consultation with a faculty adviser selects a sequence of courses for concentration in one or more of her chosen academic areas. This curriculum provides excellent backgrounds for professional careers, for graduate study, and for the responsibilities of citizenship and homemaking.

LIBERAL-GENERAL EDUCATION COURSES

65-68 Hours

Communications

8

Engl.	229 100	English Composition I	3
Engl.	229 120	English Composition II	3
Engl.	229 090	English Proficiency	0
Spch.	281 105	Oral Communication I	2

Social Science

12

Econ.	225 110	Economics I	3
Psych.	273 110	General Psychology	3
Electives in Econ., Soc., Anthro., Govt.		.....	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

33 Hours

I. Des.	610 101	Design for Contemp. Living	3
F. C. Dev.	620 250	Human Relations	2
F. Ec.	630 300	Family Economics	3
F. & N.	640 133	Food for Man	2
Gn. H. E.	650 110	Intro. to Home Economics	1
Gn. H. E.	650 300	Home Economics Seminar	1

Courses in Home Economics in one of the following areas of concentration.

21

- A. Clothing and Textiles: C. & T. 610 131 (2), C. & T.** 610 260 (3) courses in fashion and interior design, construction and related areas in home economics (16).
- B. Family and Child Development: F. C. Dev. 620 325 (3), F. C. Dev. 620 350 (2), F. C. Dev. 620 660 (3), courses in Family and Child Development and related areas in home economics (13).
- C. Family Economics: F. Ec. 630 200 (2), F. Ec. 630 360 (2), F. Ec. 630 605 (3), courses in Family Economics and related areas in home economics (14).
- D. General Home Economics: F. & N. 640 132 (3), F. Ec. 640 360 (2), F. C. Dev. 640 325 (3) and selected home economics courses (13).

UNRESTRICTED ELECTIVES

24-27 Hours

For men who take Air or Military Science, the credits will be accepted in lieu of unrestricted electives.

OTHER

Physical Education (two semesters)	0
Total for Graduation	124

* Selected in consultation with faculty adviser.

** Students selecting concentration in Clothing and Textiles should take Chem. 221 110 and 221 190 or Phys. 265 101 and 265 102 for their physical science.

Curriculum in Home Economics and Nursing
B. S. in Home Economics

(Two years and two summers¹ at K-State)
(Two years at KU Medical Center)

This unique curriculum is for students who are interested in a combination of two highly important fields for women—home economics and nursing. Women in both professions render service to families and gain satisfaction in helping others. A student attends K-State for two calendar years and takes courses in general education and basic home economics. After she completes the second summer session, she transfers to the Department of Nursing at the University of Kansas Medical Center for two years.

LIBERAL-GENERAL EDUCATION COURSES			26 Hours
<i>Communications</i>			8
Engl.	229 100	English Composition I	3
Engl.	229 120	English Composition II	3
Engl.	229 090	English Proficiency	0
Spch.	281 105	Oral Communication I	2
<i>Social Science</i>			9
Econ.	225 110	Economics I	3
Psych.	265 110	General Psychology	3
Soc.	277 211	Intro. to Sociology	3
<i>Humanities Electives</i>			9
HOME ECONOMICS			33 Hours
I. Des.	610 101	Design for Contem. Living	3
F. C. Dev.	620 250	Human Relations	2
F. C. Dev.	620 325	The Preschool Child	3
F. C. Dev.	620 350	Family Relations	2
F. Ec.	630 300	Family Economics	3
F. & N.	640 133	Food for Man	2
F. & N.	640 402	Principles of Nutrition	3
Gn. H. E.	650 110	Intro. to Home Economics	1
		Home Economics Electives	14
PROFESSIONAL AND SUPPORTING COURSES			23 Hours
Bact.	213 220	Microbiology	4
Biochem.	020 120	Intro. to Organic & Biochem.	5
Chem.	221 110	General Chemistry	5
Zool.	293 205	General Zoology	4
Zool.	293 240	Human Anat. & Phys. ²	5
OTHER			
Physical Education (two semesters)			0

1. First summer may be taken at another university with dean's approval.
2. Second summer in residence at KSU (with dual enrollment in the Department of Nursing, University of Kansas, School of Medicine, and KSU).

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**30 Hours***Communications***8**

Engl.	229	100	English Composition I	3
Engl.	229	120	English Composition II	3
Engl.	229	090	English Proficiency	0
Spch.	281	105	Oral Communication I	2

*Social Science***6**

Econ.	225	110	Economics I	3
Psych.	265	110	General Psychology	3

*Additional Requirements***16**

Select these courses from the Humanities or Social Sciences, since the Physical and Biological Sciences are represented in depth in supporting courses. Two courses in sequence plus one additional course, all from same discipline (8-9 hours). Courses in one or more additional basic disciplines (8-9 hours).

HOME ECONOMICS CORE**12 Hours**

I. Des.	610	101	Design for Contem. Living	3
F. O. Dev.	620	250	Human Relations	2
F. Ec.	630	300	Family Economics	3
F. & N.	640	133	Food for Man	2
Gn. H. Ec.	650	110	Intro. to Home Economics	1
Gn. H. Ec.	650	300	Home Economics Seminar	1

PROFESSIONAL AND SUPPORTING COURSES**66 Hours**

A. H.	005	280	Meat. Sel. & Util. H. Ec.	2
B. A.	305	273	Principles of Accounting	3
B. A.	305	305	Managerial Accounting	3
B. A.	305	325	Business Law I	3
B. A.	305	350	Small Bus. Operation	3
B. A.	305	400	Administration	3
B. A.	305	431	Personnel Administration	3
Bact.	213	200	Public Health Bact.	3
Chem.	221	110	General Chemistry	5
Chem.	221	190	El. Org. Chem.	3
Chem.	221	191	El. Org. Chem. Lab.	2
Zool.	293	205	General Zoology	4
Zool.	293	425	Human Physiology	4
F. & N.	640	245	Food Science	3
F. & N.	640	402	Principles of Nutrition	3
F. & N.	640	409	Food Purchas. & Meal Mngt.	3
Ins. M.	660	430	Quan. Food Selec. & Prep.	3
Ins. M.	660	605	Food Production Mngt.	4
Ins. M.	660	635	Food Serv. Equip. & Layout	3
Ins. M.	660	640	Org. & Mngt. of Food Serv.	3
Ins. M.	660	780	Prob. in Inst. Mngt.	3

UNRESTRICTED ELECTIVES**16 Hours**

For men who take Air or Military Science, the credits will be accepted in lieu of unrestricted electives.

OTHER

Physical Education (two semesters)	0
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Total for Graduation124 Hours

ACADEMIC PROBATION AND DISMISSAL POLICY COLLEGE OF HOME ECONOMICS

In addition to the University probation and dismissal policy that is applicable to students entering Kansas State University after June 1, 1964, the following probation and dismissal policy is applicable to all students in the College of Home Economics who enter Kansas State University after January 1, 1966.

A. PROBATION AND DISMISSAL POLICY

1. This policy shall apply to all students in the College of Home Economics who enter Kansas State University after January 1, 1966.
2. A student will be placed on probation when his cumulative and/or the previous semester's grade-point average is below 2.000.
3. A student who is admitted to the College of Home Economics from another administrative unit of the University will be placed on probation if his academic record fails to meet the provisions of item 2 above.
4. A student transferring course work from another university shall be subject to the same G. P. A. dismissal-threshold as is applicable to the student who has taken course work only at Kansas State University.
5. A student will be dismissed when his K. S. U. cumulative grade points fall 16 points or more below the total grade points required for a 2.000 cumulative grade-point average, but only if he were on probation during the previous or last semester at Kansas State University.
6. When a student has attempted from 90 through 99 credit hours for which letter grades were received, he will be dismissed if his cumulative grade-point average falls below 1.850, but only if he were on probation during the previous or last semester enrolled at Kansas State University.
7. A student will be dismissed if his cumulative grade-point average is below 2.000 upon completion of 20 credit hours (for which letter grades were received) in excess of the number required for his baccalaureate degree.
8. A student will be dismissed, providing he has been on probation during the previous or last semester enrolled in the College of Home Economics, if his cumulative grade-point average falls below the following minimum University level:

<u>Hours Attempted</u>	<u>Cumulative Grade-Point Average</u>
(Including courses for which WD's, F's and Inc.'s are reported at K. S. U. and other institutions that are accepted at K. S. U.)	
30-59	1.500
60-89	1.750
90 or more	1.850

B. READMISSION POLICY

1. A student who has been dismissed, either under the "old levels" or because of an accumulated deficit exceeding 15 grade points under the "new policy," and who has remained out of K. S. U. for at least one semester may be considered for reinstatement by the University Academic Standards Committee.
2. Students dismissed under "old levels," either at the end of the spring 1964 term or at some time in the future, may be reinstated immediately only by the University Academic Standards Committee upon recommendation or referral by the College of Home Economics Academic Standards Committee.
3. A reinstated student will be placed on probation.
4. a. A reinstated student must make a minimum grade-point average of 2.000 during his first semester or summer session after readmission, or be dismissed.

- b. If he has made a 2.000 grade-point average the first semester after readmission he will be allowed an additional semester and a summer session to raise his grade-point average (under "old levels") or his grade-point deficit (under "new policy"), whichever is applicable, to a point at which he is no longer subject to dismissal. The total time allowed is two semesters and a summer session, and if the applicable level is not attained, he will be dismissed.
5. It is recommended that the University Academic Standards Committee not reinstate a student unless it appears reasonably possible for the student to avoid dismissal at the end of the first semester or year following readmission.

C. ADVISING OF STUDENTS ON PROBATION

1. The College of Home Economics Academic Standards Committee will set general policy as to any restrictions to be placed on students on probation regarding:
 - a. Maximum credit hour load permitted for the ensuing semester or summer session;
 - b. Inclusion in assignment of courses previously failed but required for the degree;
 - c. Curtailment of non-academic activities whether on or off campus, intercollegiate or working;
 - d. Any other measures which might aid the student in returning to good standing (such as enrollment in remedial courses, referral to Counseling Center).
2. All faculty advisers will be informed of this policy, and be charged with the implementation of the recommendations.

CLOTHING AND TEXTILES

JESSIE A. WARDEN,* *Head of Department*

*Professor Warden; * Associate Professors Cormany,* Hawes,* Hill* and Howe; * Assistant Professors Craigie,* Hefter and Ott; Instructors Newby and O'Shea; Emeritus: Professors Barfoot* and Latzke; * Associate Professors Hess* and Lienkaemper**

The Department of Clothing and Textiles offers opportunities for study in socio-economics of clothing, textiles, and clothing construction, history of costume, and design of interiors. Four options leading to a Bachelor of Science degree are provided for students: (1) retailing, (2) fashion design, (3) textiles research, and (4) interior design. Major sequences in the field of clothing and textiles leading to the degree of Master of Science may be selected according to the individual student's choice, in Textiles, Socio-Economics of Clothing, History of Costume and Fashion Designing, and Interior Design.

Facilities include well-equipped studios, laboratories, an extensive University Library, and instruments for textile analysis.

FOR UNDERGRADUATE CREDIT

- 610 131. Socio-economics of Clothing.** (2) I, II. Clothing needs and practices of individuals and social groups; wardrobe planning and buying procedures.
- 610 210. Pattern Study and Garment Construction.** (3) I, II. Selection and fitting of commercial patterns; development of construction techniques using various fabrics. Six hours lab. a week.
- 610 220. Costume Design I.** (2) I, II, S. Line, form, color, texture in costume design, and selection as related to the requirements of the individual. This course is a design basis for garment selection and construction. One hour rec. and three hours lab. a week. Pr.: Art 100.
- 610 230. Fashion Merchandising I.** (3) II. Factors which influence the merchandising of fashion goods.

- 610 260. Textiles.** (3) I, II, S. Fundamentals of textiles as related to the problems of the consumer. Two hours rec. and two hours lab. a week. Pr.: Chem. 190, 191 or Phys. 101, 102.
- 610 310. Tailoring.** (3) I, II, and alt. S. Tailoring techniques; construction of a coat or suit based on a commercial pattern using the "dress-maker method." Six hours lab. a week. Pr.: C. & T. 210 or consent of instructor.
- 610 315. Costume Illustration.** (3) II. The current fashion figure, use of swipe files, fashion layout, and rendering techniques for reproduction. Pr.: Art 190, C. & T. 220, or consent of instructor.
- 610 320. Costume Design II.** (3) II. Creative designing for the fashion figure. Source of fashion inspiration. One hour rec. and six hours lab. a week. Pr.: Art 190, C. & T. 220.
- 610 325. Fashion Life Sketching.** (2) II. The professional fashion approach to the live model; various media; fashion posture, drapery, silhouettes. Pr.: Art 190.
- 610 365. Weaving I.** (2) I, II, S. Principles of design, color, and texture applied to textile construction. Pr.: Art 100 or consent of instructor.
- 610 395. Window Display.** (3) II. Designing and executing displays for windows and interior cases. Actual experience through the cooperation of the local stores. Pr.: Art 100, 290.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 610 525. Fashion Store Service Laboratory.** (5) I. Observation and supervised experience in merchandising procedures in a retail establishment. One credit rec. and four credits of supervised experience. Pr.: C. & T. 230 and B. A. 440.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 610 610. Flat Pattern Designing.** (3) I, II, and alt. S. Application of design in creating dress. Principles of flat pattern designing as applied to various problems. Pr.: C. & T. 210, 220; C. & T. 260 recommended.
- 610 615. Designing by Draping.** (3) II and alt. S. Social significance of fashion; application of design principles to dress. Designs draped in muslin and then completed in suitable fabrics. Six hours lab. a week. Pr.: C. & T. 610.
- 610 620. Costume Design III.** (3) II alt. years. Cont. of Costume Design II. Factors in fashion trend and acceptance; commercial designing for the market. Pr.: C. & T. 320 or consent of instructor.
- 610 625. Fashion Promotion.** (3) II in alt. years. Procedures involved in promotion of fashion merchandise: budgeting, planning, selecting merchandise, and other promotional activities. Pr.: C. & T. 230, or consent of instructor, and B. A. 540.
- 610 630. Clothing Economics.** (3) I and alt. S. The organization of textile industries and markets; consumer problems in relation to market conditions. Pr.: Econ. 110.
- 610 635. Fashion Merchandising II.** (3) I. The processes involved in planning and controlling the operation of fashion departments. Pr.: C. & T. 230 and Marketing 440 or consent of instructor.
- 610 650. Intermediate Textiles.** (3) I and alt. S. Current developments in textiles. Two hours rec. and two hours lab. a week. Pr.: C. & T. 260.
- 610 655. Advanced Textiles.** (3) I, S. Physical, chemical, and optical testing of textiles; emphasis placed on research techniques. One hour rec. and six hours lab. a week. Pr.: C. & T. 260, Chem. 190, 191.
- 610 680. Clothing and Textiles Seminar.** Credit arranged. II and 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.
- 610 710. Advanced Tailoring.** (3) II and alt. S. Development of a design for a coat or suit; techniques of custom tailoring; construction of a

coat or suit. Six hours lab. a week. Pr.: C. & T. 610 or 615 or consent of instructor.

610 730. History of Costume. (3) I, II, S. Aspects of the culture of various countries and periods of history as reflected in costume. Pr.: Hist. 111.

610 750. Experimental Textiles. Credit arranged. I, II, S. Pr.: C. & T. 655.

610 780. Problems in Clothing and Textiles. Credit arranged. I, II, S. Work is offered in garment designing, textiles, history of costume, clothing economics. Pr.: Senior or graduate standing; consent of instructor.

610 785. Problems in Costume Design. Credit arranged. I, II, S. Problems planned with the student to meet particular needs. Pr.: C. & T. 320 or consent of instructor.

FOR GRADUATE CREDIT

610 800. Master's Report. (1 or 2) I, II, S. Written report required of students adopting Plan II for meeting the requirements for the degree Master of Science in clothing and textiles. Subject chosen in consultation with major instructor. Pr.: Consent of department head.

610 830. Advances in Clothing. (2) S. Recent developments related to production, distribution, and use of clothing. Pr.: Six hours of clothing and textiles, three hours economics or equivalent, and consent of head of department.

610 840. Clothing Consuetude. (3) II in alt years. Costume as a reflection of cultural change upon non-western peoples. Pr.: Anthro. 656, C. & T. 730 or consent of instructor.

610 850. Advances in Textiles. (2) S. Recent developments in research related to fibers, yarns and finishes. Pr.: Eight hours of clothing and textiles, eight hours of physical science, and consent of department head.

610 870. Case Studies in the Fashion Industry. (3) On sufficient demand. Independent and creative solutions to typical problems in the fashion industry by means of case study method. Pr.: B. A. 540, C. & T. 630, or consent of instructor.

610 980. Research in Clothing and Textiles. Credit arranged. I, II, S. Research in clothing or in textiles which may form the basis for the master's thesis. Consult instructor for time of meeting. Pr.: Graduate standing.

INTERIOR DESIGN

Concentration in interior design prepares students for professional work in this field. The curriculum follows closely the proposed degree course of the national organization.

Work leading to the master's degree is offered. Graduate students may become teachers, color consultants, or designers of interiors and furnishings.

Prerequisite to graduate work is the completion of an undergraduate curriculum substantially equivalent to that in interior design. Commercial experience is desirable.

FOR UNDERGRADUATE CREDIT

610 101. Design for Contemporary Living. (3) I, II, S. Development of critical awareness of the application of principles of design in contemporary living.

610 240. Interior Design I. (2) I, II, S. Exploration and application of the principles and problems of interior design. Function, form and color studies as applied to interiors. One hour rec. and three hours lab. a week. Pr.: Art 100, C. & T. 101.

610 245. Contemporary Homes. (3) II. The design of the contemporary home as an art expression of the family in relation to everyday living. Three rec. periods a week. Pr.: Art 100 or equiv.

610 340. Interior Design II. (3) I. Survey of contemporary designers, modern trends, new products and cataloging of available products, materials and methods. Pr.: I. Des. 240.

610 345. Home Furnishings. (2) I. Refinishing, restyling, upholstering and/or slipcovering furniture; also designing and making draperies and lamp shades. Pr.: I. Des. 240.

FOR UNDERGRADUATE AND GRADUATE CREDIT

610 600. Advanced Design. (2) II, S. Special emphasis on art structure: designs for textiles using modern commercial repeats. Pr.: Art 600.

610 640. Interior Design III. (3) II. Stress on measured perspectives and renderings of traditional and contemporary interiors. Emphasis on individual design, using new materials. A field trip is required. Pr.: I. Des. 340.

610 645. Historic Furniture Design. (3) II, S. Survey of historical development of interior design from antiquity to the present, including analysis of furniture styles, architectural space and social motivation. Pr.: Art 100.

610 740. Historic Fabric Design. (3) I, S. Design employed in fabrics in each of the great art periods. Pr.: Art 100, C. & T. 260.

610 782. Problems in Interior Design. Credit arranged. I, II, S. Independent exploration in selected problems. Pr.: Full sequence of courses related to problem subject matter.

FAMILY AND CHILD DEVELOPMENT

MARJORIE STITH,* *Head of Department*

Professors McCord and Stith;* Assistant Professors Bollman, Larson and Raffington; Instructors Davis and Kitterman; Emeritus: Professors Kell* and Williams;* Associate Professor Aldous*

This department offers unique opportunities for study of the child and his family, with enriching experiences in the child development laboratory. Courses are planned to create an awareness of the child as a developing personality and to promote an understanding of the dynamics of family relationships. For those interested in working with children or adults two options are provided: (1) Preschool education and (2) community services.

The department offers work toward the degree Master of Science for students interested in professional opportunities such as child development programs, child guidance clinics, family life programs in the public schools, college teaching, child welfare with community agencies, or research in child development and family life. Current emphasis on culturally disadvantaged families and children provides new professional opportunities to the home economist with a graduate degree in child development and family relationships.

The facilities for advanced study include a research room with one-way mirrors and an intercommunication system that provides opportunities for students to observe individuals or groups in an experimental setting. Through the cooperation of the community, opportunity is afforded for practicum experiences with families and with children of all ages.

Prerequisite to graduate work in this field is a B. S. or B. A. degree, with a major in home economics or a related field.

FOR UNDERGRADUATE CREDIT

620 250. Human Relations. (2) I, II, alt. S. Increases the student's knowledge of individual development through awareness and understanding of his relationships with his family, his peers, and other people. Introductory; for beginning students.

620 325. The Preschool Child. (3) I, II, alt. S. Principles of development and guidance of preschool children in homes and in groups; ap-

plication of principles in nursery school. Pr.: Psych. 110 and sophomore standing.

620 330. Creative Experiences for the Preschool Child. (3) I. Techniques of meeting the needs of preschool children through their experiences with stories, music, kinds of play activities, and creative media. Pr.: F. C. Dev. 325.

620 350. Family Relationships. (2) I, II, S. Effects of family interaction upon individual development; consideration of pre-marital, marital, and parent-child relationships. Pr.: Sophomore standing.

620 360. Middle Childhood. (3) I, II, alt. S. Developmental characteristics of middle childhood as a basis for guidance, with emphasis on understanding of family and peer group relationships; observation of children 6 to 12; field work arranged. Pr.: Psych. 110; and one of the following: F. C. Dev. 325, Educ. 202 or Psych. 415.

620 375. Family Health. (2) I, II. Factors conducive to maintaining a high level of health for family members from the prenatal period through old age. Pr: Eight hours biological science or consent of instructor.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

620 475. The Adolescent. (3) I, II. Focus on interpersonal processes; principles and characteristics of the helping relationship in light of developmental aspects of adolescence. Pr.: Five hours of Family and Child Development, or five hours of a combination of Psychology and Educational Psychology, and junior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

620 660. The Family. (3) I, II. Consideration of the family as a whole 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.

620 670. Directed Experience in Preschool Education. (6) II. Full participation in the Nursery School Program. Planning, administration, evaluation; field experiences arranged. Prearrangement and consent of instructor required. Two hours rec. and two hours conference, eight weeks preschool participation. Pr.: F. C. Dev. 330 or equiv.

620 675. Parent Education. (2 or 3) II. Principles in child development and family relationships applied to professional group and individual work with parents. Pr.: F. C. Dev. 325, 660, six hours psychology, or consent of instructor.

620 680. Seminar in Family and Child Development. Credit arranged. I, II, S. Interpretation and evaluation of research relating to family members. May be taken more than one semester with consent of head of department. Pr.: F. C. Dev. 660 or consent of instructor.

620 700. Child Development Center Programming. (2 or 3) S in alt. years. Rationale for and techniques of administering programs for preschool children, including health, education, social services, parent involvement. Pr.: Nine hours F. C. Dev. or consent of instructor.

620 780. Problems in Family and Child Development. Credit arranged. I, II, S. Students writing a master's report enroll in this course. Pr.: Consent of department head.

FOR GRADUATE CREDIT

620 810. Advanced Study of Children. (3) I, S. Consideration of history and methods of child study; basic and current research; analysis of child development concepts in terms of implications for family life. Pr.: Psych. 420 or equiv. and F. C. Dev. 320 or Psych. 415 or consent of instructor.

620 820. Readings in Family and Child Development. (3) II, S. Implications of research findings for preparation for professional work in counseling, teaching, and research in family and child development.

Pr.: F. C. Dev. 325 or equiv. and F. C. Dev. 660 or equiv. and six hours in social science or consent of department head.

620 840. 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. 660 and consent of instructor.

620 850. Principles of Marriage Counseling. (3) I, S. To develop an understanding of the field of marriage counseling; to provide operational definitions, theoretical formulations, and illustrations applicable to its uniqueness. For counselors in the area of interpersonal relationships. Pr.: Educ. 601 or 832 or Psych. 820, F. C. Dev. 660, or consent of instructor.

620 880. Seminar in Human Development. Credit arranged. I, II. A person-centered synthesis based on consideration of forces affecting the physiological, social and self-processes involved in human development. Pr.: Graduate standing and consent of instructor. May be taken more than once with the consent of department head.

620 890. Practicum in Family and Child Development Services and Research. Credit arranged. I, II. Supervised experience in providing help or instruction to family members in various contexts; systematic observation, codification, and reporting of behavior. Pr.: F. C. Dev. 880 and six other graduate hours in Family and Child Development or conc. enrollment, and consent of department head.

620 980. Research in Family and Child Development. Credit arranged. I, II, S. Individual research problems which may form the basis for the master's thesis. Pr.: Consent of department head.

FAMILY ECONOMICS

RICHARD L. D. MORSE,* *Head of Department*

Professor Morse; Associate Professor Agan;* Assistant Professor Annis;* Instructor Rasmussen*

This department prepares students for professional work in the areas of housing, household equipment, home management, consumer education, family finance, 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 family living in society; and to study family management, its resources in relation to its goals. Undergraduate options are: (1) Consumer Interest, (2) Housing and Equipment.

Work leading to the degree Master of Science is offered by this department. Graduate students can prepare themselves for positions in home management laboratories, as family financial consultants, home management and consumer education specialists in extension, teachers and research workers in the fields of housing, equipment, home management, and family economics. Research in family economics, equipment and housing is conducted. Several research 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.

FOR UNDERGRADUATE CREDIT

630 200. Family Finance. (2) I, II, S. Financial problems involved in the effective management of the family's resources.

630 300. Family Economics. (3) I, II, S. Economic forces affecting families, and management by families of their economic resources. Pr.: Econ. 110 or equiv.

630 320. The House. (3) I, II, S. A consideration of dwellings, their environment, plans, and space requirements, which promote effective utilization of family resources. Six hours rec. and lab. a week. Pr.: Sophomore standing.

- 630 340. Household Equipment.** (2) I, II, S. Principles of operation, care and design of equipment used in the home; methods of evaluating equipment performance and demonstrating application of principles. Four hours rec. and lab. a week.
- 630 360. Home Management.** (2) I, II, S. Study of the use of family's resources toward maximum achievement of family's goals. Pr.: Junior standing.
- 630 365. Home Management Laboratory.** (2) I, II, S. Residence in home management or equivalent experience with consent of department. Arrangements for enrollment must be made prior to registration. Pr.: F. Ec. 360 or conc. enrollment.
- 630 380. Field Study in Family Economics.** Credit arranged. 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. 300, 360, and consent of department head.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 630 600. Families in the American Economy.** (3) I, S. 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.
- 630 605. Consumers and the Market.** (2 or 3) I, S. Problems of the consumer in the present market, market practices, aids toward intelligent buying of commodities, and the types of protection, including legislation. Field trip out of town. Pr.: Econ. 110.
- 630 610. Consumer Marketing Programs and Policies.** (3 or 2) 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.
- 630 620. Housing Requirements of Families.** (2) I, S. Housing requirements of families as influenced by their interests, activities, and socioeconomic status; effective ways of meeting these requirements in homes in this area. Six hours rec. and lab. a week. Field trips. Pr.: F. Ec. 320, 340; senior or graduate standing.
- 630 640. 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. 340, Phys. 115; senior or graduate standing.
- 630 660. Work Simplification.** (2) II, S. The application of the principles of motion economy in the performance of certain household tasks to promote effective use of time and energy. One hour rec. and two hours lab. a week. Pr.: Junior standing.
- 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.
- 630 705. Financial Problems of Families.** (2) II. 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. 200 or consent of instructor.
- 630 710. Resources for Consumer Education.** (3 or 2) S. Survey and evaluation of the subject matter content of consumer education books, pamphlets and audio-visu-als. Pr.: Educ. 550 or 752 or degree in social science.
- 630 715. Advances in Consumer Economics.** (3 or 2) S. Fundamental principles of consumer economics emphasizing money management, decision making in consumer purchases, institutional factors bearing on consumer decisions. Pr.: F. Ec. 600, 605 or equiv.

630 780. Problems in Family Economics. Credit arranged. 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.

FOR GRADUATE CREDIT

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. 360, 600, Econ. 110, Soc. 211 or consent of instructor. May be taken more than once with consent of department head.

630 860. Advanced Home Management. Credit arranged. 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. 365 or consent of department head.

630 980. Research in Family Economics. Credit arranged. I, II, S. Individual research problems which may form the basis for the master's thesis. Pr.: Consent of instructor.

FOODS AND NUTRITION

LUCILLE WAKEFIELD,* *Head of Department*

Professors Harrison, Tinklin* and Wakefield;* Associate Professors Alsup,* Browning* and Meyer;* Assistant Professor Newell; Instructor Miner; Emeritus: Professor Ascham;* Associate Professor McMillan;* Assistant Professor Mullen**

Basic courses in foods and nutrition are offered for all home economics students and for those whose major interest is outside the field of home economics. The department also provides specialized instruction for students who wish to become food demonstrators, nutritionists, research workers, dietitians, and teachers of foods and nutrition.

Two options in foods and nutrition lead to a bachelor's degree: (1) foods and nutrition in business and (2) foods and nutrition research. M. S. and Ph. D. programs are offered by the department. Requirement for graduate study in foods and nutrition is the completion of a four-year undergraduate curriculum equivalent to that required of undergraduate students majoring in foods and nutrition at this institution. Research and teaching laboratories provide students with excellent equipment and with opportunity to work in attractive, well-designed facilities. Cooperative research with other departments makes possible a variety of studies. Several one-half time graduate research assistantships are available to qualified students.

FOR UNDERGRADUATE CREDIT

640 132. Basic Nutrition. (3) I, II. Nutritional requirements of man with emphasis on developing judgment in the selection of foods. Not open to students in Foods and Nutrition, Institutional Management, Home Economics Education, Home Economics Extension, and Home Economics and Nursing.

640 133. Food for Man. (2) I, II, S. Food production, distribution, significance and consumption. Nutritional status of world population and local, national and international programs for improvement.

640 245. Food Science. (3) I, II, S. Preparation of foods as related to their chemical, physical, and organoleptic properties. One hour rec. and six hours lab. a week. Pr.: Chem. 190, 191 or 350, 351.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

640 402. Principles of Nutrition. (3) I, II, S. Functions and interrelationships of various nutrients in the body. Two hours rec. and three hours lab. a week. Pr.: Chem. 190, 191 or 350, 351 and Zool. 205.

- 640 405. Advances in Foods.** (2 or 3) S. Recent developments in research related to foods. Pr.: F. & N. 245 or equiv. and consent of department head.
- 640 406. Advances in Nutrition.** (2 or 3) S. Recent developments in research related to nutrition. Pr.: F. & N. 402 or equiv. and consent of department head.
- 640 409. Food Purchasing and Meal Management.** (3) I, II. Principles of food purchasing and meal service, with emphasis on management of money, time, and energy. One hour rec. and six hours lab. a week. Pr.: F. & N. 245 and Econ. 110.
- 640 410. Principles of Food Demonstration.** (2) II. Fundamentals in food demonstrations used by the teacher, home economics agent, and commercial demonstrator. Six hours lab. a week. Pr.: F. & N. 245 and senior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 640 605. Experimental Cookery.** (3) I, II, S. Fundamental principles of food quality evaluation and development of an independent research problem. Pr.: F. & N. 245, Chem. 190, 191, or 350, 351.
- 640 680. Seminar in Foods and Nutrition.** (2) I, II, S. Individual reports and discussion of current research in foods and nutrition. Pr. or conc.: F. & N. 605 and 706 or consent of department head.
- 640 706. Advanced Nutrition I.** (3) I, S. Chemistry of foods and nutrition, emphasizing food nutrients, digestion, and metabolism. Pr.: Biochem. 420, Zool. 425, or Bot. 122; for home economics majors, F. & N. 402.
- 640 712. Diet Therapy.** (3) II. Dietary modifications for pathological conditions. Pr.: F. & N. 706.
- 640 770. Advanced Foods I.** (3) I or II, on demand. Fundamental principles of food preparation approached through applied organic and colloid chemistry. Meat, eggs, emulsions and milk products are considered. Two hours rec. and three hours lab. a week. Pr.: Biochem. 420; for home economics majors, F. & N. 245.
- 640 780. Problems in Foods and Nutrition.** Credit arranged. 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.: For home economics majors, F. & N. 605 or 706.

FOR GRADUATE CREDIT

- 640 801. Advanced Nutrition II.** (3) II, S. Current knowledge of metabolic functions of food in the human organism. Pr.: F. & N. 706.
- 640 807. Advanced Foods II.** (3) I, II, or S, on demand. Cont. of F. & N. 770. Starches, fats and oils, batters and doughs, and frozen foods. Two hours rec. and three hours lab. a week. Pr.: F. & N. 770.
- 640 809. Research Methods in Foods and Nutrition.** (3) I or II, on demand. Chemical, biological, and histological methods applied to research in foods and nutrition. One hour rec. and six hours lab. a week. Pr.: F. & N. 706 and 770.
- 640 810. Nutrition Needs Throughout the Life Cycle.** (3) II in alt. years. Food patterns, dietary intakes and nutritional requirements of infants, children, adolescents, and adults. Pr.: Biochem. 420, Zool. 425, F. & N. 706.
- 640 880. Graduate Seminar in Foods and Nutrition.** (1) I, II. Discussion of investigations in foods and nutrition. May be taken four semesters for credit. Pr. F. & N. 605 and 706 or consent of instructor.
- 640 980. Research in Foods and Nutrition.** Credit arranged. I, II, S. Three hours a week for each hour of credit. Pr.: Consent of instructor.

GENERAL HOME ECONOMICS

DORETTA SCHLAPHOFF HOFFMAN,* *Head of Department*

Professors Hoeflin and Hoffman;* Instructors Reehling and Schulze; Emeritus: Professors Justin and Kramer; Assistant Professor Barnes*

FOR UNDERGRADUATE CREDIT

650 110. Introduction to Home Economics. (1) I. Scope, progress and trends in home economics.

650 300. Home Economics Seminar. (1) I, II. Challenges facing home economists, place of research in home economics, and professionalism in the field. Pr.: Senior standing or consent of instructor.

650 399. Honors Seminar in Home Economics. (1) I, II. Selected topics in home economics. May be taken more than once for credit. Pr.: For students in the Honors Program only.

FOR GRADUATE CREDIT

650 900. Methods of Research in Home Economics. (2) Study meanings of research, review of literature, organization of research from conception through publication, and research procedures. Offered when scheduled.

THE MERRILL-PALMER PROGRAM

Selected graduate and undergraduate students may attend Merrill-Palmer Institute in Detroit for one semester, earning up to 16 hours of credit. All plans must be approved in advance by the Dean of the College of Home Economics.

GENERAL HOME ECONOMICS AND HOME ECONOMICS EDUCATION

Graduate study leading to the degree Master of Science is offered in a combination field made up of general home economics and home economics education. This is made possible through the co-operative arrangements of the College of Home Economics and the College of Education. A student's program of graduate study includes courses in several departments or areas of home economics, in home economics education and related subjects, selected and apportioned according to her needs. A master's thesis or report is required, and is included in the total normal credit hour requirement for the master's degree.

Prerequisites for graduate work in this combination field of general home economics and home economics education include the completion of a standard four-year undergraduate curriculum in home economics, professional courses preparing for teaching or extension service in home economics, and successful experience, either in teaching or in extension service in home economics.

Appropriate courses for this program are listed in the offerings of the various departments in the College of Home Economics and in the College of Education (See pages 231 and 291).

The senior professor in Home Economics Education serves as adviser to assist students in selecting their courses and in planning their individual programs in Home Economics Education. The Dean of the College of Home Economics serves as adviser in General Home Economics.

CURRICULUM IN HOME ECONOMICS AND NURSING

The curriculum for students in Home Economics and Nursing is under the supervision of the dean of the College of Home Economics.

INSTITUTIONAL MANAGEMENT

GRACE M. SHUGART,* *Head of Department*

Professor Shugart; Associate Professors Riggs and Zeigler;* Assistant Professors Hemphill* and Middleton; Emeritus: Professor West**

The Department of Institutional Management provides instruction for students preparing to become dietitians or managers in hospital, college,

university, school, commercial, or industrial food services. Two degrees are offered: a Bachelor of Science in Restaurant Management and a Bachelor of Science in Home Economics for students majoring in Dietetics and Institutional Management.

Graduate study toward the M. S. degree is offered. Prerequisite to a graduate program is the completion of a four-year undergraduate curriculum substantially equivalent to that required of undergraduate students majoring in institutional management at this University.

A well-designed laboratory, furnished with hotel and restaurant-sized equipment, provides experiences in quantity food preparation and management. A research laboratory with large-scale equipment is used for quantity food production research. Facilities for undergraduate and advanced study include units of the residence hall food services and Kansas State Union.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

660 430. Quantity Food Selection and Preparation. (3) II, S. Principles and methods of the purchasing and preparation of food in quantity. One hour rec. and six hours lab. a week. Pr.: F. & N. 409.

660 445. School Lunch Management. (2) S. Advances in management of single and multiple school lunch units; recent developments in food and equipment as related to the School Lunch Program. Pr.: Ins. M. 430 or consent of department head.

FOR UNDERGRADUATE AND GRADUATE CREDIT

660 605. Food Production Management. (4) I. Production planning and controls in food service systems, with management experience in campus food services. Two hours rec. and six hours lab. a week. Pr.: Ins. M. 430.

660 635. Food Service Equipment and Layout. (3) I. Factors affecting the selection, arrangement, and maintenance of equipment in food service systems. Pr.: Ins. M. 430.

660 640. Organization and Management of Food Services. (3 or 2) 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.: Ins. M. 605 or consent of instructor.

660 780. Problems in Institutional Management. Credit arranged. I, II, S. Individual investigation of problems in institutional management. Conferences and reports at appointed hours. Pr. or conc.: Ins. M. 640 or equiv., consent of instructor.

FOR GRADUATE CREDIT

660 885. Seminar in Institutional Management. Credit arranged. 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.: Ins. M. 605 or equiv. and consent of department head.

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.: Ins. M. 640 or equiv.

660 895. Food Service Facilities Planning. (2) II, S. Programming and planning a food service layout, with emphasis on the team approach.

660 980. Research in Institutional Management. Credit arranged. I, II, S. Pr.: Consent of instructor.

The College of Veterinary Medicine

CHARLES E. CORNELIUS,* *Dean*

LEE T. RAILSBACK, *Assistant to the Dean*

VETERINARY ENROLLMENT LIMITED

By authority of the State Board of Regents, enrollment in the Curriculum in Veterinary Medicine is limited. Advancement to each of the four professional years is based upon the applicant's scholarship record and completion of the previous year, or semester, requirements in the curriculum. Resident students wishing to enter this curriculum should apply for admission to the Dean of the College of Veterinary Medicine on or following December 1 upon completion of two or more semesters' requirements in the pre-veterinary curriculum. Transfer students should make application to the Director of Admissions before applying to the Dean of the College on or following December 1. Selection of applicants for the professional curriculum is based upon the applicant's scholarship record in the required pre-veterinary curriculum and other evidence of his fitness. When all other factors are equal, first preference is given to applicants who have qualified for resident fees at Kansas State University. Ordinarily application blanks for the professional curriculum are to be returned in complete form to the Dean's office within six days, after which time the Committee on Selection will proceed with interviews and with the process of selection. In general, no requests for admission to the professional curriculum will be approved after March 1.

Applicants must offer: (1) satisfactory evidence of completing the high school units required for admission to the pre-veterinary curriculum in the College of Arts and Sciences and (2) evidence of completing 64 hours of college work as prescribed in or equivalent to the two pre-veterinary years in the College of Arts and Sciences, or evidence that such work will be completed satisfactorily by the end of the fourth semester of the pre-veterinary years. The pre-veterinary work required may be pursued at Kansas State University or in any approved junior college, college, or university, although it is strongly recommended that the second pre-veterinary year be completed in residence at Kansas State University.

For the applicant's information, a Kansas resident is interpreted as a student who is entitled to pay resident fees; a non-resident student is one who is required to pay non-resident fees.

VETERINARY READING ROOM

As a result of generous contributions from alumni and friends of the College of Veterinary Medicine, the veterinary college has a well-equipped reading room consisting of approximately 6,000 volumes which deal with all phases of veterinary medical literature and many allied fields. Veterinary students are permitted admission to the reading room at any hour during the day, and from 8:00 a.m. to 10:00 p.m. Monday through Thursday; 5:00 p.m. Friday and Saturday.

Fees for Veterinary Medical Students

Assessments

Per semester (16 weeks or more if enrolled in more than six hours)

	<i>Kansas Residents or Staff Members</i>	<i>Non-residents</i>
1. Incidental	\$140.00	\$360.00
2. Student Health	13.00	13.00
3. Student Union (building fund)	7.50	7.50
4. Student Activities (incl. Union operations)	16.50	16.50
Total for Veterinary Medical students	\$177.00	\$397.00

CURRICULUM IN VETERINARY MEDICINE

Doctor of Veterinary Medicine

The Curriculum in Veterinary Medicine in Kansas State University was established to give the young men of this state an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the University would be at their command. Better to fit the veterinarian to deal wisely with the livestock problems which he has to meet, he is required to take the work in livestock feeding, breeding, judging, poultry, in milk and dairy inspection, chemistry, bacteriology, parasitology, and zoology, in addition to his purely professional work.

Work must be taken as prescribed; except that certain courses may be selected from the list of extracurricular electives if the student has the prerequisites.

While not required, fifth-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.

Curriculum in Veterinary Medicine

For admission requirements to this curriculum consult the "Pre-Veterinary Curriculum," page 109.

The two-year Pre-Veterinary Curriculum and this curriculum lead to the two degrees, Bachelor of Science and Doctor of Veterinary Medicine.

THIRD YEAR

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Anat.	710 625	Gross Anatomy I	7	Anat.	710 635	Vet. Bacteriology	5
Anat.	710 645	Microscopic Anatomy I	5	Anat.	710 645	Gross Anatomy II	5
Chem.	221 420	Gen. Bio. Chemistry	5	Bact.	213 410	Micro. Anatomy II	3
Engl.	229 090	English Proficiency	0	Physi.	740 635	Comp. Physiol. I	4
Gn. V. M.	720 140	Vet. Orientation	1				
Total			18	Total			18

FOURTH YEAR

Bact.	213 370	Vet. Immunol. & Virol.	5	Path.	730 603	Gen. Pathology I	5
Physi.	740 645	Physiol. II	5	Physi.	740 670	Pharmacology	6
A. H.	005 240	Livestock Feeding	3	Path.	730 700	Ap. Vet. Parasit.	3
Zool.	293 625	Ani. Parasitology	3	Surg.	750 640	Fund. of Radiology	2
Surg.	740 610	Ani. Hospitalization	2	Path.	730 675	Clin. Pathology	2
Total			18	Total			18

FIFTH YEAR

Path.	730 620	Pathology II	4	Path.	730 630	Pathology III	3
Path.	730 675	Clinical Path. Lec.	1	Surg.	750 615	Lrg. Ani. Surg. I	2
Gn. V. M.	720 690	Vet. Toxicology	3	Surg.	750 670	Sm. Ani. Surg.	2
Surg.	750 605	Princ. of Surgery	3	Surg.	750 680	Obst. and Breed. Dis. ..	5
Surg.	750 700	Clinics I	1	Surg.	750 710	Clinics II	1
Surg.	750 630	Diagnosis	2	Anat.	710 650	Applied Anatomy	1
Surg.	750 650	Dis. of Lrg. Ani. I	4	Surg.	750 660	Dis. of Lrg. Ani. II	4
Gn. V. M.	720 101	Junior-Senior Conf.	1	Gn. V. M.	720 110	Junior-Senior Conf.	1
Total			19	Total			19

SIXTH YEAR

Surg.	750 645	Radiology and Clinical Techniques	1	Surg.	750 770	Inf. Dis. of Lrg. Ani. ..	5
B. A.	305 101	Fundamentals of Business for Professional People	2	Path.	730 757	Poultry Hyg. and Dis.	3
Path.	730 751	Food Hygiene and Pub. Health I	3	Path.	730 753	Food Hygiene and Pub. Health III	4
Path.	730 740	Pathology IV	3	Surg.	750 730	Clinics IV	4
Surg.	750 625	Lrg. Ani. Surg. II	4	Surg.	750 680	Dis. of Sm. Ani.	2
Surg.	750 720	Clinics III	4	Path.	730 795	Necropsy and Clinical Path. Lab. II	0
Path.	730 785	Necropsy and Clinical Path. Lab. I	0	Gn. V. M.	720 130	Junior-Senior Conf.	1
Gn. V. M.	720 600	Vet. Ethics and Official Livstk. Regulations ..	1				
Gn. V. M.	720 120	Junior-Senior Conf.	1				
Total			19	Total			19

Number of hours required for graduation: Pre-veterinary, 64; professional, 148; total, 212.

Extracurricular Electives FIRST OR SECOND SEMESTER

Anat.	710	655	Systemic Anatomy and Physiology	6 semester hours
Anat.	710	660	Systemic Anatomy and Physiology	6 semester hours
Anat.	710	700	Special Anatomy	1 to 4 semester hours
Anat.	710	801	Avian Anatomy	2 to 4 semester hours
Anat.	710	810	Bovine Anatomy	2 to 4 semester hours
Anat.	710	820	Canine Anatomy	2 to 4 semester hours
Anat.	710	830	Anatomy of Laboratory Animals	2 to 4 semester hours
Anat.	710	840	Reproductive Organ Anatomy	1 semester hour
Anat.	710	850	Anatomical Techniques	1 to 2 semester hours
Anat.	710	860	Special Microscopic Anatomy	1 to 4 semester hours
Anat.	710	870	Research in Anatomy	1 to 4 semester hours
Path.	730	645	Veterinary Mycology	3 semester hours
Path.	730	650	Fundamentals of Veterinary Public Health	3 semester hours
Path.	730	690	Veterinary Hematology	3 semester hours
Path.	730	760	Pathological Technic and Diagnosis I	3 semester hours
Path.	730	775	Advanced Food Hygiene	3 semester hours
Path.	730	780	Principles and Techniques of Research in Medical Investigation	4 semester hours
Path.	730	800	Pathology of the Diseases of Laboratory Animals	3 semester hours
Path.	730	802	Research in Pathology	1 to 6 semester hours
Path.	730	810	Problems in Pathology	1 to 6 semester hours
Path.	730	820	Advanced Clinical Pathology	3 semester hours
Path.	730	825	Pathology of Body Fluids	3 semester hours
Path.	730	830	Pathology Seminar	1 semester hour
Path.	730	840	Advanced Systemic Pathology I	5 semester hours
Path.	730	855	Oncology	4 semester hours
Path.	730	860	Necropsy Diagnosis	1 semester hour
Physi.	740	665	Physiologic Constituents of Body Fluids	2 semester hours
Physi.	740	700	Physiology and Pharmacology of the Hormones	3 semester hours
Physi.	740	803	Seminar	1 semester hour
Physi.	740	815	Histophysiology of the Nutritional Deficiencies	3 semester hours
Physi.	740	820	Research in Physiology	1 to 6 semester hours
Physi.	740	824	Physiology of Reproduction	3 semester hours
Physi.	740	825	Advanced Physiology	3 to 5 semester hours
Surg.	750	400	Diseases of Wildlife	3 semester hours
Surg.	750	740	Extra Clinics	1 semester hour
Surg.	750	801	Research in Surgery	1 to 6 semester hours
Surg.	750	810	Research in Medicine	1 to 6 semester hours
Surg.	750	820	Breeding Diseases	1 to 5 semester hours
Surg.	750	825	Systemic Medicine I	3 semester hours
Surg.	750	827	Systemic Medicine II	3 semester hours
Surg.	750	830	Surgical Techniques	1 to 6 semester hours

ANATOMY

D. M. TROTTER,* *Head of Department*

*Professor Trotter; * Assistant Professor Cardinet; Instructors Hartke, Lingle and Rogers; Emeritus: Professor Lumb*

The classroom instruction consists of lectures, quizzes, recitations, dissection of specimens, study of specially dissected specimens and various models of anatomical areas. The anatomical museum contains hundreds of anatomical specimens, various skeleton models, and bones for individual student study. In addition to the conventional embalming, the anatomical specimens are stored under controlled refrigeration. This equipment makes it possible to use fresh anatomical specimens as well as the embalmed material. In the undergraduate courses the ruminant is used as the basic-pattern dissection animal and is followed by a dissection of the dog and comparative studies on the horse, pig, chicken, and cat.

Additional courses on the graduate level are offered for veterinary medicine students or graduates and for graduate students in other fields.

Graduate work in anatomy is offered for students who have completed or are completing the curriculum in veterinary medicine and to graduate students in allied fields of biology. The department has a well-equipped laboratory with adequate facilities, including refrigeration for preserving material in various stages of dissection. The museum contains manikins, skeletons and numerous wet and dry specimens. Materials for study of domestic animals are readily obtainable. The courses offered are sufficiently elastic to cover the special interests of most students. Major work leading to the degree Master of Science is offered.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 710 625. Gross Anatomy I.** (7) I. Dissection of the body cavities, limbs, head, neck, and genital organs of the ruminant. Three hours rec. and 12 hours lab. a week. Pr.: Third-year standing in veterinary medicine. Staff.
- 710 635. Gross Anatomy II.** (5) II. Dissection of the body cavities, limbs, head, and neck of the ruminant and the dog. Parallel comparative studies on the horse, pig, chicken, and cat. Two hours rec. and 12 hours lab. a week. Pr.: Anat. 625.
- 710 640. 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.: Third-year standing in veterinary medicine. Staff.
- 710 645. Microscopic Anatomy II.** (3) II. 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.: Third-year standing in College of Veterinary Medicine or consent of faculty.
- 710 650. Applied Anatomy.** (1) II. Dissections and demonstrations of regions of diagnostic and surgical importance of the domestic animals. Three hours lab. a week. Pr.: Fifth-year standing in veterinary medicine. Staff.
- 710 655. Systemic Anatomy and Physiology I.** (6) I. The first of a two-course integrated sequence for graduate students which presents the general principles relating to the gross and microscopic anatomy and physiology of the various organ systems of domestic animals. Pr.: Consent of faculty.
- 710 660. Systemic Anatomy and Physiology II.** (6) II. The second of a two-course integrated sequence designed for graduate students which presents the general principles relating to the gross and microscopic organ systems of domestic animals. Pr.: Systemic Anatomy and Physi. 655.
- 710 700. Special Anatomy.** Credit arranged. 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.: Anat. 625, 635, Physi. 131, or equiv. Staff. Adapted to the work in which the student is specializing.

FOR GRADUATE CREDIT

- 710 801. Avian Anatomy.** (2 to 4) I, S. The study of the gross anatomy of birds, using the chicken as a type. The histology of certain organs is considered. Pr.: Consent of staff.
- 710 810. Bovine Anatomy.** (2 to 4) I, S. The study of gross anatomy of the digestive, respiratory, and circulatory systems of the ox. The urogenital system, integument, and certain muscles are included as time permits. Pr.: Consent of staff.
- 710 820. Canine Anatomy.** (2 to 4) I, II, S. Pr.: Consent of staff.
- 710 830. Anatomy of Laboratory Animals.** (2 to 4) I of even-numbered years and each S. Pr.: Consent of staff.
- 710 840. Reproductive Organ Anatomy.** (1) II of even-numbered years and each S. Pr.: Consent of staff.
- 710 850. Anatomical Techniques.** (1 to 2) I of odd-numbered years and each S. Pr.: Consent of staff.
- 710 860. Special Microscopic Anatomy.** (1 to 4) II of odd-numbered years and each S. Pr.: Consent of staff.
- 710 870. Research in Anatomy.** (1 to 4) I, II, S. For graduate students in the field of anatomy.

PATHOLOGY, PARASITOLOGY, AND PUBLIC HEALTH

E. H. COLES,* *Head of Department*

Professors Coles, Dennis,* Krull* and West;* Associate Professors Burroughs,* Ewing,* Folse,* Kelley* and Weide;* Assistant Professors Gray, Hibbs,* Mussman* and Shipley; Instructors Dillman, Lee and Wren*

Basic courses in pathology, parasitology, food hygiene and public health are offered for students enrolled in the veterinary medicine curriculum. Some of these courses are also available for graduate students whose major interests are in associated fields. Instruction is by lecture, recitation, laboratory work, seminars and demonstrations. Practical necropsy experience is provided for students as an aid to disease diagnosis. Fifth- and sixth-year students in the Veterinary Medicine Curriculum also receive practical instruction in clinical laboratory procedures and interpretation of laboratory results.

Major work leading to the degree Master of Science and Doctor of Philosophy is offered by the department. Graduate training is available for candidates for the graduate degree in the fields of clinical pathology, general pathology and systemic pathology. Course work at the graduate level includes pathologic techniques and diagnosis, oncology, advanced histopathology, advanced systemic pathology, advanced courses in clinical pathology and the pathology of infectious diseases.

Prerequisite to major work in this field is completion of a four-year curriculum in veterinary medicine.

Facilities of the department for advanced work include a well-equipped clinical pathology laboratory, animal isolation units, a histopathology preparation laboratory, virus research laboratories, a diagnostic laboratory and a wide variety of research instruments. An extensive file of tissue slides and color transparencies is available as well as an opportunity for experimental work with animals in studying animal diseases and related pathology.

COURSES IN PATHOLOGY

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 730 603. General Pathology I.** (5) II. Etiology, pathogenesis, lesions, and termination of the general processes of disease involving inflammation, necrosis, regeneration, oncology, and growth. Three hours lec. and six hours lab. a week. Pr.: Physi. 645, Anat. 645, Biochem. 420.
- 730 620. Pathology II.** (4) I. Systemic pathology; study of the pathology of the cardiovascular, respiratory, digestive and urinary systems. Three hours rec. and three hours lab. a week. Pr.: Path. 603.
- 730 630. Pathology III.** (3) II. Systemic pathology; study of the pathology of the genital, musculo-skeletal, nervous, integumentary and endocrine systems. Two hours rec. and three hours lab. a week. Pr.: Path. 620.
- 730 645. Veterinary Mycology.** (3) I, S in even years. Detailed study of the 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.: Bact. 310, Path. 630.
- 730 650. 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.: Bact. 220 and consent of staff.
- 730 675. Clinical Pathology.** (2) II. The principles, application and interpretation of clinical laboratory procedures as related to disease diagnosis. Emphasis is placed on hematology, urinalysis, parasitology, and examination of body fluids; cytologic studies and coagulation phenomena are also considered. Two hours lec. a week. Pr.: Physi. 645 and Biochem. 420.
- 730 690. Veterinary Hematology.** (3) II. 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.: Path. 675 or consent of instructor.

730 700. Applied Veterinary Parasitology. (3) II. The identification of parasites and the diagnosis of parasitosis; a consideration of the important parasitic diseases of livestock. Two hours rec. and three hours lab. a week. Pr.: Zool. 625. Limited to veterinary students.

730 740. Pathology IV. (3) I. The epidemiology and differential diagnosis of infectious diseases. Three hours rec. and demonstration a week. Pr.: Path. 630.

730 745. Advanced Histopathology. (3) I, S. Advanced study of pathologic alterations of disease. Pr.: Path. 630 and consent of staff.

730 751. Food Hygiene and Public Health I. (3) I. The procedures and regulations pertaining to meat inspection, sanitation, and public health as recommended by the U. S. Department of Agriculture are followed in the examination of food-producing animals. Three hours rec. a week. Pr.: Path. 630.

730 753. Food Hygiene and Public Health II. (4) II. Problems involved in public health as it pertains to transmission of disease from animal to man; problems of control of microorganisms in food processing, handling, and storage; instruction in sanitary production, processing of milk and dairy products. Four hours rec. a week. Pr.: Path. 740, 751.

730 757. Poultry Hygiene and Diseases. (3) II. The prevention, diagnosis, and treatment of poultry diseases. Three hours rec. a week. Pr.: Path. 740.

730 760. Pathological Technique and Diagnosis. (3) I, II. Practical experience in mammalian necropsy, avian necropsy, clinical pathology, histologic techniques, and diagnostic laboratory procedures. Pr.: Path. 740 and consent of staff.

730 775. 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 sea food, poultry, animal meat, and dairy products. Two hours lec. and three hours lab. a week. Pr.: Path. 753.

730 780. 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. 603, Physi. 645.

730 785. Necropsy and Clinical Pathology Lab. I. (1) I. Necropsy and laboratory techniques applied to the diagnosis of animal diseases. Pathologic examinations will include necropsies, biopsies, bacteriologic, hematologic, and parasitologic diagnosis. Pr.: Surg. 710, Path. 675.

730 795. Necropsy and Clinical Pathology Lab. II. (1) II. Open only to sixth-year students in veterinary medicine and graduate students. Pr.: Surg. 720, Path. 785.

FOR GRADUATE CREDIT

730 800. Pathology of the Diseases of Laboratory Animals. (3) I, S. The pathology of the diseases affecting the more common laboratory animals. Pr.: Path. 740, 745, and consent of staff.

730 802. Research in Pathology. (1-6) I, II, S. Individual research in the pathology of animal disease. Pr.: Path. 740, 760. This work may form the basis for the master's thesis and the Ph. D. dissertation.

730 810. Problems in Pathology. (1-6) I, II, S. Work is offered in poultry diseases, parasitology, clinical pathology, food hygiene, public health, and pathology. Pr.: Path. 630, Physi. 645.

730 820. Advanced Clinical Pathology. (3) I, S. Further studies and application of the more detailed laboratory procedures and tests in hematologic, serologic, bacteriologic, chemic and pathologic diagnosis. Pr.: Path. 760 and consent of staff.

- 730 825. Pathology of Body Fluids.** (3) II. A detailed study of the alterations of the components of body fluids occurring in disease processes and interpretations of these changes. Pr.: Path. 820 or consent of staff.
- 730 830. Pathology Seminar.** (1) I, II, S. Pr.: Consult department head.
- 730 835. Veterinary Epidemiology.** (2) I, S in odd years. The scope and objectives of epidemiologic principles relative to infectious and non-infectious diseases transmissible from animals to man, and application of these principles by the use of case investigations. Two hours lec. a week. Pr.: Path. 740, 753.
- 730 840. Advanced Systemic Pathology I.** (5) II. Study of etiology, pathogenesis, gross and microscopic characteristics and systemic effects of diseases of cardiovascular, respiratory, gastrointestinal, urinary, and endocrine systems. Pr.: Path. 745 and consent of staff.
- 730 845. Advanced Systemic Pathology II.** (5) I. Study of etiology, pathogenesis, gross, and microscopic characteristics and systemic effects of diseases of the skin, musculo-skeletal, genital, nervous systems, and special senses. Pr.: Path. 840 and consent of staff.
- 730 850. Pathology of Infectious Diseases.** (5) II in odd years. Detailed study of gross and microscopic lesions of specific infectious diseases; emphasis given to diagnostic characteristics and procedures. Pr.: Path. 745 and consent of staff.
- 730 855. Oncology.** (4) II in even years. Etiology, behavior, gross, microscopic characteristics, identification and prognosis of tumors. Pr.: Path. 745 and consent of staff.
- 730 860. Necropsy Diagnosis.** (1) I, II, S. Necropsy procedures and diagnosis. May be repeated each semester by all pathology majors with a maximum total of 10 credit hours. Pr.: Path. 745 or consent of staff.

PHYSIOLOGY

C. E. CORNELIUS, *Acting Head of Department*

Professor Underbjerg; Associate Professor Kodras; Assistant Professor Fedde; Instructors Frey, Roller and Upson

The Department of Physiology presents courses in comparative physiology and nutrition of domestic animals, the study of body fluids, histophysiology of body tissues, physiology of reproduction, and physiology and pharmacology of the hormones to veterinary and graduate students. An introductory course in anatomy and physiology is presented for undergraduate agricultural and/or other students. An integrated course in anatomy and physiology is offered in conjunction with the Department of Anatomy to graduate students from other areas. Instruction is by lecture, recitation, laboratory work, and physiological demonstrations.

Biophysical electronic instruments with basic accessories are available for monitoring physiological phenomena for demonstrations by the staff. Similar instruments are available for the student's use in the laboratory.

This department offers major work leading to the degree Master of Science in the field of animal physiology and/or animal nutrition, and minor work to students majoring in other departments.

Major work leading to the degree Doctor of Philosophy is offered in Veterinary (Physiology) and Animal Nutrition. (Cf.—Animal Nutrition)

Prerequisite to major work for approved and qualified students is the completion of a four-year curriculum in veterinary medicine, agriculture, or the biological sciences.

Students desiring to do major work should have a fundamental knowledge of the physical and biological sciences such as anatomy, bacteriology, botany and plant pathology, chemistry, entomology, foods and nutrition, mathematics, pathology, physics, and zoology. The exact requirements will depend on the particular field of work the student wishes to pursue. Where necessary background courses are lacking, the student will be required to take additional undergraduate courses.

Biophysical electronic instruments with basic accessories are available for monitoring physiological phenomena in research. Facilities for housing large and small laboratory animals are available.

In addition to the Farrell Library the reference libraries in the department and the College of Veterinary Medicine are supplied with material pertaining to physiology, nutrition, and related fields of medicine.

FOR UNDERGRADUATE CREDIT

740 131. Anatomy and Physiology. (4) I. General anatomy and physiology of the domestic animals. Three hours rec. and three hours lab. a week.

FOR UNDERGRADUATE AND GRADUATE CREDIT

740 635. Physiology I. (5) II. General principles of physiology of the various organ systems of domestic animals. Functional aspects of the cell, principles of body fluids, excitable tissues, endocrine system, blood, cardiology, circulation, respiration, digestion and absorption are included. Four hours rec. and three hours lab. a week. Pr.: Anat. 625, 640; Biochem. 420.

740 645. Physiology II. (5) I. Cont. of Physi. 635 to include liver function, kidney function, electrolyte and acid-base balance, temperature regulation, integumentary system, nutritional physiology, growth and reproduction. Four hours rec. and three hours lab. a week. Pr.: Physi. 635.

740 655. Systemic Anatomy and Physiology I. (6) I. The first of a two-course integrated sequence, designed for graduate students, which presents the general principles relating to the gross and microscopic anatomy and physiology of the various organ systems of domestic animals. Pr.: Consent of staff.

740 660. Systemic Anatomy and Physiology II. (6) II. The second of a two-course integrated sequence, designed for graduate students, which presents the general principles relating to the gross and microscopic anatomy and physiology of the various organ systems of domestic animals. Pr.: Systemic Anatomy and Physi. 655.

740 665. 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. 645 and consent of staff.

740 670. Pharmacology. (6) II. 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. Five hours rec. and three hours lab. a week. Pr.: Physi. 645; or Physi. 660 and Biochem. 420; or equiv.

740 700. 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. 645 and consent of staff.

FOR 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.

740 815. 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.

740 820. Research in Physiology. (1 to 6) I, II, S. For graduate students working toward the M. S. and Ph. D. degrees. Pr.: Consent of staff.

740 824. Physiology of Reproduction. (3) I. Study of reproduction of farm animals as related to the gross and microscopic anatomical structures and physiologic processes in regard to ova and spermatozoa, nutrition, and hormones. Pr.: Anat. 700, or equiv., Physi. 645, and consent of staff.

740 825. 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. 635, 645, 650 and consent of staff.

SURGERY AND MEDICINE

J. E. MOSIER, *Head of Department*

Professors Mosier and Noordsy; Associate Professors Anthony and Oehme; Assistant Professors Carnahan, Fishburn, Guffy, Jernigan, Kirkbride and Milleret; Instructors Blauch, Coffman, Evers, Harris, Kruckenberg, Millis and Santala; Emeriti: Professors Frank and Frick

The Dykstra Veterinary Hospital is a teaching hospital equipped for the diagnosis and treatment of animal diseases and the instruction of students in the science and art of veterinary medicine.

The hospital has a capacity of 35 horses or cattle, and in addition it can accommodate 100 small animal patients such as sheep, swine, dogs, and cats. Members of the clinical staff, accompanied by students, make trips into the surrounding country to diagnose and treat animal patients for all diseases affecting livestock and poultry. Consultation services for the Kansas practitioners result in numerous referral cases or investigational trips.

Fifth- and sixth-year students are active participants in the hospital and departmental services to the community and state. All students are regularly assigned in rotation during the year to various specialists of the clinical and pathology staff. In addition to the daily assignments, sixth-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 a modern hospital.

Major work leading to the degree Master of Science is offered in the Department of Surgery and Medicine. Prerequisite to graduate work in this department is the completion of a four-year curriculum substantially equivalent to that required of students majoring in veterinary medicine at this University.

Opportunities for advanced work in the department include good library facilities and adequate physical equipment. The abundance of available livestock and their diseases offer ample material for research in surgery or medicine.

COURSES IN SURGERY

FOR UNDERGRADUATE AND GRADUATE CREDIT

750 605. Principles of Surgery. (3) I. Lectures on the fundamental principles of surgery; asepsis and antisepsis; anesthesia; tissue repair, surgical instruments and materials; primary surgical techniques. Three hours rec. a week. Pr.: Fifth-year standing in veterinary medicine.

750 615. Large Animal Surgery I. (2) II. Lectures, recitations, and demonstrations on methods of restraint, neoplasms, dentistry, and surgical technique of large animals. Two hours rec. a week. Pr.: Surg. 605.

750 625. Large Animal Surgery II. (4) I. Lectures, recitations, and demonstrations on the surgical diseases of large domestic animals. Four hours rec. a week. Pr.: Surg. 605, 615.

750 670. Small Animal Surgery. (2) II. Description and application of practical surgery on small animals, including anesthesia. Two hours rec. a week. Pr.: Fifth- or sixth-year standing in veterinary medicine.

FOR GRADUATE CREDIT

750 801. Research in Surgery. (1 to 6) I, II, S. The purpose of this course is to attempt to solve many of the surgical problems confronting the veterinary practitioner. Pr.: Anat. 625, 635, 650, Surg. 605, 615, 625. Offered especially for graduates in veterinary medicine.

750 830. Surgical Techniques. (1 to 6) I, II, S. The study and application of the developments in surgical techniques. Pr.: D. V. M. degree or consent of staff.

COURSES IN OBSTETRICS

FOR UNDERGRADUATE AND GRADUATE CREDIT

750 690. Obstetrics and Breeding Diseases. (5) II. The phenomenon of reproduction; principles of normal and abnormal parturition, male and female reproductive diseases and artificial insemination are discussed.

FOR GRADUATE CREDIT

750 820. 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.

COURSES IN CLINIC

FOR UNDERGRADUATE AND GRADUATE CREDIT

750 610. Animal Hospitalization. (2) I. Discussions concerning the principles and practices of hospitalization, nursing care, parenteral nutrition, diagnostic procedures and techniques, and an introduction to the psychology of practice. Two hours rec. a week. Pr.: Fourth-year standing in veterinary medicine.

750 640. Fundamentals of Radiology. (2) II. Lectures regarding the theory and principles of X-rays, production and interpretation of the radiographs, exposure factors, special radiographic methods, film storage and handling, processing, safety measures and biologic effects of radiation. Two hours rec. a week. Pr.: Fourth-year veterinary student or consent of department heads.

750 645. Radiology and Clinical Techniques. (1) I. Demonstrations and practice in techniques of clinical procedures; lectures with demonstrations and student practice in radiology. Three hours lab. a week. Pr.: Surg. 605, 615, 670.

750 700-710. Clinics I and II. (1) I, II, respectively. The large species of animals are treated at the clinic. Students assist in the restraint of animals, diagnosis, preparation of medicants, therapy and administration, and participate in various clinical, radiographic and surgical techniques as well as in case discussions during the clinical phase of the assignments.

750 720-730. Clinics III and IV. (4) I, II, respectively. Students conduct the history taking, examination, and treatment of patients, maintain case records, interpret radiographs, perform surgery and begin to function as professional people in the hospital activities.

750 740. Extra Clinics. (1) I, II, S. A course in clinics intended for those undergraduate students desiring clinical training in addition to that offered in veterinary medicine. Three hours lab. a week. Pr.: Surg. 710 or 730.

COURSES IN MEDICINE

FOR UNDERGRADUATE CREDIT

750 135. Principles of Animal Disease Control. (3) I. A study of the factors that influence animal health and disease control. For students majoring in agriculture and other fields. Three hours lec. a week. Pr.: A. H. 101 or equiv., Physi. 131, and sophomore standing.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

750 400. Diseases of Wildlife. (3) I. Infectious and non-infectious diseases of birds, fur-bearing animals, zoological animals, and fish, with reference to methods of prevention and control. Pr.: Zool. 110, Bact. 110.

FOR UNDERGRADUATE AND GRADUATE CREDIT

750 630. Diagnosis. (2) I. Differential diagnostic methods employed for the detection of disease. Two hours rec. a week. Pr.: Fifth-year standing in veterinary medicine.

750 650-660. Diseases of Large Animals I and II. (4) II, I, respectively. I. Non-infectious diseases of the digestive, circulatory, and respiratory organs of the larger animals. II. Non-infectious diseases of the urinary organs, diseases of metabolism, of the nervous system, the organs and locomotion, the skin, and the eye. Four hours rec. a week each semester. Pr.: Surg. 665, fifth- or sixth-year standing in veterinary medicine.

750 680. Diseases of Small Animals. (2) II. Infectious and non-infectious canine and feline diseases; breeds of dogs, cats, and fur-bearing animals; erection of kennels; the breeding and care of puppies; care and feeding of dogs in general, and the hygienic measures pertaining thereto. Two hours rec. a week. Pr.: Surg. 665, Physi. 670, fourth-year standing in veterinary medicine.

750 770. Infectious Diseases of Large Animals. (5) II. Five hours rec. a week. Pr.: Surg. 660, sixth-year standing in veterinary medicine.

FOR GRADUATE CREDIT

750 810. 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.: Surg. 650, 660, 770. D. V. M. degree or consent of staff.

750 825. Systemic Medicine I. (3) I, II, S. Study of the medical aspects of diseases of the digestive, circulatory, or respiratory systems. Pr.: D. V. M. degree or consent of staff.

750 827. Systemic Medicine II. (3) I, II, S. Study of the medical aspects of diseases of the urinary, nervous, integumentary systems and special senses. Pr.: D. V. M. degree or consent of staff.

GENERAL VETERINARY MEDICINE

FOR UNDERGRADUATE CREDIT

720 101, 720 110, 720 120, 720 130. Junior-Senior Conference. (1) I, II. A faculty-junior-senior conference for the purpose of reviewing all factors concerned in the diagnosis of animal ailments. One hour a week. Pr.: Fifth- or sixth-year standing in veterinary medicine.

720 140. Veterinary Orientation. (1) I. Lectures on introduction to veterinary medicine. One hour lec. a week. Pr.: Third-year standing in veterinary medicine.

FOR UNDERGRADUATE AND GRADUATE CREDIT

720 600. Veterinary Ethics and Official Livestock Regulations. (1) I. Lectures on the ethics of the veterinary profession; national and state livestock laws; quarantine regulations; Harrison Narcotic Act. One hour rec. a week. Pr.: Sixth-year standing in veterinary medicine.

720 690. Veterinary Toxicology. (3) I. A cooperative course in which the identification and habitat of plants poisonous to animals are taught during the first six weeks by the Department of Botany. The toxic principles, symptoms, and treatment of poisonous plants and the more common chemical poisoning occurring in domestic animals, their symptoms and treatment to be taught by the Department of Surgery and Medicine during the remainder of the semester. Three hours rec. a week. Pr.: Physi. 670 and 675.

The Division of Agricultural Extension

GLENN H. BECK,* *Vice President for Agriculture*

HAROLD E. JONES,* *Director*

PAUL W. GRIFFITH,* *Associate Director*

WILBER E. RINGLER,* *Assistant Director*

ROBERT A. BOHANNON,* *Assistant to Director*

E. J. PETERSON, *Administrative Assistant*

The Division of Agricultural Extension conducts educational programs for Kansas people who are not enrolled as resident students of the University. The principal purpose of these programs is that of disseminating up-to-date, practical information developed through research and experimentation at this and other institutions and to encourage the adoption and use of such information.

COOPERATIVE AGRICULTURAL EXTENSION SERVICE

The Cooperative Agricultural Extension Service is so named because the federal, state, and county governments cooperate with the people of a county in planning, conducting, and financing a county-wide educational program for the people of the county. Kansas State University represents the state in this system through the Division of Agricultural Extension. The United States Department of Agriculture represents the Federal government. The County Agricultural Extension Council and the Board of County Commissioners, all of whom are elected by the voters, represent the county.

The Federal and State laws which provide this system, now organized and operating in every Kansas county, state that the purpose is to give instruction to the people in agriculture, home economics and related subjects. Modern conditions continually enlarge the span of subjects related to agriculture and home economics so that all of the subject matter departments on the campus contribute information to the Extension program and most of them are represented in the Division of Agricultural Extension by specialists in their subject matter fields.

The number of people participating in the Cooperative Extension program is also expanding and now includes urban and suburban people as well as farm families with whom the original program in agriculture, home economics, and 4-H club work was developed.

EXTENSION TAKES THE UNIVERSITY TO THE PEOPLE

The basic idea of the Cooperative Extension Service is to take the University to the people, and this is done by stationing members of the faculty in every county. These members of the faculty are not commonly referred to as professors but are known as county Extension agents and include agricultural agents, home economics agents, and club agents. To literally thousands of people, these Extension agents are a constant channel for communicating to and from Kansas State University.

EXTENSION TEACHES IN MANY WAYS

The methods of instruction used by Extension workers are quite informal when compared to classroom methods. Instructions on specific problems may be given by personal conference or in public meetings. Extension workers may train individuals who in turn train others, either individually or in groups. There are thousands of these public-spirited lay leaders in Kansas who are continually receiving instructions from members of the faculty of the Division of Agricultural Extension. They become, in effect, assistant instructors without pay. Extension agents extend information through the newspapers, farm magazines, radio, and television.

EXTENSION STIMULATES COMMUNITY ACTION

Extension workers may assist people to work together as a group for a common goal that is not attainable to the individual, such as: organizing county-wide campaigns to control diseases, pests, and weeds; to conserve soil and moisture in an entire watershed; to 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 TAKES PEOPLE TO THE UNIVERSITY

Extension agents acquaint many people with the work of the University by organizing and conducting groups to visit the University and its branch experiment stations and fields. Many of the state-wide 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 Demonstration Advisory Council and the 4-H Round-up.

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 the educational program of the Department and serve as the local source of information regarding the programs of all other governmental agencies affecting agriculture, such as: the Soil Conservation Service, Rural Electrification Administration, Farm Credit Administration, Agricultural Stabilization and Conservation Service, and the Farmers Home Administration.

COUNTY EXTENSION AS PART OF A STATE AND NATIONAL SYSTEM

While the county Extension offices constitute the principal means of contact between the people and the University, they are not isolated agencies. The county Extension offices are integrated with the state and national movements for the betterment of agriculture, home economics, and 4-H Club work by means of a highly trained staff of specialists and supervisors and administrative personnel, organized under several departments.

EXTENSION SPECIALISTS

Highly trained specialists are stationed at the University and in area offices in different parts of the state. These specialists assist the County Extension Agents in helping to solve problems for individuals that arise in the specialists' particular field. They also train the County Extension Agents in the new developments in research.

The basic role of the Extension Specialists is to interpret research developed by the State Agricultural Experiment Stations and the United States Department of Agriculture in a manner that the citizens of the state can use this complex technical information in solving their problems. The specialists assist the County Extension Agents in demonstrating the feasibility of applying new research by establishing practical demonstrations on farms, in homes and in agribusiness firms. The specialist has the responsibility of discovering problems confronting the people of the state on which further research is needed. Thus he serves as a liaison person between the technical research centers and the places where research is applied in a practical manner in the everyday operation of the farms, firms and homes.

EXTENSION INFORMATION

KENNETH E. THOMAS, *Head of Department*

State Leader and Director, Division of University Information, Professor Thomas

The state leader of the Department of Extension Information is also the director of the Division of University Information. This department

head coordinates and directs informational activities of the Division of Agricultural Extension with all other informational activities of Kansas State University. The Department of Extension Information is divided into two sections consisting of the office of Extension Information and the office of Radio and Television Extension.

OFFICE OF EXTENSION INFORMATION

E. D. WARNER, *Extension Editor and Associate State Leader*

Professor Warner; Associate Professors Dexter, Parris and Shankland; Assistant Professors Graham, Tennant and Unruh; Instructors Dierking, Koons and Peck

It is the objective of this department 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 mediums of communication. It also has the responsibility of reporting the progress being made, especially by rural people, in the adoption of recommended scientific methods of farming and homemaking for an improved agricultural industry. All means of communication are utilized in the dissemination of information for the benefit of both rural and town people.

Scientific information, as written in popular version by the departmental staff, is channeled through all practical means of communication, including newspapers, printed publications, circulars and posters, printed annual reports, exhibits, motion pictures, 2 x 2 slides, radio, and TV.

Each week some 400 weekly newspapers of the state, the farm press, and daily newspaper outlets are provided with news stories on research work of the Kansas Agricultural Experiment Station.

County 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, as well as central office staff workers, in planning and executing information programs that will acquaint people of Kansas with the projects being carried.

Each year over five million copies of timely, popular Extension Service, experiment station, USDA publications and other printed materials are printed and distributed.

A limited library of motion pictures and 2 x 2 slides for visual instruction is maintained for use by county agents, field workers, vocational education instructors, and personnel of cooperating agencies of government. Providing exhibits and other visual aids materials represents an important phase of work in the department.

OFFICE OF RADIO AND TELEVISION EXTENSION

JACK M. BURKE, *Manager, Radio Station KSAC, and Associate State Leader*

Associate Professor Burke; Assistant Professors DeWeese, Hill and Titus; Instructors Kuehn, Norris and Springer; Extension Assistants Nugent and Stockard

Radio is divided into two phases: (a) Broadcasting programs over KSAC, an institution-owned, non-commercial, educational station, and (b) broadcasting script and recorded services and live programs over more than 80 cooperating commercial radio stations in Kansas and on our borders.

Station KSAC, the University radio station, is used exclusively for the dissemination of informative and cultural programs produced by this institution and other educational agencies. Four and three-fourths hours a day are devoted to the broadcast of programs originating from within all colleges of the University and the Division of Agricultural Extension. Approximately 50 percent of the broadcast time is devoted to all-University programs, while 50 percent is devoted to programs originating from within the Extension service. The University radio station is also used as a "proving ground" for students enrolled in radio courses.

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 these stations when the personnel are in the field.

Television programs showing results of research work and demonstrations are prepared, directed, and presented on the several cooperating TV stations in the state. Special television training is provided for Extension and other University staff members who participate from time to time on educational television shows.

AGRICULTURAL PRODUCTION, MANAGEMENT, AND NATURAL RESOURCE DEVELOPMENT

JOHN M. FERGUSON, *State Leader*

The departments listed below include those members of the Extension staff who conduct and supervise programs in agricultural production and management education throughout the state. The programs are developed in cooperation with the county Extension agents and the residents of the counties through their designated leaders.

AGRICULTURAL ECONOMICS

JOHN A. NORDIN, *Head of Department*

NORMAN V. WHITEHAIR, *Assistant Head of Department*

Professors Coolidge, Nordin and Whitehair; Assistant Professors Figurski, McReynolds, Overley, Schlender, Thomas and Treat; Instructors Bartlett, Buarlay, Collins, Frederick, Greene, Guy, Hackler, Hageman, Hamilton, McClelland, Mullen, Parker, Pretzer, Smerchek, Trayer and Urban; Emeritus: Instructor Means

AGRONOMY

RAYMOND V. OLSON, *Head of Department*

FRANK G. BIEBERLY, *Section Leader*

Professors Bieberly, Cleavinger and Olson; Assistant Professors Dicken, Edelblute, Harper, Hyde, Nilson, Peterson, Sander, Whitney and Wilkins; Instructor Beason; Emeritus: Professor Lind

ANIMAL HUSBANDRY

DON L. GOOD, *Head of Department*

WENDELL A. MOYER, *Section Leader*

Professors Good and Moyer; Assistant Professors McAdams, Westmeyer and Zoellner; Instructor Ahlschwede; Emeritus: Professor Elling

DAIRY AND POULTRY SCIENCE

CHARLES L. NORTON, *Head of Department*

Professor Norton; Associate Professor Bonewitz; Assistant Professors Adams, Call and Jackson

ENTOMOLOGY

HERBERT C. KNUTSON, *Head of Department*

Professor Knutson; Associate Professor Gates; Assistant Professor Halazon; Instructor Brooks

HORTICULTURE AND FORESTRY

RONALD W. CAMPBELL, *Head of Department*

HAROLD G. GALLAHER, *Section Leader*

Professors Amstein and Campbell; Associate Professors Gallaher, Morrison and Roberts; Assistant Professors Biswell, Grey and Kepler; Instructors Atchison, Deutsch, Geisler, Gould, Jones, Leuthold, Naughton, Nighswonger, Shreve, Slusher and Strickler

PLANT PATHOLOGY

STUART M. PADY, *Head of Department*

Professors King and Pady; Instructor Willis

VETERINARY MEDICINE

CHARLES E. CORNELIUS, *Dean*

Professor Cornelius; Associate Professors Caley and Osburn; Instructor Upson

ENGINEERING EXTENSION

JOHN M. FERGUSON, *Head of Department*

Professors Ferguson, Stover and Wendling; Associate Professor Herpich; Assistant Professors Jepsen, Schindler, Selby and True; Instructor Bergsrud; Extension Assistant Shuyler

The function of the Department of Engineering Extension 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 means of demonstrations, institutes, training schools, publications, news releases, radio and television programs, and personal contacts.

When the department was first started in 1910, it dealt chiefly with drainage and irrigation. Other subjects have been added, including the control of soil erosion, water conservation, farm structures, farm machinery, conveniences for the farm home, and farm electrification. Much of the work is conducted in cooperation with the county agricultural agent's office in each county. Some work is done in cooperation with various governmental agencies, some with commercial farm equipment companies, some with structural supply and appliance companies, some with REA cooperatives, and some with public utilities.

All counties in the state are cooperating with the department in demonstration work involving drainage, irrigation, water conservation, and the control of erosion. Standardized plans for hundreds of farm buildings are furnished to farm operators each year. Advice and suggestions for remodeling farm buildings are furnished upon request to several hundred farm families each year. Recommendations are made for the selection, installation, and operation of practical and efficient systems of water supply, sewage disposal, wiring, lighting, insulation, air conditioning, and heating for the rural home. A program on the selection, use, adjustment, and cost of operation of farm machinery is conducted each year for the rural people. A planned program of 4-H Club work is conducted on many of the engineering phases of agriculture.

Farm safety and the prevention of farm fires are a definite part of the over-all engineering Extension program.

MARKETING AND UTILIZATION OF AGRICULTURAL PRODUCTS

NORMAN V. WHITEHAIR, *State Leader*

AGRICULTURAL ECONOMICS

JOHN A. NORDIN, *Head of Department*

NORMAN V. WHITEHAIR, *Assistant Head*

Professors Coppersmith, Nordin and Whitehair; Associate Professor Wilkowske; Assistant Professors Jackson, McDonald, Walker and Wallace; Instructor Reed

FLOUR AND FEED MILLING INDUSTRIES

JOHN A. SHELLENBERGER, *Head of Department*

ROBERT W. SCHOEFF, *Section Leader*

Professors Schoeff, Shellenberger and Wilcox; Extension Assistant Balding

These departments are responsible for carrying marketing programs in grain, livestock, poultry, dairy, retail products, marketing information, consumer information, and marketing and utilization of formula feeds.

During part of the year assistance is given in conducting county Extension schools. An increasing portion of the time is devoted to management work with marketing firms in the many areas of production. Special short courses for key personnel are held on the campus or over the state to assist in training in marketing and management principles.

An increasing amount of time is devoted to marketing orders. Adults as well as 4-H Club members are cooperators in these marketing programs.

HOME ECONOMICS EXTENSION

SHIRLEY A. MARSH, *Head of Department*

Professors Koenig and Marsh; Associate Professors Ellithorpe, Johnson, Self and Wiggins; Assistant Professors Anderson, Atkinson, Brill, Dickinson, Hobble, Miller, Neufeld, Pass, Starkey and Ulrich; Instructors Crews and Kemp; Emeritus: Professors Allen, Myers and Smurthwaite; Assistant Professor Briggs

Extension educational work in home economics is carried on in counties through organized study groups, public meetings, press, radio, television, and self-teaching materials. Definite programs are pursued throughout the year by the home demonstration units, 4-H clubs, and special interest groups. Educational materials prepared by the specialists and by county home economics agents are used by local leaders in their respective communities.

The programs of work for the various groups in the counties are based on local situations in the communities. They evolve through community and committee meetings and include the development of activities pertaining not only to the home and to the community but also to international problems. On January 1, 1966, all 105 Kansas counties had appropriations for Home Economics Extension Work, with 116 home economics agent positions.

4-H AND OTHER YOUTH PROGRAMS

GLENN M. BUSSET, *Head of Department*

Professor Busset; Associate Professors Apel, Eyestone, Hanna and Prawl; Assistant Professors Bates, Dunn, Honstead and Tomkinson; Instructor Schlesener; Emeritus: Professor Johnson

4-H Club work is an out-of-school youth educational program of the University, conducted in cooperation with County Agricultural Extension

Councils, and the United States Department of Agriculture. There are about 1,203 clubs with 32,254 club members.

In 4-H Club work young people take part in agricultural, homemaking, community service, and other activities. 4-H Club work is often explained by the slogan, "Learning by Doing." Through projects, scientific information recommended by the University is applied to problems of farm and home living.

Each local 4-H Club elects its own officers, who conduct club meetings with guidance of two or more volunteer adult leaders. Each club meets at least once monthly, in a club member's home or in a public building. The meetings have educational features, such as demonstrations, talks, discussions. Adult leaders counsel with the club members and give guidance to their club activities. Each club member carries to completion at least one project of his own. Any boy or girl 8 to 19 years of age may be a 4-H member. The leaders and club members work in cooperation with the county Extension agents.

4-H Club work began as the University sought to extend research developments to the farmers of Kansas. Children were organized into informal educational groups, shortly after 1903. Corn, canning, and poultry clubs were among the first educational groups that had affiliation with the University.

It became evident that the educational development of boys and girls was of greater importance than the spread of improved farm and home practices; hence, the 4-H Club program was broadened to include not only projects of a farm and home nature, but many activities such as health, music, conservation of wildlife and natural resources, recreation, parliamentary practices, and art. The present 4-H Club program is designed to develop citizenship and leadership among rural young people and to provide opportunity for them to participate with their parents and friends in the adoption of better farm and home practices.

A later development, extending 4-H Club work around the world, is the 4-H Club's International Farm Youth Exchange. Since the two-way exchange began in 1948, 141 Kansas 4-H Club members have lived for periods of up to six months with farm families in 46 foreign countries around the world. Two hundred eighty-one youth from 64 foreign countries have lived in 739 Kansas host family homes. Kansas has sent and received more "IFYE's" than any other state.

COMMUNITY AND RESOURCE DEVELOPMENT

NORMAN V. WHITEHAIR, *State Leader*

DONALD B. ERICKSON, *Section Leader*

AGRICULTURAL ECONOMICS

JOHN A. NORDIN, *Head of Department*

NORMAN V. WHITEHAIR, *Assistant Head of Department*

Professors Erickson, Nordin and Whitehair; Associate Professor Bevins; Assistant Professors Baker, Frazier, Olsen and Smythe

This department has two purposes. The first aim is to provide stimulus and guidance in developing and implementing county or area-wide improvement programs that will strengthen the local economy, and otherwise enhance the level of well-being of people. Extension specialists encourage the optimum development and utilization of all local resources. They cooperate with county Extension agents, local leaders, civic and governmental agencies, and lay organizations to improve agriculture, promote non-farm employment and strengthen community services.

Secondly, Extension has an important obligation in public affairs and a responsibility to help people understand issues affecting them. In doing so, however, specialists do not determine public policy. Rather their function is to equip people through educational processes to analyze the

issues involved on the basis of all available facts. It is the prerogative and responsibility of people themselves, individually or collectively, to make their own decisions on policy issues and express them as they see fit.

COUNTY EXTENSION OPERATIONS

OSCAR W. NORBY, *Head of Department*

Professor Norby; Associate Professors Cox, Hoss, King and Ross; Assistant Professors Blankenhagen, Jones, McGaugh, Mann, Sughrue and Wells; Instructors Crist and Schroeder; Emeritus: Professors Baird, Blecha, Hagans and Jaccard; Associate Professors Glover and Neff; Assistant Professor Meyer

County agricultural Extension work is an organized activity of Kansas State University to develop and carry out the Extension program as authorized in federal and state legislation. The Smith-Lever Act, passed by Congress in 1914 and amended in 1953, defines Extension work as follows:

"Cooperative agricultural extension work shall consist of the giving of instruction and practical demonstration in agriculture and home economics and subjects related thereto, through field demonstrations, publications and otherwise. (Persons not attending or resident in land-grant colleges in the several communities may participate in the program.) This work shall be carried out in such manner as may be mutually agreed upon by the Secretary of Agriculture and the state agricultural college or colleges receiving the benefits of the Smith-Lever Act."

The 1915 session of the Kansas Legislature accepted the provisions of the Smith-Lever Act. The Kansas law provides for county agricultural Extension councils with whom the Extension program of Kansas State University is conducted in the counties. The purpose of the councils is cooperative with the executive board of each County Agricultural Extension Council and the Director of Extension.

Extension work is financed by federal, state and local tax funds. The Smith-Lever Act and subsequent congressional acts authorize federal appropriations for the support of Extension work. The Kansas Legislature makes appropriations for the Extension program through the budget of Kansas State University. The county boards of commissioners appropriate for Extension work in accordance with a budget developed annually and cooperative with the executive board of each County Agricultural Extension Council and the Director of Extension.

Supervisory work of the district agricultural agents assisted by the district home economics agents includes selecting and training persons interested in becoming county Extension agents, representing the Director of Extension by carrying out his responsibilities as imposed by state law, cooperating with the County Agricultural Extension Councils in planning county Extension programs, and otherwise developing the cooperative program in the counties as conducted by the County Agricultural Extension Councils and Kansas State University.

Each of the 105 counties has an agricultural agent and home economics agent position. Thirty-four counties have club agent positions. There are 21 assistant and associate agent positions, making a total of 265 county Extension agent positions. Approximately 35 men and women with Bachelor of Science or Master of Science degrees in agriculture or home economics are employed annually to replace agents who are promoted within the college system or leave Extension work.

DIVISION OF CONTINUING EDUCATION

JOHN E. KITCHENS, *Director*

Professor Kitchens; Assistant Professors Ferguson, Harold, Miller, Mordy and Williamson; Instructors Bowmaker, Hagan, Locke, Reichow and Swegle; Assistant Instructor Deyoe; Emeritus: Professors Billings and Pattison

The Division of Continuing Education was established to help meet the increased demands of a changing society for greater educational oppor-

tunities beyond the campus, in response to rapidly developing patterns for a coordinated statewide extension program in Kansas, and to recent federal legislation.

The purposes of the Division of Continuing Education are to provide:

1. University work for adults whose regular academic program has been interrupted.
2. Technical, professional and postgraduate continuing education.
3. Citizenship training for civic literacy and public responsibility.
4. Continuing opportunities for cultural, intellectual, physical and emotional development.
5. Family life and consumer education.
6. Urban and community development, including research on a wide range of urban problems.
7. Labor education.
8. International education.
9. Assistance to, and cooperation with, a wide range of adult education agencies—public and private; local, national and international; compulsory and voluntary.

To carry out these purposes, the work of the Division is divided into the following areas:

OFFICE OF COMMUNITY SERVICES

OFFICE OF CONFERENCES AND SHORT COURSES

OFFICE OF EXTENSION CLASSES

OFFICE OF HOME STUDY

OFFICE OF CONTRACTS AND GRANTS

OFFICE OF COMMUNITY SERVICES

The Office of Community Services has responsibility for offering a variety of adult education services to the citizens of Kansas. At the present time the following kinds of service are available to individuals, groups, communities, schools, and other organizations:

Community Services. Community services include consultation and assistance on community organization and community improvement problems, and on adult education programs concerned with the liberal arts or public affairs.

Leadership Training. Leadership training is interpreted to mean those activities which help prepare an adult better to fulfill positions of leadership to which he may have been elected or appointed. Leadership training includes workshops, institutes, and program planning aids for groups and organizations concerned with community improvements and adult education programming.

Speakers Bureau. The Speakers Bureau contributes to adult education and program planning in Kansas by publishing two speakers lists each year. One list includes a variety of speakers prepared to talk to different audiences on a variety of subjects. The other list is designed specifically for commencement exercises.

Kansas Rural-Urban Art Program. KRUAP is a program of personal and cultural improvement centered around appreciation for and involvement in art. The program is centered around both credit and non-credit classes, regional art shows and critiques, and a statewide amateur art show.

Music Extension. Music Extension is another cultural extension program of Kansas State University. While not as extensive as the art program, plans are under way to take music as a personal improvement project to all areas of Kansas; to state institutions; to communities with the establishment of community music groups; to church and civic groups with music programs.

World Affairs Education. In cooperation with the Kansas Council on World Affairs and the Foreign Policy Association, the Office of Commu-

nity Services brings to the citizens of Kansas the "Great Decisions" program, the Annual World Affairs Conference, and special programs throughout the year.

OFFICE OF CONFERENCES AND SHORT COURSES

The Office of Conferences and Short Courses is responsible for the conduct of the Division's conference activity. In addition, this Office coordinates all conferences held on the campus which involve off-campus personnel, performing the following functions: (1) advising of suitable dates and listing conferences on the Master Calendar in the Student Union; (2) committing physical plant facilities with the responsible university agents; (3) rendering all conference administrative services as are necessary; (4) coordinating the university conference with other campus and community activities; and (5) except in those cases where non-fee funds are available, collecting conference fees and making disbursements.

Any group interested in sponsoring or co-sponsoring such an activity with the Department is welcome to discuss its proposal with the Conference Coordinator. In general, conferences should conform to the following criteria: (1) be educational in nature so that the main purpose of those attending is to learn rather than to conduct organizational business; (2) be in the public interest; (3) and be financially self-supporting. Over-all conference planning is normally the joint responsibility of a committee composed of representatives from Continuing Education, academic department(s) and the off-campus group(s). Program content is the responsibility of the discipline department.

OFFICE OF EXTENSION CLASSES

The Office of Extension Classes is responsible for the following activities:

Extension Classes. Extension classes are off-campus credit courses offered for adults.

Evening Classes. Evening classes are those regularly scheduled classes which appear on the academic line schedule during normal off-duty hours. The Office of Extension Classes is responsible for the publication and dissemination of information of continuing education opportunities for adults during off-duty working hours; for surveying the needs of the citizens of the greater Manhattan area; and for bringing the results of these surveys to the attention of the University and of the academic departments for their guidance in scheduling classes.

Non-Credit Classes. Non-credit classes are those on- or off-campus courses which, though on a college level, earn no credit toward a degree.

If any group is interested in a particular course they should contact the Coordinator of Classes, Division of Continuing Education, Kansas State University, Manhattan.

Extension Course Offerings. In addition to many courses listed by the academic departments of the University, the Division of Continuing Education may offer the following courses on an extension class basis:

CAC 300. Accounting Principles I. (3) Principles and structure of accounts designed to give power to analyze commercial accounts and statements; problems used as an application of principles to practice. Lecture and demonstrations.

CAC 310. Accounting Principles II. (3) Partnership and corporation accounting and problems, with special emphasis on payroll records and accounting. Lecture and demonstrations. Pr.: Accounting I (CA 300, Acctg. 300, or equiv.).

CAR 3. Drawing Fundamentals I. (2) The fundamentals of drawing for non-professional students. Three hours of studio and three hours by arrangement with the instructor a week. Not to be taken for credit by students enrolled in curriculums in Architecture and Humanities (Art and Painting Adaptation).

CAR 4. Drawing Fundamentals II. (2) Cont. of CAR 3.

CAR 7. Painting I. (2) The fundamentals of painting in oil or water color intended for non-professional students. Three hours of studio and three hours by arrangement with the instructor a week. Not to be taken for credit by students enrolled in curriculums in Architecture and Humanities (Art and Painting Adaptation).

CAR 8. Painting II. (2) Cont. of CAR 7.

CAR 10. Appreciation of Art. (2) Study of principles and ideas basic to an intelligent appreciation of drawings, paintings, and sculpture, and of the aims and techniques of the artists who created them. Two hours rec. a week. Not to be taken for credit by students enrolled in curriculums in Architecture and Humanities (Art and Painting Adaptation).

CAR 11. Clay Modeling I. (2) The fundamentals of clay modeling for non-professional students. Three hours of studio and three hours by arrangement with the instructor a week. Not to be taken for credit by students enrolled in curriculums in Architecture and Art and Painting.

CAR 12. Clay Modeling II. (2) Cont. of CAR 11.

CAR 13. Sculpture I. (2) The fundamentals of sculpture intended for non-professional students. Three hours of studio and three hours by arrangement with the instructor a week. Not to be taken for credit by students enrolled in curriculums in Architecture and Art and Painting.

CAR 14. Sculpture II. (2) Cont. of CAR 13.

OFFICE OF HOME STUDY

By action of the Board of Regents, correspondence instruction in Kansas at the state institutions of higher education was consolidated, with the exception of specialized courses, into a single Statewide Correspondence Center at the University of Kansas, Lawrence, Kansas. For this reason, the offerings at Kansas State University are limited to those contained in the General Catalog. Full and complete information about correspondence study opportunities in Kansas are available from the Office of Home Study.

National University Extension Association. Kansas State University is a member of the National University Extension Association (NUEA). Students who wish to study courses not listed in this bulletin may write to the Secretary of the NUEA, University of Minnesota, Minneapolis, Minnesota 55455, requesting a copy of the **Guide to Correspondence Study** (price 25¢), which lists all home study courses offered by institutions belonging to the NUEA.

College Credit Courses. Students who plan to apply a home study college credit course to a degree from Kansas State University must meet all prerequisites for the course before enrolling in it. Prerequisites for a home study course are the same as for the equivalent course in residence, and are listed in the description of the course. Unless otherwise indicated, the prerequisite is simply high school graduation.

A home study course which is equivalent to a college credit course taught in residence carries exactly the same course number as the course in residence. A home study course which has no exact equivalent in residence carries a special course number beginning with the letter C.

College of Agriculture

AGRONOMY

CA 3. Farm Crops A. (3) An introductory course in agronomy, with special emphasis on agronomic problems of Kansas. Equiv.: Agron. 220 minus 1 hour of laboratory credit. Pr.: Bot. 210 (General Botany) or Bot. 122 (Biology II).

ANIMAL HUSBANDRY

CL 2. History of Breeds. (2) A history of the development and origin of the principal breeds of cattle, swine, sheep, and horses.

HORTICULTURE

CH 3. Floriculture. (2) A study of garden flowers and house plants, propagation, soils, arrangement, and general horticultural practices.

CH 7. Landscape Gardening. (2) A general study of the principles of landscape design; a study in planning and planting home grounds.

POULTRY SCIENCE

100. Farm Poultry Production. (2) An introductory course in poultry production, processing, management, and marketing.

College of Home Economics

FAMILY AND CHILD DEVELOPMENT

C630. Development and Guidance of Youth. (3) Study of the developmental characteristics of the school-age child through adolescence as a basis for guidance; observation of youth 6-18. Field work arranged. Pr.: F. C. Dev. 320 (The Preschool Child).

Non-Credit Courses

All the home study courses of this division are available to the student on a **non-credit** basis regardless of his previous academic experience. Should it seem to this division that he lacks sufficient background for the particular course in which he is interested, he will be so informed. The division also offers five courses which are available for **non-credit** enrollments only:

NC 1. Cooperative Bookkeeping I. Accounting for Cooperative Enterprise. Fundamental principles of double-entry bookkeeping as applied to co-operative associations. For those who have little or no experience or training in accounting. 15 assignments. \$20.00, exclusive of textbook and workbook.

NC 2. Cooperative Bookkeeping II. Accounting and Management Problems. A cont. of Cooperative Bookkeeping I, with emphasis upon accounting and management problems encountered in the operations of a cooperative enterprise. 15 assignments. \$20.00, exclusive of textbook and workbook.

NC 3. English Proficiency Preparation. A review of the fundamentals of English composition for students who require special preparation for the KSU English Proficiency examination. 10 assignments. \$15.00, exclusive of textbook.

NC 4. The Young Child in Groups. The care of preschool children in groups; emphasis on emotional, physical, social, and intellectual development of the child; license requirements, facilities, programs, and administration of care centers; books and stories, music, toys and equipment, creative activities, science and nature for young children. A course especially designed for parents of young children and others interested in the establishment and operation of day care centers, co-operative nursery groups, play groups, or nursery schools. 24 assignments. \$30.00, exclusive of textbook.

NC 5. Salesmanship. An introduction to the theory and practice of sales activities which constitute the daily work of the salesman. The course content is selected so as to be of value to students in general as well as to those interested in business. 16 assignments. \$20.00, exclusive of textbook.

OFFICE OF CONTRACTS AND GRANTS

The Office of Contracts and Grants is responsible for the organization, development, and administration of programs of continuing education financed through federal programs, industry, and non-profit foundations. The activities of this office are limited to two programs at the present time.

1. Rural Electric Job Training and Safety Program, in cooperation with

the Kansas Electric Cooperatives and the State Board for Vocational Education.

2. **Civil Defense Training Program** sponsored by the Office of Civil Defense, Department of the Army, with responsibility for the technical training of civil defense workers in Kansas.

GENERAL SERVICES

For further information about the activities of the Division of Continuing Education write to the Director, Division of Continuing Education, Kansas State University, Manhattan, Kansas.

Officers of Administration, Instruction, and Research

Includes only those with rank of instructor or above.

Administrative Section

- AHRENS, STEPHEN H., Assistant to the Director, Endowment and Development (1964). B. A., 1958, Kansas State University.
- AKIN, JAMES N., Assistant Director of Placement (1966). B. S., 1960, M. S., 1964, Kansas State University.
- ALLISON, MAX L., Residence Hall Director, Instructor (1964). B. S., 1961, University of Illinois.
- AMEEL, HENRIETTA R., Instructor, University Library (1960). A. B., 1930, Coe College; A. B. in L. S., 1935, University of Michigan.
- *BAEHR, WILLIAM FREDERICK, Professor, University Library (1943, 1959). B. S. in L. S., 1927, M. A. 1930, University of Illinois.
- BAXTER, MABEL GERTRUDE, Instructor Emeritus, University Library (1916-47, 1957).
- BEATTY, DANIEL D., Business Manager, Professor of Business Administration (1956, 1959). A. B., 1947, Hope College; M. B. A., 1949, University of Michigan.
- *BECK, GLENN H., Vice President for Agriculture (1936, 1965). B. S., 1936, University of Idaho; M. S., 1938, Kansas State University; Ph. D., 1950, Cornell University.
- BERGEN, GERALD R., Assistant Director, Aids, Awards, and Veterans Service Office (1965). B. S., 1958, Kansas State University.
- BLACKBURN, RICHARD D., Director, Kansas State Union (1963). B. S., 1950, Kansas Wesleyan University; M. P. S., 1956, University of Colorado.
- BRETTTEL, J. ALLAN, Assistant Dean, Foreign Student Adviser, Assistant Professor (1966). B. S., 1949, M. S., 1951, Westminster College.
- *BROWN, JOHN LOTT, Vice President for Academic Affairs, Professor of Psychology and Physiology (1965, 1966). B. S. E. E., 1945, Worcester Polytechnic Institute; M. A., 1949, Temple University; Ph. D., 1952, Columbia University.
- BUTLER, NORVILLE L., Associate Professor, Student Health Center (1964). B. A., 1931, Nebraska Wesleyan University; M. D., 1940, College of Medicine, University of Nebraska.
- CAMP, MILDRED, Associate Professor Emeritus, University Library (1927, 1955). A. B., 1912, Eureka College; B. L. S., 1924, University of Illinois.
- CHILDRESS, DOROTHY S., Instructor, University Library (1966). B. A., 1965, Kansas State University.
- *DANSKIN, DAVID G., Director, Counseling Center, Professor of Psychology (1959, 1966). A. B., 1950, University of Redlands; M. A., 1951, Ph. D., 1954, Ohio State University.
- DAVIS, ELIZABETH HAMILTON, Associate Professor Emeritus, University Library (1920, 1958). A. B., 1909, McMurray College for Women; B. L. S., 1911, University of Illinois.
- DODGE, THEODORE O., Director, Budget Office, Assistant Professor (1946, 1957). B. S., 1940, Kansas State University; C. P. A., 1954, Kansas.
- EDWARDS, A. THORNTON, Director of Housing and Food Service, Associate Professor of Psychology (1945, 1949). B. S., 1941, M. S., 1946, Kansas State University.
- ELKINS, RICHARD NELSON, Assistant Director of Admissions, Instructor (1966). B. S., 1956, M. S., 1963, Kansas State University.
- FARLEY, RICHARD A., Director of Library, Professor (1966). B. S., 1941, University of Wisconsin, M. L. S., 1952, University of Illinois.
- *FARRELL, FRANCIS DAVID, President Emeritus (1918, 1943). B. S., 1907, Utah State Agricultural College; Agr. D., 1925, University of Nebraska; LL. D., 1943, Washburn Municipal University.
- FLOWERS, HENRY M., Instructor, Counseling Center (1966). B. A., 1948, Greenville College; M. A., 1957, Wichita University.
- FOSTER, DONALD E., Assistant to Director of Records (1965). B. S., 1960, M. S., 1961, Kansas State University.
- *FRIESEN, WALTER S., Associate Dean of Students, Men's Affairs; Assistant Professor of Education (1961, 1965). A. B., 1953, Tabor College; M. S., 1957, Kansas State Teachers College; Ed. D., 1963, Colorado State College.
- FRITH, THOMAS J., Assistant Dean of Students, Residence Hall Program Director; Assistant Professor (1965). A. B., 1960, M. A., 1963, Ed. S., 1965, University of Iowa.
- GEISSLER, VERNON V., Assistant Director of Placement (1966). B. S., 1942, M. S., 1966, Kansas State University.
- *GERRITZ, ELLSWORTH M., Dean of Admissions and Records; Professor (1954, 1962). B. E., 1938, St. Cloud State Teachers College; M. S., 1948, Ph. D., 1951, University of Minnesota.
- GINGRICH, RANDOLPH F., Administrator of Physical Plant, Professor (1923, 1959). B. S., 1923, University of Nebraska; M. S., 1929, Kansas State University.
- GROVE, PEARCE S., Associate Professor, University Library (1965). B. A. E., 1956, M. E. D., 1957, University of Florida; M. S. in L. S., 1958, University of Illinois.
- GUTZMAN, STANLEY D., Instructor, University Library (1965). B. A., 1959, University of Colorado, University of Munich and University of Freiburg; M. A., 1965, University of Denver.
- *HAJDA, JOSEPH, Director of International Activities, Associate Professor of Political Science (1957, 1965). B. Pol. Sci., 1948, Charles University, Prague (Czechoslovakia); A. B., 1951, M. A., 1952, Miami University; Ph. D., 1954, Indiana University.
- HESS, H. DEAN, Executive Alumni Secretary (1961). B. S., 1950, Kansas State University.

* Graduate faculty.

- HEYWOOD, KENNETH M., Director, Endowment and Development (1956). B. S., 1938, Kansas State University; M. A., 1949, University of Wyoming.
- JENKINS, DARYL J., Instructor, Counseling Center (1966). B. A., 1962, Washington State University; M. A., 1966, Kansas State University.
- *JONES, C. CLYDE, Vice President for University Development, Professor of Commerce (1960, 1966). B. A., 1944, Marshall College; M. A., 1950, Ph. D., 1954, Northwestern University.
- JUBELT, HILBERT P., Director, Student Health Center; Physician (1961). B. S., 1941, University of Illinois; M. D., 1943, University of Illinois College of Medicine.
- *KENNEDY, CARROLL EARL, Assistant Director of Counseling Center, Associate Professor of Family and Child Development (1954, 1966). A. B., 1949, Wheaton College; M. S., 1953, Kansas State University; Ed. D., 1963, University of Maryland.
- KENNEDY, HAROLD W., Director, Aids, Awards, and Veterans Service Office (1961). B. S., 1949, Colorado State University; M. S., 1962, Kansas State University.
- KERR, WENDELL ROBERT, Assistant to Director of Housing; Assistant Professor of Education (1947, 1957). B. S., 1947, M. S., 1957, Kansas State University.
- *KITCHENS, JOHN E., Director of Continuing Education and Summer School, Professor (1956, 1966). B. A., 1949, New Mexico Western University; M. A., 1954, Ph. D., 1964, University of New Mexico.
- *KRUII, ROBERT F., Dean of the Graduate School; Professor of Chemistry (1967). A. B., 1948, Ph. D., 1951, Washington University (St. Louis).
- LACY, JR., BURRITT S., Consulting Psychiatrist, Student Health Center (1964). B. A., 1941, Harvard University; M. D., 1944, Cornell University.
- LAFENE, BENJAMIN WILLIAM, Professor; Physician, Student Health Center (1946, 1948, 1962). B. S., 1923, Michigan State University; M. D., 1931, Western Reserve University.
- LAHEY, MARGARET N., Associate Dean of Students and Dean of Women; Associate Professor (1957). B. S., 1941, M. A., 1953, Ph. D., 1962, University of Minnesota.
- LAMBERT, JOHN P., Instructor, Radiation Safety Officer (1964). B. S., 1959, Lebanon Valley College; M. P. H., 1963, University of Michigan.
- LAUGHLIN, J. BRUCE, Director of Placement (1962, 1966). B. S., 1950, University of Kansas; M. S., 1961, Kansas State University.
- LEWIS, JAMES J., Director of Admissions (1963). B. S., 1953, M. S., 1954, Kansas State University; Ed. D., 1961, University of Kansas.
- LUNN, SHARON L., Residence Hall Director; Instructor (1965). B. S., 1962, Baker University.
- MacMILLAN, WILLIAM, Instructor, Counseling Center (1964). A. B., 1951, University of Michigan.
- MATHEWS, JAMES C., Assistant Professor, University Library (1958, 1966). B. S., 1952, Kansas State College of Pittsburg; M. S. in L. S., 1956, Kansas State Teachers College of Emporia.
- *McCAIN, JAMES ALLEN, President (1950). A. B., 1926, LL. D., 1951, Wofford College; M. A., 1929, Duke University; Ed. D., 1948, Stanford University; LL. D., 1965, Montana State University.
- MILBOURN, MAX W., Assistant to the President, Associate Professor of Journalism (1949, 1957). A. B., 1938, University of Wichita.
- MORRIS, LAURENCE F., Director of Records, Assistant Professor (1966). B. A., 1951, Regis College; M. A., 1955, Western State College; Ed. D., 1965, University of Colorado.
- NELSON, DeVERE V., Director of Sports Information, Assistant Professor (1966). B. S., 1949, Kansas State University.
- *NOONAN, JOHN P., Associate Dean of Graduate School (1947, 1966). B. S., 1947, Rockhurst College; M. S., 1950, Kansas State University; Ph. D., 1955, Denver University.
- OGG, WILLIAM D., Instructor, Counseling Center (1964). B. S., 1956, M. S., 1964, Kansas State University.
- OWSLEY, CAROL LEE, Instructor, University Library (1942, 1947). B. S., 1932, M. S., 1947, Kansas State University.
- PADY, DONALD S., Instructor, University Library (1966). A. B., 1959, University of Kansas; M. S. in L. S., 1962, Kansas State Teachers College of Emporia.
- *PARKER, S. THOMAS, Director of Computing Center, Professor of Mathematics (1947, 1951, 1963). B. A., 1931, M. A., 1934, University of British Columbia (Canada); Ph. D., 1947, University of Cincinnati.
- PEINE, CAROLINE F., Assistant Dean of Women, Instructor (1961). A. B., 1947, Carleton College; M. S., 1951, Kansas State University.
- PERRY, RALPH H., Comptroller, Assistant Professor (1946, 1953, 1962). B. S., 1946, Kansas State University.
- PETERS, CHESTER E., Dean of Students and Dean of Men, Professor (1958). B. S., 1947, M. S., 1950, Kansas State University; Ph. D., 1953, University of Wisconsin.
- PETERSON, JACK TELLIN, Consulting Pathologist, Student Health Center (1965). A. B., M. D., 1950, Kansas University.
- PLYE, CALVIN A., Assistant Professor, Student Health Center (1963). B. A., 1929, Pacific Union College; M. D., 1943, Loma Linda University.
- RAZAK, C. KENNETH, Director of Industrial Research (1966). B. S., 1939, M. S., 1942, University of Kansas. Professional Engineer, 1951.
- RICHARDS, ARNE H., Instructor, University Library (1965). B. A., 1954, Yankton College; M. S. in L. S., 1960, University of Illinois.
- RICHTER, EDWARD A., Instructor, University Library (1960). B. S., 1951, South Dakota State College; M. L. S., 1955, University of Minnesota.

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- RIDGEWAY, EDITH MARY, Assistant Professor, University Library (1943, 1956). A. B., 1927, Kansas State Teachers College of Emporia; B. S. in L. S., 1940, University of Illinois; M. S., 1956, Kansas State University.
- RIGGS, JEAN M., Associate Professor of Institutional Management, Associate Director of Housing and Food Service (1960, 1964). B. S., 1939, M. S., 1956, Iowa State University.
- ROBERTS, MARY EILLEN, Assistant Professor, University Library (1938, 1943). B. S., 1930, Kansas State University; B. S. in L. S., 1938, University of Illinois; A. M., 1949, University of Michigan.
- ROCHAT, CARL ROBERT, Director, Office of University News, Associate Professor of Journalism (1953, 1954). B. S., 1940, Kansas State University; M. S., 1948, University of Illinois.
- ROOF, DONALD B., Residence Hall Director, Instructor (1964). B. S., 1964, Kansas State University.
- RUDOLPH, GERALD A., Associate Professor, University Library (1963). A. B., 1952, Washington University; M. S. in L. S., 1960, Western Reserve University; Ph. D., 1959, University of Washington.
- *SINNETT, E. ROBERT, Assistant Director, Counseling Center; Counselor; Associate Professor of Psychology (1962). A. B., 1948, University of Iowa; M. A., 1950, Ph. D., 1953, University of Michigan.
- SMITH, WALTER D., Associate Director, Kansas State Union (1957, 1966). B. A., 1960, Kansas Wesleyan University.
- SODERHOLM, DOROTHY J., Instructor, University Library (1966). B. A., 1946, Kearney State Teachers College; M. A., 1956, Wheaton College; M. S., 1959, University of Illinois.
- STEHLEY, DONALD R., Associate Alumni Secretary (1961, 1966). B. S., 1950, Kansas State University.
- STRONG, MABEL B., Residence Hall Director; Instructor (1964). B. S., 1961, Kansas State University.
- TAYLOR, ELLYN MARIE, Instructor, University Library (1957, 1958). B. S., 1938, Kansas State Teachers College of Emporia.
- *THOMAS, KENNETH EUGENE, Head, Division of University Information, Professor (1951, 1963). A. B., 1951, Southwestern College; M. S., 1952, Kansas State University; Ph. D., 1961, University of Wisconsin.
- THOMPSON, WILMA M., Residence Hall Director, Instructor (1960). B. S., 1960, Colorado State College; M. S., 1964, Kansas State University.
- TOWNSEND, ROBERT B., Assistant Professor, University Library (1964, 1966). B. S., 1951, M. S. in L. S., 1962, University of Illinois.
- *TREMEL, WILLIAM C., Director, Student Religious Activities; Professor of Philosophy (1956, 1965). A. B., 1940, Denver University; Th. M., 1945, Th. D., 1950, Iliff School of Theology.
- WADE, IONE C., Residence Hall Director, Instructor (1965). B. S., 1928, University of Southern California; M. S., 1963, Washington State University.
- WALLACE, ROGER KEITH, Consulting Radiologist, Student Health Center (1954). B. S., M. S., 1944, University of South Dakota; M. D., 1946, University of Nebraska.
- WANCURA, ELDON N., Instructor, University Library (1962). B. S., 1957, Kansas State University; M. A., 1961, Denver University.
- WASHINGTON, PANSY H., Instructor, University Library (1964). B. S., 1940, Sam Houston College; M. S. in L. S., 1952, University of Southern California.
- *WEBER, ARTHUR D., Vice President Emeritus (1924, 1963). B. S., 1922, M. S., 1926, Kansas State University; Ph. D., 1940, D. Sc., 1950, Purdue University.
- WHITE, NEVA L., Assistant Professor, University Library (1966). A. B., 1944, Goshen College; A. B. in L. S., 1946, University of Michigan.
- *WIESNER, EUGENE F., Assistant Professor, Counseling Center (1964). B. S., 1957, M. S. in Education, 1959, Fort Hays State College; Ph. D., 1964, University of Kansas.
- WILCOX, RICHARD P., Instructor, University Library (1964). A. B., 1960, B. S., 1962, University of Kansas; M. S. in L. S., 1963, Kansas State Teachers College of Emporia.
- WILLIAMS, EVAN W., Instructor, University Library (1964). A. B., 1955, Washington University; M. S. in L. S., 1956, University of Illinois.
- WOODRUFF, DORIS J., Residence Hall Director, Instructor (1964). B. S., 1961, Kansas State University.

College of Agriculture

- ABMEYER, ERWIN, Assistant Professor of Horticulture; Assistant Pomologist, Northeast Kansas Experiment Fields (1934, 1935). B. S., 1933, Kansas State University.
- *ADAMS, ALBERT W., Assistant Professor of Dairy and Poultry Science; Assistant Poultry Scientist, Agr. Exp. Sta. (1962, 1965). B. S., 1951, M. S., 1955, Kansas State University.
- AGAN, RAYMOND JOHN, Professor of Agriculture (1963). B. S., 1940, M. S., 1950, Iowa State University; Ed. D., 1955, University of Missouri.
- AICHER, LOUIS CORNELIUS, Professor of Animal Husbandry Emeritus (1921, 1957). B. S., 1910, Kansas State University.
- ALLEN, DELORAN M., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1966). B. S., 1961, Kansas State University; M. S., 1963, University of Idaho; Ph. D., 1966, Michigan State University.
- *ANDERSON, KLING LEROY, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1936, 1946). B. S., 1936, University of California; M. S., 1938, Kansas State University; Ph. D., 1951, University of Nebraska.

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- ARMSTRONG, C. ANCEL, Instructor in Dairy Science; Assistant in Dairy Improvement, Agr. Exp. Sta. (1958). B. S., 1958, Kansas State University.
- ATKINSON, C. HARRY, Associate Professor of Agronomy; Soil Scientist, Soil Conservation Service, U. S. D. A., Agr. Exp. Sta. (1949). B. S., 1931, M. S., 1933, Pennsylvania State University.
- *AUBEL, CLIFF E., Professor of Animal Husbandry Emeritus (1915, 1961). B. S., 1915, Pennsylvania State University; M. S., 1917, Kansas State University; Ph. D., 1931, University of Minnesota.
- AXELTON, MILBURN C., Instructor in Agronomy; Assistant Agronomist, Southwest Kansas Experiment Fields (1929, 1951). B. S., 1928, Kansas State University.
- BANBURY, EVANS E., Associate Professor; Superintendent in charge, Colby Branch Agr. Exp. Sta. (1946, 1955). B. S., 1940, Kansas State University.
- *BARNETT, FRANCIS L., Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1956, 1959). B. S., 1952, McGill University (Canada); M. S., 1954, Ph. D., 1956, Pennsylvania State University.
- *BARTLEY, ERLE E., Professor of Dairy and Poultry Science; Dairy Nutritionist, Agr. Exp. Sta. (1949, 1958). B. S., 1944, Allahabad University (India); M. S., 1946, Ph. D., 1949, Iowa State University.
- *BASSETTE, RICHARD, Associate Professor of Dairy and Poultry Science; Associate Dairy Scientist, Agr. Exp. Sta. (1958, 1964). B. S., 1952, M. S., 1955, Ph. D., 1958, University of Maryland.
- BAXTER, WILLIAM M., Instructor and Assistant to the Superintendent, Fort Hays Agr. Exp. Sta. (1949, 1952). B. S., 1949, Kansas State University.
- *BECK, GLENN H., Vice President for Agriculture (1936, 1965). B. S., 1936, University of Idaho; M. S., 1938, Kansas State University; Ph. D., 1950, Cornell University.
- *BIDWELL, ORVILLE W., Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1950, 1960). A. B., 1940, Oberlin College; B. S., 1942, Ph. D., 1949, Ohio State University.
- *BLOCKER, H. DERRICK, Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1965). B. S., 1954, M. S., 1958, Clemson University; Ph. D., 1965, North Carolina State.
- *BOHANNON, ROBERT A., Professor; Campus Coordinator, International Agricultural Programs, Agr. Exp. Sta. (1951, 1966). B. S., 1949, Michigan State University; M. S., 1951, Kansas State University; Ph. D., 1957, University of Illinois.
- BOREN, FRED W., Associate Professor and Superintendent in charge, Southeast Kansas Branch Agr. Exp. Sta. (1957, 1965). B. S., 1946, A and M College of Texas; M. S., 1950, Kansas State University; Ph. D., 1965, Utah State University.
- BRADLEY, HOWARD RALEY, Associate Professor of Agriculture (1951). B. S., 1930, M. S., 1937, Kansas State University.
- *BRANDNER, LOWELL, Professor; Agricultural Editor (1947, 1961). A. B., 1937, B. S., 1937, Emporia State Teachers College; M. S., 1951, Kansas State University; Ph. D., 1960, University of Wisconsin.
- BRAUM, JOHN E., Assistant Professor of Agronomy; Assistant Agronomist, East Central Kansas Experiment Fields (1951, 1952). B. S., 1951, Kansas State University.
- BRENT, BENNY E., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1966). B. S., 1959, M. S., 1960, Kansas State University; Ph. D., 1966, Michigan State University.
- BRETHOUR, JOHN R., Assistant Professor; Assistant Animal Husbandman, Fort Hays Branch Agr. Exp. Sta. (1957, 1962). B. S., 1955, Kansas State University; M. S., 1956, Oklahoma State University.
- BROWDER, LEWIS E., Instructor in Plant Pathology; Plant Pathologist, U. S. D. A., Agr. Exp. Sta. (1958). A. S., 1952, Cameron State Agricultural College; B. S., 1954, M. S., 1956, Oklahoma State University.
- *BULLER, ORLAN H., Assistant Professor of Agricultural Economics; Assistant Economist, Agr. Exp. Sta. (1963). B. S., 1958, Kansas State University; M. S., 1959, Ph. D., 1965, Michigan State University.
- BURCHETT, LOWELL A., Instructor in Agronomy; Assistant Agronomist, North Central Kansas Experiment Fields (1965). B. S., 1956, Oklahoma State University.
- *BURKHARD, RAYMOND KENNETH, Associate Professor of Biochemistry; Associate Biochemist, Agr. Exp. Sta. (1950, 1957). A. B., 1947, Arizona State College; Ph. D., 1950, Northwestern University.
- *BURLEIGH, JAMES R., Assistant Professor of Plant Pathology; Plant Pathologist, U. S. D. A., Agr. Exp. Sta. (1964). B. S., 1958, Fresno State College; M. S., 1962, Ph. D., 1964, Washington State University.
- *CALL, LELAND E., Dean and Director Emeritus (1907, 1946). B. S., 1906, M. S., 1912, Ohio State University.
- *CAMPBELL, RONALD W., Professor; Head, Department of Horticulture; Horticulturist in charge, Agr. Exp. Sta. (1946, 1966). B. S., 1943, M. S., 1946, Kansas State University; Ph. D., 1955, Michigan State University.
- CARPENTER, FRANK R., Assistant Dean of Resident Instruction; Assistant Professor (1961). B. S., 1948, M. S., 1951, Kansas State University.
- *CARPENTER, WILLIAM J., Professor of Horticulture; Floriculturist, Agr. Exp. Sta. (1953, 1966). B. S., 1949, University of Maryland; M. S., 1950, Ph. D., 1953, Michigan State University.
- CLAPP, ALFRED L., Professor of Agronomy Emeritus (1915, 1961). B. S., 1914, M. S., 1934, Kansas State University.

* Graduate faculty.

- *CLAYDON, THOMAS J., Professor of Dairy and Poultry Science; Dairy Scientist, Agr. Exp. Sta. (1946, 1965). B. S. A., 1934, University of Saskatchewan (Canada); M. S., 1936, Ph. D., 1939, Iowa State University.
- *CLEGG, ROBERT E., Professor of Biochemistry; Biochemist, Agr. Exp. Sta. (1948, 1954). B. S., 1936, Rhode Island State College; M. S., 1939, North Carolina State College; Ph. D., 1948, Iowa State University.
- CONVERSE, HARRY H., Agricultural Engineer, U. S. D. A., Off Farm Conditioning, Handling and Storage of Grain; Agr. Exp. Sta. (1954). B. S., 1946, M. S., 1947, Kansas State University.
- COVINGTON, RICHARD C., Instructor in Animal Husbandry (1966). B. S., 1964, California State Polytechnic College.
- *COX, RUFUS F., Professor of Animal Husbandry; Animal Husbandman, Agr. Exp. Sta., Head of Department Emeritus (1930, 1966). B. S., 1923, Oklahoma State University; M. S., 1925, Iowa State University; Ph. D., 1941, Cornell University.
- *CRAIG, JAMES V., Professor of Dairy and Poultry Science; Poultry Geneticist, Agr. Exp. Sta. (1955, 1960). B. S., 1948, M. S., 1949, University of Illinois; Ph. D., 1952, University of Wisconsin.
- *CUNNINGHAM, BRYCE A., Assistant Professor of Biochemistry; Assistant Biochemist, Agr. Exp. Sta. (1963). B. A., 1955, B. S., 1958, Ph. D., 1963, University of Minnesota.
- DePEW, LESTER J., Assistant Professor of Entomology; Assistant Entomologist (P. O. Garden City) (1954, 1959). B. S., 1949, Colorado A and M; M. S., 1954, University of Minnesota.
- *DEYOE, CHARLES W., Associate Professor of Grain Science and Industry; Agr. Exp. Sta. (1962, 1963). B. S., 1955, Kansas State University; M. S., 1957, Ph. D., 1959, Texas A and M College.
- DICKERSON, JERRY D., Engineering Technician, U. S. D. A., Agricultural Research Service (1963). B. S., 1957, M. S., 1964, Kansas State University.
- *DICKERSON, OTTIE J., Associate Professor of Plant Pathology; Nematologist, Agr. Exp. Sta. (1961, 1966). A. S., 1953, Arkansas Polytechnic College; B. S. A., 1955, M. S., 1956, University of Arkansas; Ph. D., 1961, University of Wisconsin.
- DODGE, GILBERT R., Assistant Professor and Administrative Assistant, Agr. Exp. Sta. (1958). B. S., 1950, Kansas State University; C. P. A., 1957, Kansas.
- DRAKE, CALVIN L., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1966). B. S., 1955, Kansas State University; M. S., 1959, University of Arkansas; Ph. D., 1964, Kansas State University.
- DUITSMAN, W. WILLIAM, Associate Professor and Superintendent in charge, Fort Hays Branch Agr. Exp. Sta. (1941, 1952.) B. S., 1940, Kansas State University.
- *EDMUNDS, LEON K., Assistant Professor of Plant Pathology; Plant Pathologist, U. S. D. A., Agr. Exp. Sta. (1960). B. S., 1953, Ph. D., 1958, University of Wisconsin.
- *ELLIS, JR., ROSCOE, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1948, 1960). B. S., 1948, M. S., 1950, Kansas State University; Ph. D., 1952, University of Wisconsin.
- *ELMER, OTTO HERMAN, Professor of Plant Pathology Emeritus (1927, 1961). B. S., 1911, M. S., 1917, Oregon State College; Ph. D., 1924, Iowa State University.
- *ELZINGA, RICHARD J., Associate Professor of Entomology; Associate Entomologist, Agr. Exp. Sta. (1961, 1966). B. S., 1955, M. S., 1956, Ph. D., 1960, University of Utah.
- ERHART, ANDREW B., Professor and Superintendent in charge, Garden City Branch Agr. Exp. Sta. (1931, 1952). B. S., 1933, Kansas State University.
- ERICKSON, DONALD B., Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1966). B. S., 1955, M. S., 1960, University of Wyoming; Ph. D., 1964, Purdue University.
- ESHBAUGH, ELBERT L., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1945, 1952). B. S., 1936, M. S., 1951, Kansas State University.
- *FARMER, EARL L., Associate Professor of Dairy and Poultry Science; Associate Dairy Scientist, Agr. Exp. Sta. (1949, 1964). B. S., 1948, University of Missouri; M. S., 1957, Kansas State University; Ph. D., 1963, University of Wisconsin.
- *FARRELL, EUGENE PATRICK, Associate Professor of Grain Science and Industry; Milling Technologist, Agr. Exp. Sta. (1949, 1954). B. S., 1935, M. S., 1952, Kansas State University.
- *FARRELL, FRANCIS DAVID, President Emeritus (1918, 1943). B. S., 1907, Utah State Agricultural College; Agr. D., 1925, University of Nebraska; LL. D., 1943, Washburn Municipal University.
- *FELTNER, KURT C., Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1965). B. S., 1956, M. S., 1958, University of Wyoming; Ph. D., 1963, University of Arizona.
- *FILINGER, GEORGE A., Professor of Horticulture Emeritus; International Agricultural Programs (1931, 1966). B. S., 1924, M. S., 1925, Kansas State University; Ph. D., 1931, Ohio State University.
- *FINNEY, KARL FREDERICK, Professor of Grain Science and Industry; Chemist, U. S. D. A., Agr. Exp. Sta. (1938, 1948). A. B., 1935, Kansas Wesleyan University; B. S., 1936, M. S., 1937, Kansas State University.
- FOGLEMAN, MAX E., Assistant Professor; Assistant Horticulturist, Garden City Branch Agr. Exp. Sta. (1964). B. S., 1958, M. S., 1961, Kansas State University; Ph. D., 1964, Iowa State University.
- GEHRT, AL J., Administrative Assistant, U. S. D. A., Agricultural Research Service (1958).
- GEYER, WAYNE A., Assistant Professor of Horticulture; Assistant Forester, Agr. Exp. Sta. (1966). B. S., 1955, Iowa State University; M. S., 1962, Purdue University.

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- *GOOD, DON L., Professor, Head of Department of Animal Husbandry; Animal Husbandman in charge, Agr. Exp. Sta. (1947, 1966). B. S., 1947, Ohio State University; M. S., 1950, Kansas State University; Ph. D., 1956, University of Minnesota.
- *GREIG, JR., JAMES K., Associate Professor of Horticulture; Associate Olericulturist, Agr. Exp. Sta. (1952, 1961). B. S., 1949, M. S., 1950, University of Arkansas; Ph. D., 1960, Kansas State University.
- GRONAU, DON M., Instructor in Agronomy; Assistant Agronomist, Newton Experiment Fields (1965). B. S., 1962, Kansas State University.
- GWIN, JR., ROY E., Assistant Professor and Superintendent in charge, Tribune Branch Agr. Exp. Sta. (1957, 1966). B. S., 1943, M. S., 1963, Kansas State University.
- HACKEROTT, HAROLD LEROY, Associate Professor; Associate Agronomist, Fort Hays Branch Agr. Exp. Sta. (1954, 1964). B. S., 1945, M. S., 1946, Kansas State University.
- HADLE, FRED BENTON, Assistant Professor of Horticulture; Assistant Pomologist, Agr. Exp. Sta. (1951). B. S., 1951, M. S., 1958, Kansas State University.
- HADLEY, RALPH G., Agricultural Aide, U. S. D. A., Agricultural Research Service (1959).
- *HALL, CHARLES V., Associate Professor of Horticulture; Associate Olericulturist, Agr. Exp. Sta. (1953, 1961). B. S., 1950, M. S., 1953, University of Arkansas; Ph. D., 1960, Kansas State University.
- HALL, LAWRENCE FENOR, Associate Professor of Agriculture (1926, 1941). B. S., 1923, M. S., 1927, Kansas State University.
- *HANSING, EARL DAHL, Professor of Plant Pathology; Plant Pathologist, Agr. Exp. Sta. (1935, 1947). B. S., 1933, University of Minnesota; M. S., 1937, Kansas State University; Ph. D., 1941, Cornell University.
- *HARBERS, LENIEL H., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (on leave) (1964). B. S., 1957, M. S., 1958, Texas A and M College; Ph. D., 1961, Oklahoma State University.
- HARRIS, WALLACE W., Assistant Professor; Assistant Agronomist, Colby Branch Agr. Exp. Sta. (1954, 1955). B. S., 1951, M. S., 1954, Kansas State University.
- *HARVEY, T. L., Associate Professor of Entomology; Associate Entomologist, Agr. Exp. Sta. (1954, 1964). B. S., 1950, M. S., 1951, Kansas State University; Ph. D., 1963, Oklahoma State University.
- HAYES, EDWARD R., Instructor in Grain Science and Industry; Assistant in Milling and Baking Research, Agr. Exp. Sta. (1966). B. S., 1958, Northwestern State College.
- *HEADLEY, VERL E., Assistant Professor of Grain Science and Industry; Milling Technologist, Agr. Exp. Sta. (1964). B. S., 1958, Tri-State College; M. S., 1960, Ph. D., 1964, Michigan State University.
- *HEDGCOTH, JR., CHARLES, Assistant Professor of Biochemistry; Assistant Biochemist, Agr. Exp. Sta. (1965). B. S., 1961, Ph. D., 1965, University of Texas.
- HERRON, GEORGE M., Instructor; Assistant in Soils, Garden City Branch Agr. Exp. Sta. (1956). B. S., 1949, M. S., 1950, Oklahoma State University.
- HESS, CARROLL V., Dean, College of Agriculture; Associate Director, Agr. Exp. Sta. (1966). B. S., 1947, Pennsylvania State University; M. S., 1948, Ph. D., 1953, Iowa State University.
- *HEYNE, ELMER GEORGE, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1936, 1947). B. S., 1935, University of Nebraska; M. S., 1938, Kansas State University; Ph. D., 1952, University of Minnesota.
- HINES, ROBERT H., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1966). B. S., 1957, Purdue University; M. S., 1961, Ph. D., 1966, Michigan State University.
- *HOBBS, JAMES A., Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1950, 1958). B. S., 1935, M. S., 1940, University of Manitoba (Winnipeg); Ph. D., 1948, Purdue University.
- *HODGES, JULIAN A., Professor of Agricultural Economics Emeritus (1923, 1965). B. S., 1917, M. S., 1923, University of Kentucky; A. M., 1938, Ph. D., 1938, Harvard University.
- HOOVER, JAMES D., Instructor in Animal Husbandry (1966). B. S., 1961, Kansas State University.
- *HOOVER, LEO MICHAEL, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (on leave) (1947, 1959). B. S., 1940, Kansas State University; M. S., 1941, Iowa State University; Ph. D., 1954, Harvard University.
- HOOVER, WILLIAM J., Professor; Head, Department of Grain Science and Industry; Director, Food and Feed Grains Institute (1966). B. S., 1950, M. S., 1954, Ph. D., 1961, University of Illinois.
- *HOPKINS, THEODORE L., Associate Professor of Entomology; Associate Entomologist, Agr. Exp. Sta. (1960, 1963). B. S., 1951, M. S., 1956, Oregon State University; Ph. D., 1960, Kansas State University.
- HOSENEY, RUSSELL C., Analytical Chemist, U. S. D. A., Agricultural Research Service (1956). B. S., 1957, Kansas State University.
- *HURLEY, WILLIAM C., Assistant Professor of Grain Science and Industry; Assistant in Milling and Baking Research, Agr. Exp. Sta. (1964). B. S., 1956, Iowa State University; M. S., 1957, University of Missouri; Ph. D., 1962, Texas A and M College.
- *HUSTON, KEITH, Professor of Dairy and Poultry Science; Dairy Scientist, Agr. Exp. Sta. (1954, 1963). B. S., 1949, M. S., 1950, Ph. D., 1951, University of Wisconsin.
- *JACOBS, HYDE S., Professor of Agronomy; Agronomist, Agr. Exp. Sta.; Director, Kansas Water Resources Research Institute (1957, 1966). B. S. A., 1952, M. S., 1953, University of Idaho; Ph. D., 1957, Michigan State University.

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- *JOHNSON, JOHN A., Professor of Grain Science and Industry; Associate in Milling and Baking Research, Agr. Exp. Sta. (1940, 1955). B. S., 1940, North Dakota Agricultural College; M. S., 1942, Kansas State University; Ph. D., 1954, University of Minnesota.
- KADOUM, AHMED M., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1966). B. S., 1958, Alexandria University; M. S., 1963, Ph. D., 1966, University of Nebraska.
- KAHRS, AMOS J., Instructor in Dairy and Poultry Science; Assistant Poultry Scientist, Agr. Exp. Sta. (1956, 1958). B. S., 1953, Kansas State University.
- *KEEN, RAY A., Professor of Horticulture; Ornamental Horticulturist, Agr. Exp. Sta. (1947, 1956). B. S., 1942, Kansas State University; M. S., 1947, Ph. D., 1956, Ohio State University.
- *KELLEY, PAUL LEO, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1943, 1957). B. S., 1943, M. S., 1946, Kansas State University; Ph. D., 1956, Iowa State University.
- KILGORE, GARY L., Instructor, Southeast Kansas Branch Agr. Exp. Sta. (1966). B. S., 1964, M. S., 1966, Kansas State University.
- KIRACOFFE, GUY H., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1966). B. S., 1958, M. S., 1960, Virginia Polytechnic College; Ph. D., 1965, Kansas State University.
- *KLOPFENSTEIN, WILLIAM E., Assistant Professor of Biochemistry; Assistant Biochemist, Agr. Exp. Sta. (1964). B. S., 1958, M. S., 1961, Ph. D., 1964, Pennsylvania State University.
- *KNIGHT, DALE A., Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1948, 1957). B. S., 1945, Kansas State University; M. S., 1946, Cornell University; A. M., 1948, Ph. D., 1952, University of Chicago.
- *KNUTSON, HERBERT, Professor; Head, Department of Entomology; Entomologist in charge, Agr. Exp. Sta. (1953). A. B., 1936, Iowa Wesleyan College; M. S., 1937, Southern Methodist University; Ph. D., 1941, University of Minnesota.
- *KOCH, BERL A., Professor of Animal Husbandry; Animal Husbandman, Agr. Exp. Sta. (1956, 1963). B. S., 1949, Iowa State University; M. S., 1951, Cornell University; Ph. D., 1955, University of California.
- *KOUDELE, JOSEPH WENDELL, Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1947, 1958). B. S., 1943, University of Nebraska; M. S., 1947, University of Minnesota; Ph. D., 1956, Michigan State University.
- *KROPF, DONALD HARRIS, Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1962). B. S., 1952, University of Wisconsin; M. S., 1953, University of Florida; Ph. D., 1956, University of Wisconsin.
- LARSON, VERNON C., Professor; Chief of Party, AID/Nigeria (1962, 1966). B. S., 1947, M. S., 1950, Ph. D., 1954, Michigan State University.
- *LAUDE, HILMER HENRY, Professor of Agronomy Emeritus (1911, 1958). B. S., 1911, Kansas State University; M. S., 1918, Texas A and M College; Ph. D., 1930, University of Chicago.
- LAUNCHBAUGH, JR., JOHN L., Associate Professor; Associate Agronomist, Fort Hays Branch Agr. Exp. Sta. (1955). A. B., 1947, M. S., 1948, Fort Hays Kansas State College; Ph. D., 1952, Texas A and M College.
- LAWLESS, JOHN R., Assistant Professor; Assistant Agronomist, Colby Branch Agr. Exp. Sta. (1960, 1965). B. S., 1958, University of Nebraska; M. S., 1960, Washington State University.
- LIANG, GEORGE H. L., Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1964). B. S., 1956, Taiwan Provincial College; M. S., 1961, University of Wyoming; Ph. D., 1964, University of Wisconsin.
- LIVERS, RONALD W., Professor; Agronomist, Fort Hays Branch Agr. Exp. Sta. (1962, 1966). B. S., 1948, M. S., 1949, Kansas State University; Ph. D., 1957, University of Minnesota.
- LONG, CHARLES E., Instructor in Horticulture; Ornamental Horticulturist, Agr. Exp. Sta. (1965). B. S., 1964, Oklahoma State University.
- LUNDQUIST, MARVIN C., Assistant Professor of Agronomy; Assistant Agronomist, Sandyland Experiment Fields (1951, 1965). B. S., 1950, M. S., 1952, Kansas State University.
- *MACKINTOSH, DAVID L., Professor of Animal Husbandry Emeritus (1921, 1965). B. S., 1920, University of Minnesota; M. S., 1925, Kansas State University.
- *MACMASTERS, MAJEL M., Professor of Grain Science and Industry; Cereal Chemist, Agr. Exp. Sta. (1960). B. S., 1926, M. S., 1928, Ph. D., 1934, University of Massachusetts.
- *MADER, ERNEST LEE, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1948). B. S., 1936, M. S., 1944, Oklahoma State University; Ph. D., 1948, University of Nebraska.
- *MANUEL, MILTON LLOYD, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1945, 1959). B. S., 1941, M. S., 1948, Kansas State University; Ph. D., 1952, University of Minnesota.
- *MARION, GERMAIN BERNARD, Professor of Dairy and Poultry Science; Dairy Scientist, Agr. Exp. Sta. (1953, 1962). B. S., 1948, Cornell University; M. S., 1951, Ph. D., 1951, University of Wisconsin.
- *MARTIN, WILLARD HUNGATE, Professor of Dairy Science Emeritus (1925, 1928). B. S., 1918, Purdue University; M. S., 1922, Pennsylvania State University.
- McCORMICK, DEWEY Z., Assistant Professor of Animal Husbandry; International Agricultural Programs (1960). B. S., 1921, Kansas State University.
- *McCOY, JOHN HENRY, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1940, 1960). B. S., 1940, M. S., 1942, Kansas State University; Ph. D., 1955, University of Wisconsin.

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- *MELCHERS, LEO EDWARD, Professor of Plant Pathology Emeritus (1913, 1956). B. S., 1912, M. S., 1913, Ohio State University.
- *MENZIES, CARL STEPHEN, Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1954, 1965). B. S., 1954, Texas Technological College; M. S., 1956, Kansas State University; Ph. D., 1965, University of Kentucky.
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- MILES, NEIL W., Assistant Professor of Horticulture; Assistant Pomologist, Agr. Exp. Sta. (1966). B. S., 1959, M. S., 1964, Ph. D., 1965, University of Minnesota.
- *MILLER, GERALD DALE, Assistant Professor of Grain Science and Industry; Assistant Cereal Chemist, Agr. Exp. Sta. (1946, 1947). B. S., 1924, University of Nebraska; M. S., 1953, Kansas State University.
- *MILLS, ROBERT B., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1963). B. S., 1949, Kansas State University; M. Ed., 1953, University of Colorado; Ph. D., 1963, Kansas State University.
- *MITCHELL, HOWARD LEE, Professor; Head, Department of Biochemistry; Biochemist in charge, Agr. Exp. Sta. (1946, 1961). B. S., 1938, Oklahoma State University; Ph. D., 1946, Purdue University.
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- MOORE, WALTER ASHTON, Assistant Professor of Agronomy; Assistant Agronomist, South Central Kansas Experiment Fields (1943, 1951). B. S., 1944, Kansas State University.
- *MORRILL, JR., JAMES L., Assistant Professor of Dairy and Poultry Science; Assistant Dairy Scientist, Agr. Exp. Sta. (1962, 1964). B. S., 1958, Murray State College; M. S., 1959, University of Kentucky; Ph. D., 1963, Iowa State University.
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- MULLEN, CLYDE WILLIAM, Assistant Dean Emeritus (1937, 1961). B. S., 1915, Oklahoma State University; M. S., 1917, Kansas State University.
- *MURPHY, LARRY S., Assistant Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1965). B. S., 1959, M. S., 1960, Ph. D., 1965, University of Missouri.
- NAUHEIM, CHARLES W., Agricultural Economist, U. S. D. A., Agricultural Research Service, Production Economics Research Branch (1954). B. S., 1932, M. S., 1934, Kansas State University.
- *NORDIN, JOHN A., Professor; Head, Department of Agricultural Economics; Agricultural Economist in charge, Agr. Exp. Sta. (1961). B. A., 1935, M. A., 1937, Ph. D., 1941, University of Minnesota.
- *NORDIN, PHILIP, Associate Professor of Biochemistry; Associate Biochemist, Agr. Exp. Sta. (1954, 1963). B. S., 1949, M. S., 1950, University of Saskatchewan (Canada); Ph. D., 1953, Iowa State University.
- *NORTON, CHARLES L., Professor; Head, Department of Dairy and Poultry Science; Dairy and Poultry Scientist in charge, Agr. Exp. Sta. (1958, 1964). B. S., 1940, University of Illinois; Ph. D., 1944, Cornell University.
- ODOM, RICHARD E., Assistant Professor of Horticulture; Assistant Floriculturist, Agr. Exp. Sta. (1965). B. S., 1951, Texas A and M College; M. S., 1953, Colorado State University; Ph. D., 1965, Kansas State University.
- *OLSON, RAYMOND V., Professor; Head, Department of Agronomy (1947, 1952). A. S., 1939, North Dakota School of Forestry; B. S., 1941, North Dakota State College; M. S., 1942, Ph. D., 1947, University of Wisconsin.
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- *OTTO, MERTON L., Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1939, 1957). B. S., 1921, M. S., 1942, Kansas State University.
- OVERLEY, CARL BENJAMIN, Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1946, 1947). B. S., 1946, Kansas State University.
- *PADY, STUART MCGREGOR, Professor; Head, Department of Plant Pathology; Plant Pathologist in charge, Agr. Exp. Sta. (1945, 1952). B. A., 1928, M. A., 1929, McMaster University (Canada); Ph. D., 1933, University of Toronto (Canada).
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- *PARRISH, DONALD BAKER, Professor of Chemistry; Biochemist and Nutritionist, Agr. Exp. Sta. (1943, 1952). B. S., 1935, M. S., 1938, Ph. D., 1949, Kansas State University.
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- *PAYNE, LOYAL FREDERICK, Professor of Poultry Science Emeritus (1921, 1961). B. S., 1912, Oklahoma State University; M. S., 1925, Kansas State University.
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- *PFOST, HARRY B., Professor of Grain Science and Industry; Feed Technologist, Agr. Exp. Sta. (1959). B. S., 1940, University of Missouri; M. S., 1948, Alabama Polytechnic Institute; Ph. D., 1959, Michigan State University.
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- *PICKETT, WILLIAM F., Professor of Horticulture Emeritus (1918, 1965). B. S., 1917, M. S., 1923, Kansas State University; Ph. D., 1935, Michigan State University.
- *PINE, WILFRED HAROLD, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1934, 1949). B. S., 1934, M. S., 1938, Kansas State University; Ph. D., 1948, University of Minnesota.
- *PITTENGER, THAD H., Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1959). B. S., 1947, Ph. D., 1951, University of Nebraska.
- *PITTS, CHARLES W., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1962, 1965). B. S., 1960, Mississippi State College; M. S., 1962, Ph. D., 1965, Kansas State University.
- *POMERANZ, YESHAJAHU, Professor of Grain Science and Industry; Research Technologist, U. S. D. A., Agr. Exp. Sta. (1962, 1964). B. S., Israeli Institute of Technology; Ph. D., 1962, Kansas State University.
- POWERS, WILLIAM L., Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1966). B. S., 1958, Colorado State University; M. S., 1962, Ph. D., 1966, Iowa State University.
- *QUINLAN, LEON REED, Professor of Landscape Architecture Emeritus; Ornamental Horticulturist and Landscape Architect, Retired, Agr. Exp. Sta. (1927, 1931). B. S., 1921, Colorado State University; M. L. A., 1925, Harvard University.
- RANEY, ROBERT J., Assistant Professor of Agronomy; Assistant Agronomist, Irrigation Experiment Field (1953, 1965). B. S., 1952, M. S., 1954, Kansas State University.
- REED, CHARLES E., Instructor in Agricultural Economics (1962). B. S., 1947, Kansas State University; M. S., 1954, University of Kansas.
- *RETTENMEYER, CARL W., Associate Professor of Entomology; Associate Entomologist, Agr. Exp. Sta. (1960, 1965). A. B., 1953, Swarthmore College; Ph. D., 1962, University of Kansas.
- *RICHARDSON, DRAYTFORD, Professor of Animal Husbandry; Animal Nutritionist, Agr. Exp. Sta. (1951). B. S., 1938, Clemson Agricultural College; M. S., 1950, Ph. D., 1951, Iowa State University.
- ROBERTS, HAROLD A., Instructor in Dairy and Poultry Science; Assistant Dairy Scientist, Agr. Exp. Sta. (1963). B. S., 1959, Kansas State University.
- ROBINSON, DONALD L., Instructor, Garden City Branch Agr. Exp. Sta. (1966). B. S., 1964, Southern Illinois University; M. S., 1966, Oklahoma State University.
- ROSS, WILLIAM MAX, Associate Agronomist, Cereal Crops, Field Crops Research Branch, A. R. S., U. S. D. A., Fort Hays Agr. Exp. Sta. (1951, 1954). B. S., M. S., Ph. D., University of Illinois.
- ROTH, PAUL L., Instructor in Horticulture; Assistant Forester, Agr. Exp. Sta. (1955). B. S., 1951, M. S., 1955, Purdue University.
- *RULIFFSON, WILLARD S., Associate Professor of Biochemistry; Associate Biochemist, Agr. Exp. Sta. (1953). B. S., 1940, Buena Vista College; M. S., 1948, Ph. D., 1953, State University of Iowa.
- RUSS, OLIVER G., Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1949, 1965). B. S., 1950, M. S., 1953, Kansas State University.
- *SANFORD, PAUL EVERETT, Professor of Dairy and Poultry Science; Poultry Nutritionist, Agr. Exp. Sta. (1949, 1960). B. S., 1941, Kansas State University; M. S., 1942, Ph. D., 1949, Iowa State University.
- SCHALLES, ROBERT R., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1966). B. S., 1963, Colorado State University; M. S., 1966, Ph. D., 1966, Virginia Polytechnic Institute.
- *SCHRUBEN, LEONARD WILLIAM, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1949, 1951). B. S., 1939, Kansas State University; M. S., 1940, University of Illinois; M. P. A., 1948, M. A., 1949, Ph. D., 1949, Harvard University.
- SCOVILLE, ORLIN J., Professor of Agricultural Economics (1966). B. S., 1931, M. S., 1933, Colorado State University; Ph. D., 1949, Harvard University.
- *SHELLENBERGER, JOHN A., Distinguished University Professor of Grain Science and Industry; Head of Department Emeritus (1944, 1966). B. S., 1928, University of Washington; M. S., 1930, Kansas State University; Ph. D., 1934, University of Minnesota.

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- *SJO, JOHN B., Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1948, 1961). B. S., 1949, M. S., 1952, Kansas State University; Ph. D., 1960, Michigan State University.
- *SKIDMORE, EDWARD L., Soil Scientist, Agricultural Research Service, U. S. D. A. (1963). B. S., 1958, Utah State University; Ph. D., 1963, Oklahoma State University.
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- SLOAN, ROBERT F., Assistant Professor of Agronomy; Assistant Agronomist, Cornbelt Agricultural Experiment Field (1936, 1951). B. S., 1938, M. S., 1941, Kansas State University.
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- *SMITH, RICHARD M., Assistant Professor of Agronomy; Research Soil Scientist, U. S. D. A. (1962). A. B., 1934, A. M., 1935, University of Missouri; Ph. D., 1940, Ohio State University.
- *SMITH, ROGER CLETUS, Professor of Entomology Emeritus (1920, 1958). A. B., 1911, Miami University; A. M., 1915, Ohio State University; Ph. D., 1917, Cornell University.
- *SMITH, WALTER H., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1948, 1965). B. S., 1943, M. S., 1949, Kansas State University.
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- *SORENSEN, EDGAR LAVELL, Assistant Professor; Research Agronomist, U. S. D. A. (1955). B. S., 1941, M. S., 1952, Utah Agricultural College; Ph. D., 1955, University of Wisconsin.
- *SORENSEN, LEONARD ORLO, Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1955, 1964). B. A., 1951, M. S., 1953, Ph. D., 1963, University of Minnesota.
- *SPIES, HAROLD G., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1959, 1964). B. S., 1956, Oklahoma State University; M. S., 1957, Ph. D., 1959, University of Wisconsin.
- STEGMEIER, WILLIAM D., Instructor; Assistant in Soils, Garden City Branch Agr. Exp. Sta. (1958). B. S., 1956, M. S., 1959, Colorado State University.
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- STILES, DAVID A., Assistant Professor, Southeast Kansas Branch Agr. Exp. Sta. (1966). B. S., 1964, University of Maryland; M. S., 1966, Kansas State University.
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- *STUTEVILLE, DONALD L., Assistant Professor of Plant Pathology; Assistant Plant Pathologist, Agr. Exp. Sta. (1964). B. S., 1959, M. S., 1961, Kansas State University; Ph. D., 1964, University of Wisconsin.
- SWALLOW, CLARENCE W., Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1954, 1964). B. S., 1951, M. S., 1955, Kansas State University.
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- *THOMPSON, HUGH E., Associate Professor of Entomology; Associate Entomologist, Agr. Exp. Sta. (1956, 1963). B. S., 1941, University of Rhode Island; Ph. D., 1953, Cornell University.
- *THROCKMORTON, RAY IAMS, Dean and Director Emeritus, Agriculture (1911, 1952). B. S. 1911, Pennsylvania State University; M. S., 1922, Kansas State University.
- *TUMA, HAROLD J., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1965). B. S., 1955, M. S., 1958, Kansas State University; Ph. D., 1961, Oklahoma State University.
- *VANDERLIP, RICHARD L., Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1964). B. S., 1960, Kansas State University; M. S., 1962, Ph. D., 1965, Iowa State University.
- WALTER, TED L., Assistant Professor of Agronomy, Assistant Agronomist, Agr. Exp. Sta. (1951). B. S., 1949, University of Nebraska; M. S., 1951, Colorado State University.
- *WARD, ARLIN B., Associate Professor of Grain Science and Industry; Agr. Exp. Sta. (1961). B. S., 1942, M. S., 1951, Kansas State University.
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- *WASSOM, CLYDE E., Associate Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1954). B. S., 1949, M. S., 1951, Ph. D., 1953, Iowa State University.
- *WHEAT, JOHN D., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1954, 1957) (on leave). B. S., 1942, M. S., 1951, Texas A and M College; Ph. D., 1954, Iowa State University.

- *WHITNAH, CARRELL HENRY, Professor of Biochemistry Emeritus; B. A., 1913, University of Nebraska; M. S., 1917, University of Chicago; Ph. D., 1925, University of Nebraska.
- *WILBUR, DONALD A., Professor of Entomology; Entomologist, Agr. Exp. Sta. (1928, 1949). B. S., 1925, Oregon State College; A. M., 1928, Ohio State University.
- WILDE, GERALD E., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1966). B. S., 1962, Texas Technological College; Ph. D., 1966, Cornell University.
- WILKINS, HOWARD D., Assistant Professor of Agronomy; Secretary, Kansas Crop Improvement Association (1954, 1965). B. S., 1953, M. S., 1954, Kansas State University.
- WILLIS, WILLIAM WAYNE, Assistant Professor of Horticulture Emeritus (1944, 1961). A. B., 1912, College of Emporia.
- WINZER, JACK W., Assistant Professor of Horticulture; Southeast Kansas Experiment Field (1963, 1966). B. S., 1957, M. S., 1959, Texas A and M College.
- *WITHEE, LAURESTON VAN, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1953, 1965). B. S., 1947, Kansas State University; M. S., 1952, University of Nebraska; Ph. D., 1963, Kansas State University.
- *WOODRUFF, NEIL PARKER, Agricultural Engineer, Agricultural Research Service, U. S. D. A. (1949). B. S., 1949, M. S., 1953, Kansas State University.
- *WRIGHT, GEORGE, Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1962). B. S., 1951, M. S., 1956, Kansas State University; Ph. D., 1962, Michigan State University.
- *ZAHNLEY, JAMES WALTER, Professor of Agronomy Emeritus (1915, 1954). B. S., 1909, B. S. in Agric., 1918, M. S., 1926, Kansas State University.

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- *CHADWICK, THEODORE AVERY, Professor of Architecture (1927, 1947). B. S., 1927, North Dakota Agricultural College; M. Arch., 1954, Massachusetts Institute of Technology. Registered Architect in New York, 1936, in Kansas, 1953.
- *CHANG, AMOS I. T., Associate Professor of Architecture (1966). B. S., Civil Engg., 1939, National Chung King University; M. F. A. in Arch., 1949, Ph. D. in Arch., 1951, Princeton University. Registered Architect.
- *CHRISTENSEN, KEITH H., Associate Professor of Architecture (1966). B. Arch., 1950, University of Nebraska; M. Arch., 1957, University of Michigan. Registered Architect, 1960.
- CLAYCAMP, CARROL DEAN, Instructor in Architectural Structures (1964). B. S., 1958, Kansas State University. Registered Architect, 1964. Professional Engineer, 1963.
- COOL, VINCENT J., Assistant Professor of Architecture (1957). B. S., 1951, Kansas State University. Registered Architect, 1952.
- *DAY, DENNIS J., Assistant Professor of Landscape Architecture (1966). B. S., 1964, Michigan State University; M. L. A., 1966, University of Michigan.
- *DEINES, VERNON PHILIP, Associate Professor of Planning and Architecture; Director of the Curriculum in Regional Planning (1957, 1966). B. S., 1952, M. R. P., 1961, Kansas State University; Ph. D., 1967, University of Pittsburgh. Professional Engineer, 1952.
- *DURGAN, JACK CLYDE, Associate Professor of Architecture (1954, 1962). B. Arch., 1951, Oklahoma State University; M. S., 1958, Kansas State University. Registered Architect in Texas, 1951, in Kansas, 1954.
- *EALY, ROBERT P., Professor of Landscape Architecture; Director of the Curriculum in Landscape Architecture (1961). B. S., 1941, Oklahoma State University; M. S., 1946, Kansas State University; Ph. D., 1955, Louisiana State University.
- *FISCHER, EMIL C., Professor; Dean, College of Architecture and Design; Architect (1955, 1963). A. B., 1929, Columbia College; B. S., 1932, M. S., 1933, Columbia University. Registered Architect in New Jersey, 1935; in Kansas, 1955.
- HALL, CHARLES L., Assistant Professor of Architecture (1964). B. Arch., 1953, Pennsylvania State University. Registered Architect in Kansas, 1953, in Minnesota, 1961, in North Dakota, 1962, in South Dakota, 1962. NCARB, 1961.
- *HEINTZELMAN, JOHN CRANSTON, Professor of Architecture (1947, 1954). B. Arch., 1938, Massachusetts Institute of Technology; M. Arch., 1941, Columbia University. Registered Architect, 1953.
- *HELM, JR., JOHN FREDERICK, Professor of Drawing and Painting (1924, 1938). B. D., 1924, Syracuse University; D. F. A., 1951, Bethany College.
- JACOB, THOMAS D., Assistant Instructor in Architecture (1966). B. Arch., 1965, Kansas State University.
- *KRIDER, ALDEN, Professor of Architecture (1949, 1962). B. S., 1933, M. S., 1955, Kansas State University. Registered Architect in Missouri, 1945, in Kansas, 1949.
- LAY, K. EDWARD, Instructor in Architecture (1963). B. Arch., 1956, Pennsylvania State University. Registered Architect in Pennsylvania, 1961.
- LIPPENBERGER, RAY E., Assistant Professor of Architecture (1964). B. S., 1936, Kansas State University. Registered Architect in Kansas, 1949, in Nebraska, 1955.
- *McGRAW, EUGENE THOMAS, Assistant Professor of Architecture (1958, 1964). B. Arch., 1957, Oklahoma State University; M. R. P., 1963, Kansas State University.
- *MELARAGNO, MICHELE G., Assistant Professor of Architectural Structures (1966). Dr. of Engg., 1959, University of Bari, Italy. Registered Professional Engineer, Rhode Island and Massachusetts; Member Society of Professional Engineers.

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- *MILLER, HAROLD JAMES, Associate Professor of Architecture (1959, 1965). B. S., 1952, B. Arch., 1952, Kansas State University; March, 1960, University of Illinois. Registered Architect, 1952. Professional Engineer, 1952.
- MORSE, RICHARD HUGH, Assistant Professor of Architecture and Assistant to the Dean (1961, 1965). B. S., 1951, M. Arch., 1964, Kansas State University. Registered Architect, 1954.
- *PARKS, CHARLES ELWOOD, Associate Professor of Landscape Architecture (1949, 1965). Extension Specialist in Landscape Architecture (1949, 1950). B. S., 1949, University of Illinois; M. S., 1957, Kansas State University.
- *QUINLAN, LEON REED, Professor of Landscape Architecture Emeritus; Ornamental Horticulturist and Landscape Architect, Agr. Exp. Sta. (1927, 1931, 1964). B. S., 1921, Colorado State University; M. L. A., 1925, Harvard University.
- ROWLAND, THOMAS LEROY, Instructor in Architecture (1962). B. Arch., 1961, Kansas State University.
- *SANNER, ALBERT E., Assistant Professor of Architecture (1963). B. S., Arch., 1947, B. S., Arch. Engg., 1948, University of Illinois. Registered Architect in Illinois, 1950, in Indiana, 1959.
- SLACK, EARL REX, Assistant Professor of Architecture (1965). B. Arch., 1952, University of Oklahoma. Registered Architect in Oklahoma, 1957.
- *THORSON, INGOLF EUGENE, Professor of Architectural Structures (1948). B. S., 1940, University of Washington. Professional Engineer in Washington, 1947.
- *WEIGEL, PAUL, Professor of Architecture Emeritus (1921, 1924, 1959). B. Arch., 1912, Cornell University. Registered Architect in New York, 1917, in Kansas, 1950.
- WEISENBURGER, RAY B., Assistant Professor of Architecture (1964). B. Arch., 1959, University of Illinois. Registered Architect, 1962.
- WENDT, EUGENE G., Instructor in Architecture (1962)* B. Arch., 1959, Kansas State University.
- *WRIGHT, HENRY, Regents' Distinguished Professor of Environmental Technology (1965).

College of Arts and Sciences

- *ABERLE, NELLIE, Professor of English Emerita (1921, 1959). B. S., 1912, M. S., 1914, Kansas State University.
- *ACKERT, JAMES EDWARD, Professor of Zoology Emeritus; Dean of Graduate School Emeritus (1913, 1950). A. B., 1909, A. M., 1911, Ph. D., 1913, University of Illinois.
- *ADAMS, MARJORIE, Assistant Dean; Associate Professor of English (1954, 1961). B. A., 1941, Louisiana Polytechnic; M. A., 1948, Ph. D., 1951, University of Texas.
- AESCHBACHER, WILLIAM DRIVER, Temporary Professor of History; Director Dwight D. Eisenhower Library; Secretary Mississippi Valley Historical Association. B. S., 1940, M. A., 1946, Ph. D., 1948, University of Nebraska.
- ALEXANDER, LOREN R., Instructor in Modern Languages (1965). B. M., 1951, Southwestern College; M. A., 1954, Colorado State College of Education; M. A., 1965, Michigan State University.
- *ALIBERTI, DOMENICO B., Assistant Professor of Modern Languages (1965). Ph. D., 1959, University of Messina, Italy.
- *ALM, OSCAR WILLIAM, Professor of Psychology Emeritus (1929, 1957). A. B., 1917, University of Nebraska; M. A., 1918, Columbia University; Ph. D., 1920, University of Minnesota.
- *ALSOP, INEZ, Associate Professor of History Emerita (1923, 1960). B. S., 1916, Kansas State Teachers College (Emporia); M. S., 1920, University of Kansas.
- *AMEEL, DONALD JULES, Professor; Head, Department of Zoology; Zoologist in charge, Agr. Exp. Sta. (1937, 1945). A. B., 1928, Wayne University; M. A., 1930, D. Sc., 1933, University of Michigan.
- AMOS, EDGAR McCALL, Associate Professor of Technical Journalism Emeritus (1921, 1950). B. S., 1902, Kansas State University.
- ANDERSON, ANTHONY, Visiting Professor of Physics (1965). M. A., 1956. Ph. D., 1960, Oxford University (U. K.)
- *ANDERSON, LORAN C., Assistant Professor of Botany; Anatomist, Agr. Exp. Sta. (1963). B. S., 1958, M. S., 1959, Utah State University; Ph. D., 1962, Claremont Graduate School.
- *ANDREWS, ARTHUR CLINTON, Professor of Chemistry (1926, 1952). B. S., 1924, University of Wisconsin; M. S., 1929, Kansas State University; Ph. D., 1938, University of Wisconsin.
- *ANSELL, ORA JOYE, Associate Professor of English (1946, 1957). B. S., 1932, Kansas State University; M. A., 1939, University of Michigan; B. L. S., 1946, University of Chicago; Ph. D., 1956, University of Colorado.
- APPLEGATE, ROBERTA G., Assistant Professor of Technical Journalism (1964). A. B., 1940, Michigan State University; M. S., 1942, Northwestern University.
- AVERY, MADALYN, Associate Professor of Physics (1924, 1946). B. S., 1924, M. S., 1932, Kansas State University.
- *BABCOCK, RODNEY WHITTEMORE, Professor of Mathematics Emeritus; Dean Emeritus (1930, 1960). A. B., 1912, University of Missouri; M. A., 1915, Ph. D., 1924, University of Wisconsin.
- *BACKER, JACK EUGENE, Assistant Professor of Technical Journalism (1963). B. A., 1958, Wayne State, Nebraska; M. A., 1963, State University of Iowa.

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- *BAGLEY, EDGAR SIDNEY, Professor of Economics; Economist, Agr. Exp. Sta. (1940, 1950). B. A., 1935, M. A., 1937, University of California at Los Angeles; Ph. D., 1950, State University of Iowa.
- BAILEY, BILLY H., Research Associate of Physics (1962). B. S., 1961, M. S., 1964, Kansas State University.
- *BANERJEE, KALI S., Visiting Professor (1965). B. A., 1935, M. A., 1937, Ph. D., 1950, Calcutta.
- *BARFOOT, DOROTHY, Professor of Art Emerita (1930, 1962). B. A., State University of Iowa; M. A., 1928, Columbia University.
- *BARK, LAURENCE DEAN, Associate Professor of Physics; Associate Meteorologist, Agr. Exp. Sta. (1956). B. S., 1948, M. S., 1950, University of Chicago; Ph. D., 1954, Rutgers University.
- *BARKLEY, THEODORE M., Assistant Professor of Botany; Taxonomist, Agr. Exp. Sta. (1961). B. S., 1955, Kansas State University; M. S., 1957, Oregon State University; Ph. D., 1960, Columbia University.
- *BARNES, TED, Assistant Professor of Speech (1963). B. A., 1956, M. A., 1957, University of Kansas; Ph. D., 1960, University of Iowa.
- BARRETT, ERNIE D., Assistant Athletic Director (1958). B. S., 1951, M. S., 1956, Kansas State University.
- BATES, JAMES C., Professor of Botany Emeritus (1935, 1953). A. B., 1920, M. A., 1933, Ph. D., 1935, University of Kansas.
- *BECHTEL, ROBERT D., Assistant Professor of Mathematics (1963). B. S., 1953, McPherson College; M. S., 1959, Kansas State University; Ph. D., 1963, Purdue University.
- *BECK, HENRY VOORHEES, Professor of Geology (1946, 1961). B. S., 1946, M. S., 1949, Kansas State University; Ph. D., 1955, University of Kansas.
- *BEESON, MARGARET E., Assistant Professor of Modern Languages (1960). A. B., 1948, Wesleyan College; M. A., 1949, Emory University; Ph. D., 1954, University of Texas.
- BELL, CLARENCE ALTON, Instructor in Mathematics (1964). B. S., 1953, M. S., 1954, Kansas State University.
- BERGER, EDWARD P., Instructor in Statistics (1965). B. S., 1958, A. M. 1959, Duke University.
- BHALLA, CHANDER P., Associate Professor of Physics (1966). B. S., 1952, B. Sc., 1954, M. S., 1955, Punjab University; Ph. D., 1960, University of Tennessee.
- BIBERSTEIN, BILLY JOE, Assistant Professor of Military Science (1965). B. S., 1956, Kansas State University; 1963, Armor Career Officers' Course.
- *BODE, WERNER, Assistant Professor of Physics (1964). Ph. D., University of Cologne, Germany.
- *BORG, ALFRED FRANCIS, Professor; Head, Department of Bacteriology; Bacteriologist in charge, Agr. Exp. Sta. (1957). B. S., 1940, M. S., 1943, Ph. D., 1948, University of Washington.
- *BOYER, WILLIAM WALTER, Professor of Political Science (1965). B. A., 1947, College of Wooster; M. A., 1949, Ph. D., 1953, University of Wisconsin.
- BRASHER, BOB R., Instructor in Physical Education (1964). B. S., 1954, Bradley University; M. S., 1955, University of Colorado.
- *BRIGGS, JR., J. MORTON, Assistant Professor of History (1965). A. B., 1951, Dartmouth College; A. M., 1957, Ph. D., 1962, Columbia University.
- BRIGHT, CHARLES D., Associate Professor of Aerospace Studies (1963). S. B., 1948, Massachusetts Institute of Technology; M. B. A., 1950, Harvard Graduate School of Business.
- BRINKMAN, P. DELBERT, Assistant Professor of Technical Journalism (1965). B. S., 1958, Emporia State Teachers College; M. A., 1963, Indiana University.
- *BRONDELL, WILLIAM JOHN, Assistant Professor of English (1964). A. B., 1959, University of Missouri; M. A., 1964, University of Missouri.
- *BROOKINS, DOUGLAS G., Associate Professor of Geology (1962). A. B., 1958, University of California; Ph. D., 1963, Massachusetts Institute of Technology.
- *BROOKS, PHILIP C., Adjoint Professor of History (1964); Director Harry S. Truman Library. A. B., 1928, University of Michigan; M. A., 1930, Ph. D., 1933, University of California.
- BROOKS, ROBERT S., Assistant Professor of Speech (1964). B. A., 1952, Ottawa University; M. S., 1954, Ph. D., 1964, University of Kansas.
- *BROWDER, ROBERT PAUL, Professor; Head, Department of History (1965). B. A., 1942, M. A., 1947, Stanford University; M. A. 1949, Ph. D., 1951, Harvard University.
- BROWN, MERLE, Assistant Professor of Physics (1964) (State Climatologist). B. S., 1942, Kansas State College at Pittsburg.
- *BROWN, SAM C., Assistant Professor of Psychology (1963). B. B. A., 1957, City College of New York; M. A., 1961, Ph. D., 1963, University of Virginia.
- *BUNTON, NORMA D., Professor; Head, Department of Speech (1954, 1960). B. S., 1939, Southwest Texas State College; M. Ed., 1947, University of Texas; Ph. D., 1954, State University of Iowa.
- *BURKE, WILLIAM L., Assistant Professor of Speech (1964). B. S., 1959, M. A., 1960, Ph. D., 1965, Northwestern University.
- BUSSING, CHARLES EARL, Assistant Professor of Geography (1964). A. B., 1959, Colorado State College; M. A., 1961, University of Colorado.
- CAGLE, GARY R., Instructor in Philosophy (1963). A. B., 1959, Monmouth College.

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- *CARDWELL, ALVIN BOYD, Director, Bureau of General Research; Professor of Physics (1936, 1955). Head, Department of Physics; Physicist in charge, Agr. Exp. Sta.; Physicist in charge, Engg. Exp. Sta.; B. S., 1925, D. Sc., 1961, University of Chattanooga; M. S., 1927, Ph. D., 1930, University of Wisconsin.
- *CAREY, JAMES CHARLES, Professor of History (1948, 1954). B. A., 1937, Nebraska State Teachers College (Wayne); M. A., 1940, Ph. D., 1948, University of Colorado.
- CATRELL, FREDERICK ALBERT, Associate Professor of Military Science (1964). B. S., 1950, Michigan State University; 1957, Artillery Career Officers' Course.
- *CHALMERS, JOHN, Dean; Professor of Economics (1963). A. B., 1938, Middlebury College; Ph. D., 1943, Cornell University.
- *CHAPIN, ERNEST KNIGHT, Associate Professor of Physics (1923, 1932). A. B., 1918, M. S., 1923, University of Michigan.
- CHATELAIN, VIRGINIA L., Instructor in Mathematics (1947). B. S., 1943, M. S., 1947, Kansas State Teachers College of Emporia.
- CHAUDHURI, SAM, Assistant Professor of Geology (1966). Ph. D., 1966, Ohio State University.
- *CHELIKOWSKY, JOSEPH RUDOLPH, Professor; Head, Department of Geology and Geography (1937, 1955). B. A., 1931, M. A., 1932, Ph. D., 1935, Cornell University.
- *CHRIST, RICHARD E., Assistant Professor of Psychology (1965). B. S., 1955, M. S., 1961, University of Toledo; Ph. D., 1962, University of Massachusetts.
- *CLARK, RICHARD C., Professor; Head, Department of Modern Languages (1962). B. A., 1942, Temple University; M. A., 1949, Ph. D., 1954, University of Pennsylvania.
- CLARK, WILLIAM KLINE, Instructor in Geology (1949, 1956). B. S., 1947, University of Notre Dame; M. S., 1950, Kansas State University.
- CLEARY, ELIZABETH, Instructor in Speech (1961). B. S., 1934, Boston University; M. S., 1961, Kansas State University.
- COATES, WILLIAM A., Associate Professor of Modern Languages (1966). B. A., 1937, Harvard College; M. A., 1939, Ph. D., 1950, Harvard University.
- COHEN, PETER Z., Instructor in English (1961). B. S., 1953, M. A., 1961, University of Wyoming.
- COLLISCHAN, JUDY KAY, Instructor in Art (1964). B. A., 1962, Hamline University; M. F. A., 1964, Ohio University.
- CONOVER, DARLINE, Instructor in English (1963). B. S., 1927, Kansas State University.
- *CONOVER, ROBERT WARREN, Professor of English Emeritus (1915, 1954). B. A., 1911, M. A., 1914, Wesleyan University.
- *CONOVER, WILLIAM JAY, Assistant Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1964). B. S., 1959, Iowa State University; M. A., 1962, Ph. D., 1964, The Catholic University of America.
- *CONROW, KENNETH, Associate Professor of Chemistry (1961, 1964). B. A., 1954, Swarthmore College; Ph. D., 1957, University of Illinois.
- CONROW, MARGARET E., Temporary Assistant Professor of English (1964). B. A., 1954, Swarthmore College; M. A., 1955, Ph. D., 1962, University of Illinois.
- *CONSIGLI, RICHARD ALBERT, Associate Professor of Bacteriology (1962). B. S., 1954, Brooklyn College; M. A., 1956, Ph. D., 1960, University of Kansas.
- *COPELAND, JAMES L., Assistant Professor of Chemistry (1962). B. S., 1952, University of Illinois; Ph. D., 1962, Indiana University.
- CORBET, JAMES J., Instructor in Mathematics (1963, 1965). B. S., 1963, M. S., 1964, Kansas State University.
- *CORRELL, CHARLES MECLAIN, University Historian; Professor of History Emeritus (1922, 1950). B. S., 1900, Kansas State University; Ph. B., 1907, Ph. M., 1908, University of Chicago.
- *CRAIGIE, BARBARA, Assistant Professor of Art (1954, 1963). B. A., 1932, University of Minnesota; M. A., 1942, University of Missouri.
- *CRAWFORD, FRANCIS W., Associate Professor of Physics (1960). A. B., 1924, Phillips University; M. S., 1929, Ph. D., 1934, University of Oklahoma.
- *CRAWFORD, GOLDA MILDRED, Associate Professor of History (1946, 1964). B. S., 1928, M. S., 1940, Kansas State University; D. S. S., 1963, Syracuse University.
- CRAWFORD, NAOMI Z., Instructor in Chemistry Emeritus (1922, 1963). B. S., 1919, M. S., 1922, University of Nebraska.
- *CUNKLE, CHARLES HENRY, Professor of Mathematics (1965). A. B., 1938, Indiana University; M. A., 1941, Louisiana State University; Ph. D., 1955, University of Missouri.
- *CURNUTTE, JR., BASIL, Professor of Physics; Associate Physicist, Agr. Exp. Sta. (1954, 1964). B. S., 1945, U. S. Naval Academy; Ph. D., 1953, Ohio State University.
- *DAANE, ADRIAN H., Professor; Head, Department of Chemistry (1963). B. S., 1941, University of Florida; Ph. D., 1950, Iowa State University.
- *DACE, WALLACE, Associate Professor of Speech (1963). A. B., 1943, Illinois Wesleyan University; M. F. A., 1948, Yale University; Ph. D., 1952, Denver University.
- *DAKIN, RALPH EUGENE, Professor of Sociology; Sociologist, Agr. Exp. Sta. (1948, 1964). B. F. A., 1942, M. A., 1948, Ph. D., 1958, University of Colorado.
- *DALE E. BROCK, Associate Professor of Physics (1957). B. S., 1940, M. S., 1944, University of Oklahoma; Ph. D., 1953, Ohio State University.

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- *DANSKIN, DAVID G., Associate Professor of Psychology; Director, Student Counseling Center (1959, 1962). A. B., 1950, University of Redlands; M. A., 1951, Ph. D., 1954, Ohio State University.
- *DAVIS, EARLE ROSCO, Professor; Head, Department of English (1949, 1950). A. B., 1927. B. M., 1929, Monmouth College; M. A., 1928, University of Illinois; Ph. D., 1935, Princeton University.
- *DeCOU, DONALD FRANK, Associate Professor of Economics (1947). B. S., 1929, Kansas State Teachers College of Pittsburg; M. B. A., 1934, Northwestern University.
- *DEIBLER, GERALD WILLIAM, Assistant Professor of Drawing and Painting (1956, 1963). B. A., 1951, University of Nebraska; M. F. A., 1955, University of Colorado.
- *DENNING, DENNIS F., Assistant Professor of Speech (1959). B. S., 1951, M. S., 1956, Kansas State Teachers College of Emporia; Ph. D., 1966, University of Kansas.
- DiSANTO, JOSEPH, Assistant Professor of Sociology (1966). B. S., 1957, Black Hills State Teachers College; M. S., 1962, University of Wisconsin.
- DISSINGER, EDWARD R., Assistant Football Coach (1959). B. S., 1936, Baker University; M. A., 1961, Kansas State University.
- *DIXON, LYLE J., Associate Professor of Mathematics (1963). B. S., 1948, M. S., 1950, Oklahoma State University; Ph. D., 1963, University of Kansas.
- DODDS, DARRELL DeLOSS, Assistant Professor of Athletics (1963). B. S., 1959, M. S., 1960, Kansas State University.
- *DONOVAN, ROBERT KENT, Assistant Professor of History (1964). B. A., 1954, Harvard University; B. A., 1958, M. A., 1963, Cambridge University; Ph. D., 1965, Harvard University.
- *DOUGLAS, LOUIS HARTWELL, Professor of Political Science (1949). A. B., 1931, Hastings College; M. A., 1937, Ph. D., 1949, University of Nebraska.
- DYER, PETER MADISON, Assistant Professor of Military Science (1964). B. S., 1957, Northeastern University, Boston; 1964, Signal Corps Career Officers' Course.
- EATON, GEORGE R., Assistant Professor of Technical Journalism (1955). B. S., 1947, South Dakota State College.
- EBBERTS, GEORGE ORVAL, Assistant Dean; Assistant Professor (1946, 1956). B. S., 1949, M. S., 1951, Kansas State University.
- *EBERLE, ROLF A., Assistant Professor of Philosophy (1965). A. B., 1960, M. A., 1964, Ph. D., 1965, University of California at Los Angeles.
- EDDY, BURTON ANDERSON, Assistant Professor of Military Science (1964). B. S., 1955, Kansas State University; 1961, Infantry Career Course.
- EDWARDS, EDNA, Assistant instructor in Music (1965). B. S., 1932, Kansas State University.
- *EISENSTARK, ABRAHAM, Professor of Bacteriology; Virologist, Agr. Exp. Sta. (1951, 1959). B. A., 1940, M. A., 1942, Ph. D., 1948, University of Illinois.
- *EITNER, WALTER HUGO, Assistant Professor of English (1954, 1959). A. B., 1948, University of Denver; A. M., 1949, University of Michigan; Ph. D., 1959, University of Denver.
- *ELEFThERIOU, BASIL E., Assistant Professor of Zoology (1963). B. A., 1956, University of Maine; M. A., 1959, University of Massachusetts; Ph. D., 1961, Purdue University.
- *ELLIS, BYRON ELBRIDGE, Professor of Technical Journalism (1949, 1950). A. B., 1927, Pacific Union College; A. M., in Ed., 1933, University of Southern California.
- *ELLSWORTH, LOUIS DANIEL, Professor of Physics (1946, 1954). B. S., 1937, Case Institute of Technology; M. S., 1938, Ph. D., 1941, Ohio State University.
- *EMERSON, M. JARVIN, Associate Professor of Economics (1962). B. A., 1957, Luther College; M. A., 1960, Ph. D., 1963, State University of Iowa.
- *ENGLER, LEO F., Associate Professor of Speech (1962). B. A., 1952, University of Iowa; M. A., 1953, Ph. D., 1962, University of Texas.
- EPSTEIN, LEONARD J., Instructor in English (1961). B. A., 1960, M. A., 1961, San Francisco State College.
- *ERWIN, LESTER EDGAR, Associate Professor of Bacteriology; Associate Poultry Bacteriologist, Agr. Exp. Sta. (1946, 1950). B. S., 1924, Kansas State University; M. S., 1929, Ph. D., 1938, Iowa State University.
- ESTLOW, WILLIS L., Assistant Professor of Geology and Geography (1956). A. B., 1944, University of Denver; M. S., 1948, University of Wisconsin; Ed. D., 1961, University of Colorado.
- EVANS, JOHN C., Assistant Professor of Physics (1966). B. S., 1960, University of Oklahoma; M. S., 1962, Rensselaer Polytechnic Institute; M. S., 1964, Ph. D., 1966, University of Michigan.
- *EVANS, JOSEPH CLARK, Assistant Professor of Modern Languages (1960, 1963). B. A., 1952, M. A., 1953, University of Nebraska; Ph. D., 1963, University of Kansas.
- *EVANS, THOMAS MARION, Professor; Head, Department of Physical Education (1942, 1950). B. S., 1930, Kansas State University; M. S., 1942, University of Michigan; P. E. Dir., 1958, Indiana University.
- *FAN, LIANG-SHING, Assistant Professor of Economics (1964). B. A., 1956, National Taiwan University; M. A., 1960, Ph. D., 1965, University of Minnesota.
- *FARKAS, HERBERT M., Assistant Professor of Mathematics (1964). B. S., 1956, City College of New York; M. A., 1958, Brandeis University; Ph. D., 1964, Illinois Institute of Technology.

- *FAULKNER, JACOB OLIN, Professor of English Emeritus (1922, 1955). B. A., 1907, Washington and Lee University; M. A., 1920, Pennsylvania State University.
- FEDOSKY, EDWARD J., Instructor in Physical Education (1960). B. S., 1952, M. S., 1958, Indiana University.
- *FERGUSON, CLYDE RANDOLPH, Assistant Professor of History (1960, 1963). B. A., 1955, University of Oklahoma; M. A., 1957, Ph. D., 1960, Duke University.
- FERNANDEZ, ROBERTA, Instructor in Modern Languages (1966). B. A., 1962, M. A., 1966, University of Texas.
- *FEYERHERM, ARLIN M., Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1953, 1964). B. S., 1946, University of Minnesota; M. S., 1948, University of Iowa; Ph. D., 1952, Iowa State University.
- *FINA, LOUIS R., Associate Professor of Bacteriology; Microbiologist, Agr. Exp. Sta. (1954, 1962). B. A., 1942, M. S., 1948, Ph. D., 1950, University of Illinois.
- *FISCHER, WILLIAM R., Associate Professor of Music (1948, 1954). B. M., 1939, M. M., 1940, Northwestern University; B. A., 1953, Drake University.
- FISHER, KENNETH W., Associate Professor of Physics (1966). B. Sc., 1953, M. Sc., 1954, Ph. D., 1957, University of London.
- *FISHER, WALTER DUMMER, Professor of Economics; Economist, Agr. Exp. Sta. (1951, 1957). A. B., 1937, Harvard University; Ph. D., 1943, University of Chicago.
- FITZNER, GUSTAVE PAUL, Instructor in Military Science (1965).
- FLANAGAN, BRUCE, Associate Professor of Speech (1966). B. S., 1953, Western Michigan University; M. S., 1958, Southern Illinois University; Ph. D., 1966, University of Florida.
- FOLLAND, NATHAN O., Assistant Professor of Physics (1966). B. A., 1959, Concordia College; Ph. D., 1965, Iowa State University.
- *FOLTZ, VERNON DANIEL, Professor of Bacteriology; Bacteriologist, Agr. Exp. Sta. (1927, 1946). B. S., 1927, M. S., 1929, Kansas State University.
- *FRAZIER, JOHN CARROLL, Professor of Botany; Plant Physiologist, Agr. Exp. Sta. (1926, 1947). A. B., 1925, DePauw University; M. A., 1926, University of Nebraska; Ph. D., 1939, University of Chicago.
- FREEMAN, ELSIE T., Instructor in English (1946). B. A., 1952, New York State Teachers College; M. A., 1955, Boston University.
- FREUND, JURGEN, Instructor in Modern Languages (1966). Staatsexamen, 1966, University of Freiburg.
- *FRIEDMANN, EUGENE ALVIN, Professor, Head, Department of Sociology and Anthropology (1965). A. B., 1947, M. A., 1949, Ph. D., 1953, University of Chicago.
- *FRIESEN, JAMES D., Assistant Professor of Physics (1964). B. A., 1957, M. A., 1959, University of Saskatchewan; Ph. D., 1962, University of Toronto.
- *FRYER, HOLLY CLAIRE, Professor; Head, Department of Statistics; Director, Statistical Laboratory, Agr. Exp. Sta. (1940, 1959). B. S., 1931, University of Oregon; M. S., 1933, Oregon State University; Ph. D., 1940, Iowa State University.
- *FULLER, LEONARD EUGENE, Professor of Mathematics (1952, 1959). B. A., 1941, University of Wyoming; M. S., 1947, Ph. D., 1950, University of Wisconsin.
- *GAINEY, PERCY LEIGH, Professor of Bacteriology Emeritus (1914, 1957). B. S., 1908, M. S., 1910, North Carolina State College; A. M., 1911, Ph. D., 1926, Washington University.
- *GARZIO, ANGELO C., Professor of Art (1957). B. A., 1949, B. S., 1949 Syracuse University; Diploma di Profitto, 1950, University of Florence, Italy; M. A., 1954, M. F. A., 1955, State University of Iowa.
- *GEIGER, ALICE LOUISE, Assistant Professor of Art Emerita (1945). A. B., 1922, B. F. A., 1933, University of Kansas; M. A., 1939, Colorado State College of Education.
- *GEYER, KATHERINE, Professor of Physical Education (1927, 1945). B. S., 1927, Ohio State University; M. A., 1934, Columbia University.
- *GIER, HERSCHTEL THOMAS, Professor of Zoology; Associate Embryologist, Agr. Exp. Sta. (1947). A. B., 1931, Kansas State Teachers College of Pittsburg; Ph. D., 1936, Indiana University.
- GILLESPIE, VINCENT E., Assistant Professor of English (1966). B. A., 1952, Sterling College; M. A., 1956, Ph. D., 1966, University of Kansas.
- *GIVEN, KINGSLEY WALTON, Professor of Speech (1920, 1950). B. A., 1926, Park College; M. A., 1929, State University of Iowa.
- GLAD, DONALD D., Visiting Professor of Psychology (1963). B. A., 1943, M. A., 1943, University of Utah; Ph. D., 1946, Stanford University.
- *GLENN, ESTHER BEACHEL, Assistant Professor of English (1948, 1954). A. B., 1930, Kansas Wesleyan University; M. S., 1952, Kansas State University.
- *GOODRICH, ARTHUR LEONARD, Professor of Zoology (1929, 1947). B. S., 1928, College of Idaho; M. S., 1929, University of Idaho; Ph. D., 1938, Cornell University.
- *GOSS, JAMES ARTHUR, Assistant Professor of Botany; Assistant Plant Physiologist, Agr. Exp. Sta. (1956, 1957). B. S., 1951, Utah State University; Ph. D., 1957, University of California.
- GREEN ELTON EDMOND, Assistant Professor of Physical Education (1956). B. S., 1951, M. S., 1957, Kansas State University.
- GREEN, RALPH EMERSON, Instructor in Physics (1961). B. S., 1939, Tri-State College; M. S., 1954, University of Alabama.
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- GREENWOOD, MICHAEL JAMES, Assistant Professor of Economics (1965). B. S., 1962, DePaul University; M. A., 1965, Northwestern University.
- GROSH, DORIS L., Instructor in Mathematics (1946, 1965). B. S., 1946, University of Chicago; M. S., 1949, Kansas State University.
- *GUHL, ALPHAEUS MATTHEW, Professor of Zoology; Associate Zoologist, Agr. Exp. Sta. (1943, 1954). B. A., 1922, North Central College; M. S., 1939, Ph. D., 1943, University of Chicago.
- *GUSTAFSON, MERLIN D., Assistant Professor of Political Science (1960). B. S., 1943, M. S., 1947, Kansas State University; Ph. D., 1956, University of Nebraska.
- GUTHRIDGE, WILLIAM W., Assistant Basketball Coach (1964). B. S., 1960, M. S., 1963, Kansas State University.
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- *HAAJDA, JOSEPH, Associate Professor of Political Science (1957, 1960). B. Pol. Sci., 1948, Charles University, Prague (Czechoslovakia); A. B., 1951, M. A., 1952, Miami University; Ph. D., Indiana University.
- *HAMMAKER, ROBERT M., Assistant Professor of Chemistry (1961). B. S., 1956, Trinity College; Ph. D., 1960, Northwestern University.
- *HANDEL, STEPHEN J., Assistant Professor of Psychology (1966). B. S., 1962, Massachusetts Institute of Technology; Ph. D., 1966, Johns Hopkins University.
- *HANNAH, ELAINE, Assistant Professor of Speech (1961). B. A., 1946, University of Buffalo; M. A., 1948, University of Wisconsin; Ph. D., 1956, University of Indiana.
- *HANNAH, JOHN, Associate Professor; Acting Head, Department of Art (1957, 1962, 1964). B. F. A., 1952, University of Buffalo; M. F. A., 1955, University of Illinois.
- *HANSEN, MERLE FREDERICK, Professor of Zoology; Associate Parasitologist, Agr. Exp. Sta. (1950, 1963). B. A., 1939, M. A., 1941, University of Minnesota; Ph. D., 1948, University of Nebraska.
- *HARRIS, JOHN ORVILLE, Professor of Bacteriology; Bacterial Physiologist, Agr. Exp. Sta. (1941, 1952). B. S., 1939, Kansas State University; M. S., 1941, University of Hawaii; Ph. D., 1943, Kansas State University.
- *HARRIS, VIDA AGNES, Associate Professor of Art Emerita (1924, 1963). B. S., 1914, Kansas State University; A. M., 1927, University of Chicago.
- *HATHAWAY, CHARLES, Assistant Professor of Physics (1964). B. S., 1958, Texas A and M College; Ph. D., 1964, University of Oklahoma.
- *HAUSMAN, CARL R., Chairman, Director of Philosophy; Associate Professor (1953, 1963). A. B., 1949, University of Louisville; M. A., 1951, Duke University; Ph. D., 1960, Northwestern University.
- *HAYGOOD, ROBERT C., Assistant Professor of Psychology (1964). B. S., 1949, University of Illinois; M. S., 1959, Ph. D., 1963, University of Utah.
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- *HAYS, ROBERT WILSON, Associate Professor of Music (1946, 1963). B. A., 1920, Carroll College; M. S., 1940, Union Theological Seminary.
- *HELSON, HARRY, Peterson Distinguished Professor of Psychology (1961). A. B., 1921, Bowdoin College; M. A., 1922, Ph. D., 1924, Harvard University.
- HERZMANN, LAVERNE CARL, Instructor in Mathematics (1963, 1965). B. S., 1963, Upper Iowa University; M. S., 1965, Kansas State University.
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- HICK, SANDRA RAE, Instructor in Physical Education (1961). B. S., 1960, Mankato State University.
- HIEBERT, PAUL G., Assistant Professor of Anthropology (1966). B. A., 1954, Tabor College; M. A., 1958, University of Minnesota.
- *HIGGINSON, FRED HALL, Professor of English (1950, 1964). A. B., 1942, M. A., 1947, University of Wichita; Ph. D., 1950, University of Minnesota.
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- *HILL, OPAL BROWN, Associate Professor of Art (1944, 1954). B. S., 1944, M. S., 1950, Kansas State University.
- *HILL, RANDALL CONRAD, Professor of Sociology (1929, 1935). B. S., 1924, M. A., 1927, Kansas State University; Ph. D., 1929, University of Missouri.
- *HILYARD, DELMER, Assistant Professor of Speech (1965). B. A., 1951, University of Denver; M. S., 1958, Kansas State Teachers' College of Emporia; Ph. D., 1965, Michigan State University.
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- *HOWE, FLORENCE VIRGINIA, Professor of Speech (1947, 1959). A. B., 1935, Elmira College; M. S., 1949, Ed. D., 1958, Boston University.
- *HSU, CHEN-JUNG, Professor of Mathematics (1965). B. S., 1937, D. S., 1961, Tohoku University (Japan).
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- *HUMMEL, WILLIAM CASTLE, Professor of English (1950). A. B., 1939, Allegheny College; M. A., 1940, Ph. D., 1946, University of Pittsburgh.
- *ILES, IVOR VICTOR, Professor of Political Science Emeritus (1911, 1949). B. A., 1904, M. A., 1905, University of Kansas.
- JANES, WILLIAM CHARLES, Associate Professor of Mathematics (1922, 1946). B. S., 1919, Northwestern University; M. A., 1922, University of Nebraska.
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- *JONES, KENNETH W., Assistant Professor of History (1965). A. B., 1958, M. A., 1959, Ph. D., 1966, University of California.
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- *JUSSILA, CLYDE, Assistant Professor of Music (1949, 1952). B. M., 1949, University of Washington; M. S., 1951, Kansas State University.
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- KNORR, FRITZ GUSTAVE, Head Wrestling Coach; Assistant Professor of Athletics (1942, 1952). B. S., 1932, M. S., 1945, Kansas State University.
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- *KRAMER, CHARLES LAWRENCE, Associate Professor of Botany; Assistant Mycologist, Agr. Exp. Sta. (1958). B. A., 1950, M. A., 1953, Ph. D., 1957, University of Kansas.
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- *LARMER, OSCAR VANCE, Associate Professor of Drawing and Painting (1950, 1964). B. F. A., 1949, University of Kansas; M. F. A., 1955, Wichita University.
- LARSON, AMBROSE JAMES, Instructor in Military Science (1963).
- LARSON, SARA CHARLOTTE, Instructor in Geography Emerita (1946, 1964). A. B., 1917, Knox College; B. E., 1927, Illinois State Normal University; M. S., 1942, University of Chicago.
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- *MARR, JOHN MAURICE, Professor of Mathematics (1953, 1958). B. S., 1941, Central Missouri State College; M. A., 1949, University of Missouri; Ph. D., 1953, University of Tennessee.
- *MARZOLF, G. RICHARD, Assistant Professor of Zoology (1962). B. A., 1957, Wittenberg College; Ph. D., 1962, University of Michigan.
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- MAXWELL, GEORGE WILLARD, Assistant Professor of Physics Emeritus (1927, 1960). A. B., 1912, M. S., 1920, University of Michigan.
- MAYS, ODIS DEAN, Instructor in Military Science (1965).
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- *McDOWELL, MAYNARD LEE, Associate Professor of Chemistry (1926, 1956). A. B., 1924, Central College of Missouri; A. M., 1926, University of Missouri; Ph. D., 1934, State University of Iowa.
- McFARLAND, JOHN O., Instructor in Aerospace Studies (1964).

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- *McKINLEY, JOHN M., Associate Professor of Physics (1960). B. S., 1951, University of Kansas; Ph. D., 1960, University of Illinois.
- McKINNEY, KATHERYN ANN, Assistant Professor of Physical Education (1946). B. S., 1934, Kansas State University; M. A., 1935, George Peabody College for Teachers.
- *McMAHON, KENNETH JAMES, Associate Professor of Bacteriology (1949, 1960). B. S., 1947, South Dakota State University; M. S., 1949, Oklahoma State University; Ph. D., 1954, Kansas State University.
- *MEDLIN, CALVIN J., Professor of Technical Journalism Emeritus; Graduate Manager of Student Publications (1934, 1949). B. S., 1920, M. S., 1941, Kansas State University.
- *MELOAN, CLIFTON E., Associate Professor of Chemistry (1959, 1963). B. S., 1953, Iowa State University; Ph. D., 1959, Purdue University.
- *MILLER, CECIL HALE, Professor of Philosophy (1945, 1951). A. B., 1930, University of Kansas; M. A., 1939, University of California.
- *MILLER, JORDAN YALE, Associate Professor of English (1950, 1963). B. A., 1942, Yale University; Ph. D., 1957, Columbia University.
- MILLER, MARGARET, Instructor in Modern Languages (1966). B. A., 1936, Bethany College; M. A., 1955, The Hartford Seminary Foundation.
- MILLER, MICHAEL HOLMES, Assistant Professor of Mathematics (1960, 1965). B. S., 1958, M. S., 1964, Iowa State University.
- *MILLER, WILLIAM ARTHUR, Associate Professor of Bacteriology; Associate Food Bacteriologist, Agr. Exp. Sta. (1947, 1952). B. S., 1929, University of Illinois; M. S., 1931, University of Pennsylvania; Ph. D., 1935, University of Illinois.
- *MITCHELL, JAMES C., Associate Professor of Psychology (1966). B. S., 1957, M. A., 1959, Ph. D., 1962, Ohio State University.
- MOLBERT, ELISABETH, Associate Professor of Physics (1966). B. S., 1947, Ph. D., 1948, Doctor of Medicine, 1951, University of Freiburg.
- *MOORE, FRITZ, Professor of Modern Languages (1934). A. B., 1927, University of Akron; M. A., 1930, Ph. D., 1932, University of Illinois.
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- *MORRIS, MARIA, Associate Professor of Art Emerita (1925, 1963). B. S., 1911, M. S., 1927, Kansas State University.
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- *MOSER, HERBERT CHARLES, Associate Professor of Chemistry; Assistant Chemist, Agr. Exp. Sta. (1957). B. A., 1952, San Jose State College; Ph. D., 1957, Iowa State University.
- *MOSES, WILLIAM R., Professor of English (1950, 1954). B. A., 1932, M. A., 1933, Ph. D., 1939, Vanderbilt University.
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- *MUNRO, DONALD FARNHAM, Associate Professor of Modern Languages Emeritus (1940). B. S., 1926, M. A., 1927, Acadia University (Canada); Ph. D., 1933, University of Illinois.
- MURPHY, GARDNER, Visiting Professor of Psychology (1962). B. A., 1916, Yale University; A. M., 1917, Harvard University; Ph. D., 1923, Columbia University.
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- MYERS, DONALD L., Instructor in Mathematics (1964). B. A., 1962, Washburn University; M. S., 1964, Kansas State University.
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- *NARASIMHAM, GORTI VENKATA LAKSHMI, Assistant Professor of Economics (1965). B. A., 1952, Andhra University; M. A., 1962, Iowa State University; Ph. D., 1964, University of Pittsburgh.
- *NELSON, JOHN W., Assistant Professor of Physics (1962). B. A., 1949, Washington University; M. A., 1951, Ph. D., 1959, University of Texas.
- NEWBY, FRANCES ANN, Instructor in Art (1963). B. F. A., 1961, Kansas City Art Institute.
- *NEWCOMB, MARGARET ALICE, Associate Professor of Botany (1925, 1941). B. S., 1925, M. S., 1927, Kansas State University.
- *NICHOLS, DUANE, Assistant Professor of English (1964). B. S., 1952, M. E., 1957, University of South Dakota.
- NIESCHMIDT, ERNEST B., Instructor in Physics (1961, 1963). A. B., 1959, M. S., 1961, San Diego State College.
- *NOBLE, MERRILL E., Professor; Head, Department of Psychology (1954, 1961). B. A., 1947, New Mexico Highlands University; M. A., 1949, Ph. D., 1951, Ohio State University.
- *NORDIN, JOHN A., Professor; Head, Department of Economics (1961). B. A., 1935, M. A., 1937, Ph. D., 1941, University of Minnesota.
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- OPPY, MARY L., Instructor in English (1965). A. B., 1936, Otterbein College; M. A., 1937, Ohio State University.
- O'SHEA, JOHN WILLIAM, Instructor in Art (1956). B. F. A., 1954, Denver University; M. F. A., 1956, State University of Iowa.
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- *PARKER, S. THOMAS, Professor of Mathematics; Director of Computing Center (1947, 1961). B. A., 1931, M. A., 1933, University of British Columbia (Canada); Ph. D., 1947, University of Cincinnati.
- *PARKS, WILLIAM F., Assistant Professor of Physics (1964). B. S., 1960, Lehigh University; Ph. D., 1964, State University of Iowa.
- *PARRISH, FRED LOUIS, Professor of History Emeritus (1927, 1963). A. B., 1917, M. A., 1922, Northwestern University; B. D., 1920, Garnett Biblical Institute; Ph. D., 1927, Yale University.
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- *RAPPOPORT, LEON H., Assistant Professor of Psychology (1964). B. A., 1953, New York University; M. A., 1962, Ph. D., 1963, University of Colorado.
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- RUGGLES, BERTRAM L., Professor, Head of Department of Aerospace Studies (1964). B. S., 1942, Iowa State University; M. A., 1950, American University; 1957, Air Command and Staff College; 1964, Air War College.
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- *SANGER, RALPH GRAFTON, Professor; Head, Department of Mathematics (1946). B. S., 1925, M. S., 1926, Ph. D., 1931, University of Chicago.
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- SCHELP, RICHARD HERBERT, Instructor in Mathematics (1959, 1966). B. S., 1959, Central Missouri State College; M. S., 1961, Kansas State University.
- SCHNEIDER, HAROLD WILLIAM, Instructor in English (1961). B. A., 1950, University of Minnesota.
- SCHOLL, MARGARET ANNE, Instructor in Modern Languages (1963). A. B., 1961, University of Buffalo; M. A., 1962, Middlebury College.
- SCHRAG, GERALD CLARK, Instructor in Mathematics (1962, 1964). A. B., 1960, Bethel College; M. S., 1964, Kansas State University.
- *SCHRENK, WILLIAM GEORGE, Professor of Chemistry; Physical Chemist, Agr. Exp. Sta. (1938, 1951). A. B., 1932, Westmar College; M. S., 1936, Ph. D., 1945, Kansas State University.
- *SEARLES, JR., SCOTT, Professor of Chemistry (1952, 1962). B. A., 1941, M. A., 1942, University of California; Ph. D., 1947, University of Minnesota.
- *SELF, HUBER, Assistant Professor of Geography (1947, 1953). B. S., 1941, Central Oklahoma State College; M. S., 1947, Oklahoma State University.
- *SETSER, DONALD W., Associate Professor of Chemistry (1963). B. S., 1956, M. S., 1958, Kansas State University; Ph. D., 1961, University of Washington.
- SHADDAY, EARL W., Instructor in Aerospace Studies (1965).
- SHAW, DALE GARRATT, Instructor in Mathematics (1964, 1966). B. A., 1963, Colorado College; M. S., 1966, Kansas State University.
- *SHENKEL, JR., CLAUDE WESLEY, Professor of Geology (1949, 1958). B. S., 1941, Kansas State University; M. S., 1947, Ph. D., 1952, University of Colorado.
- SHERIFF, ALBERT II., Instructor in Physical Education (1965). B. S., 1949, M. S., 1966, Kansas State University.
- SHERMAN, LOUIS, Instructor in Music (1960, 1961). B. M., 1954, Bethany College.
- *SHOWALTER, DONALD FOX, Professor of Psychology Emeritus (1928, 1961). A. B., 1916, M. A., 1917, University of Nebraska; Ph. D., 1931, University of Kansas.
- SHULL, PAUL, Associate Professor of Music (1960). B. M. E., 1950, M. M. E., 1951, University of Colorado.
- *SIDDALL, WILLIAM R., Associate Professor of Geography; Chairman, Division of Geography (1965). A. B., 1950, Harvard University; M. A., 1955, Ph. D., 1957, University of Washington.
- SIDORFSKY, FRANK M., Assistant Professor of Music (1965). B. M. E., 1952, Kansas State Teachers College of Emporia; M. M., 1957, Eastman Conservatory of Music (University of Rochester).
- *SILKER, RALPH, Professor of Chemistry (1941, 1948). B. A., 1927, University of Dubuque; M. S., 1931, Ph. D., 1934, State University of Iowa.
- *SINCLAIR, JOSEPH BRUCE, Assistant Professor of History (1966). B. A., 1956, University of California, Berkeley; M. A., 1957, New Mexico Highlands University; M. A., 1959, University of Delaware; Ph. D., 1966, Case Institute of Technology.
- *SINNETT, E. ROBERT, Associate Professor of Psychology; Assistant Director, Student Counseling Center (1962). B. A., 1948, University of Iowa; M. A., 1950, Ph. D., 1953, University of Michigan.
- SITZ, SARAH G., Instructor in Mathematics (1946). B. S., 1926, Iowa State University.
- SLOAT, FLOYD B., Associate Professor of Mathematics (1946, 1947). B. A., 1938, Ouachita College; M. A., 1941, University of Arkansas.
- SLOOP, JEAN C., Assistant Professor of Music (1959). B. A., 1953, Gettysburg College; M. A., 1956, Eastman School of Music (University of Rochester).
- SMITH, MAX, Instructor in Speech (1965). B. A., 1959, Purdue University; M. A., 1964, University of Michigan.

- SMITH, WAYNE BICKLEY, Associate Professor of Military Science (1963). LL. B., 1940, Oklahoma University; Associate Army Command and General Staff College.
- *SMITHS, BENJAMIN LEVI, Assistant Professor of Chemistry Emeritus (1926, 1952). B. S., 1924, M. S., 1925, Ph. D., 1926, Michigan State University.
- *SNYDER, VERYLE E., Assistant Professor of Physical Education (1954). B. S., 1942, M. S., 1950, Kansas State University.
- *SOCOLOFSKY, HOMER E., Professor of History (1946, 1963). B. S., 1943, M. S., 1947, Kansas State University; Ph. D., 1954, University of Missouri.
- *SOELLNER, ROLF, Associate Professor of English (1961). B. S., 1950, University of Erlangen (Germany); M. A., 1951, Ph. D., 1953, University of Illinois.
- *SPANGLER, JOHN D., Assistant Professor of Physics (1965). B. S., 1958, Kansas State University; Ph. D., 1961, Duke University.
- *SPERRY, ARTHUR BRADLEY, Professor of Geology Emeritus (1921, 1953). B. S., 1919, University of Chicago.
- *STACEY, KARL, Professor of Geography (1943, 1959). B. A., 1936, M. A., 1937, University of Colorado; Ph. D., 1955, Clark University.
- *STAMEY, WILLIAM L., Associate Dean; Professor of Mathematics (1953, 1963). A. B., 1947, Colorado State University; M. A., 1949, Ph. D., 1952, University of Missouri.
- *STANISLAWSKI, MICHAEL B., Assistant Professor of Anthropology (1963). B. A., 1959, Stanford University; Ph. D., 1963, University of Arizona.
- *STEUNENBERG, THOMAS BERNARD, Professor of Music (1947). B. M. E., 1933, Northwestern University; M. M., 1938, University of Michigan; Ph. D., 1947, Eastman School of Music (University of Rochester).
- *STOVER, STEPHEN L., Assistant Professor of Geography (1964). A. B., 1940, McPherson College; M. A., 1941, University of Kansas; M. S., 1955, Ph. D., 1960, University of Wisconsin.
- *STURMER, ANNA MARIE, Professor of English Emerita (1920, 1950). A. B., 1917, A. M., 1920, University of Nebraska.
- *SULEIMAN, MICHAEL WADIE, Assistant Professor of Political Science (1965). B. A., 1960, Bradley University; M. S., 1962, Ph. D., 1965, University of Wisconsin.
- *SUMMERFELT, ROBERT C., Assistant Professor of Zoology (1964). B. S., 1957, Wisconsin State College; M. S., 1959, Ph. D., 1964, Southern Illinois University.
- *SWEEDLUN, VERNE SEBASTIAN, Professor of History (1941, 1947). A. B., 1923, Bethany College; M. A., 1929, University of Kansas; Ph. D., 1940, University of Nebraska.
- TANNER, PETER H., Assistant Professor of Music (1963, 1964). B. M., 1958, M. M., 1959, Eastman School of Music (University of Rochester).
- TARRANT, DONALD H., Associate Professor of Aerospace Studies (1965). B. S., 1948, Morningside College; M. S., 1959, Iowa State University; 1959, Squadron Officers' School.
- *TAYLOR, ROBERT BARTLEY, Assistant Professor of Anthropology (1957, 1960). B. S., 1949, Wheaton College; M. A., 1956, Ph. D., 1960, University of Oregon.
- TERRY, ROBERT LEE, Assistant Professor of Military Science (1965). B. S., 1956, Kansas University; 1965, Engineer Corps Career Officers' Course.
- *THOMPSON, CHARLES P., Assistant Professor of Psychology (1965). B. S., 1958, Wisconsin State College; M. S., 1960, Ph. D., 1962, University of Wisconsin.
- *THOMPSON, FRANK JAMES, Assistant Professor of Physical Education (1937, 1949). B. Ed., 1934, Minnesota State Teachers College (Mankato); M. Ed., 1936, Springfield College (Massachusetts).
- *THORNTON, ROBERT, Professor of English (1960). B. A., 1939, Wesleyan University; M. A., 1940, Western Reserve University and Harvard University; Ph. D., 1949, Harvard University.
- *TIEMEIER, OTTO WILLIAM, Professor of Zoology; Associate Wildlife Conservationist, Agr. Exp. Sta. (1947, 1964). A. B., 1937, M. A., 1939, University of Kansas; Ph. D., 1947, University of Illinois.
- *TOMASCH, ELMER JOHN, Associate Professor of Drawing and Painting (1947, 1959). B. S., 1935, Western Reserve University; M. S., 1956, Kansas State University.
- *TREMMEI, WILLIAM C., Director of Student Religious Activities; Professor of Philosophy (1956, 1959). A. B., 1940, Denver University; Th. M., 1945, Th. D., 1950, Hiff School of Theology.
- *TRUMBO, DON ARTHUR, Professor of Psychology (1957, 1959). B. S., 1953, Western Michigan University; M. A., 1955, Ph. D., 1958, Michigan State University.
- *TURNER, LOIS BELLE, Assistant Professor of History (1946, 1955). B. S., 1941, M. S., 1946, Kansas State University.
- *TWISS, PAGE C., Associate Professor of Geology (1953, 1964). B. S., 1950, M. S., 1955, Kansas State University; Ph. D., 1959, University of Texas.
- *VAN SWAAY, MAARTEN, Assistant Professor of Chemistry (1963). B. S., 1951, Leiden University, Netherlands; Ph. D., 1956, Princeton University; "Drs", 1956, Leiden University, Netherlands.
- VAUGHT, CARL G., Assistant Professor of Philosophy (1965). A. B., 1961, Baylor University; M. A., 1963, Yale University; Ph. D., to be awarded, 1966, Yale University.
- *VAZQUEZ, BURNEY L., Assistant Professor of Modern Languages (1965). B. A., 1950, Washburn University; M. S., 1953, Kansas State Teachers College; Ph. D., 1964, University of Kansas.
- VIAN, RICHARD W., Assistant Professor of Geology (1966). A. B., 1957, M. S., 1959, Miami University; Ph. D., 1965, University of Michigan.

* Graduate faculty.

- VOGT, JOHN L., Assistant Professor of Art (1963). B. F. A., 1960, Kansas City Art Institute; M. F. A., 1963, University of Illinois.
- VOOIS, JACQUES C., Assistant Professor of Music (1965). B. M., 1958, Oberlin College; M. M., 1963, Manhattan School of Music, New York, N. Y.
- *WALKER, WARREN VINCENT, Associate Professor of Music (1948, 1959). B. A., 1946, University of Washington; M. M., 1948, Cincinnati Conservatory of Music.
- *WALTERS, CHARLES P., Associate Professor of Geology (1936, 1958). B. S., 1936, M. S., 1937, Kansas State University; Ph. D., 1957, Cornell University.
- *WASHBURN, LOUIS P., Professor of Physical Education Emeritus (1926, 1954). B. S., 1907, Carleton College; B. P. E., 1911, M. P. E., 1925, Springfield College.
- *WATERS, JERRY BLAKELY, Assistant Professor of Political Science (1961, 1966). B. S., 1954, Kansas State University; M. S., 1957, Ph. D., 1966, Michigan State University.
- *WAUTHIER, RAYMOND AUGUST, Assistant Professor of Physical Education (1949). B. S., 1945, Albion College; M. S., 1947, Drake University.
- *WEARDEN, STANLEY, Associate Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1957, 1959). B. S., 1950, St. Louis University; M. S., 1951, University of Houston; Ph. D., 1957, Cornell University.
- WEAVER, DOUGLAS W., Head Football Coach (1960). B. A., 1953, Michigan State University.
- WEINGLASS, DAVID H., Instructor in Modern Languages (1964). B. A., 1958, M. A., 1962, Cambridge University.
- WEIS, JERRY S., Assistant Professor of Botany (1966). B. A., 1958, Kansas Wesleyan; M. A., 1960, Ph. D., 1964, University of Kansas.
- *WEISS, ROBERT MORRIS, Assistant Professor of History (1966). B. A., 1960, Brandeis University; M. A., 1961, Ph. D., 1966, University of Wisconsin.
- *WELDEN, TERRY A., Assistant Professor of Speech (1960). B. A., 1954, West Virginia University; M. A., 1957, University of Pittsburgh; Ph. D., 1961, Michigan State University.
- WENDT, ROBERT LOUIS, Assistant Professor of Military Science (1965). B. S., Washington State University; 1965, Ordnance Corps Career Officers' Course.
- *WHITE, ALFRED EVERETT, Professor of Mathematics Emeritus (1909, 1950). B. S., 1904, M. S., 1909, Purdue University.
- *WHITE, MARY FRANCES, Associate Professor of English (1947, 1951). B. S., 1928, M. S., 1930, Kansas State University; Ph. D., 1955, Denver University.
- WHITMAN, JOHN F., Assistant Professor of Aerospace Studies (1963). B. S., 1956, University of Illinois.
- *WILCOXON, GEORGE DENT, Professor of History (1946, 1948). A. B., 1936, M. A., 1938, Ph. D., 1941, University of California at Los Angeles.
- WILKINS, GEORGE MELVIN, Instructor in Military Science (1965).
- *WILLIAMS, DUDLEY, Distinguished Regents Professor of Physics (1964). A. B., 1933, M. A., 1934, Ph. D., 1936, University of North Carolina.
- *WILLIAMS, ROBERT E., Assistant Professor of Mathematics (1965). B. S., 1959, M. A., 1961, Ph. D., 1965, University of Missouri.
- WILLIS, CECIL G., Assistant Professor of Sociology and Anthropology (1964). B. A., 1953, St. Martin's College; M. A., 1960, Kent State University.
- *WILSON, FREDDIE E., Assistant Professor of Zoology; Physiologist, Agr. Exp. Sta. (1965). B. A., 1958, M. A., 1960, University of Kansas; Ph. D., 1965, Washington State University.
- *WIMMER, EDWARD JOSEPH, Professor of Zoology (1928, 1941). B. A., 1925, M. A., 1927, Ph. D., 1928, University of Wisconsin.
- *WINGARD, PAUL SIDNEY, Assistant Professor of Geology (1957, 1961). A. B., 1952, M. S., 1955, Miami University; Ph. D., 1960, University of Illinois.
- WINTER, MORICE FREDERICK, Professor of Athletics; Head Basketball Coach (1947, 1953). B. S., 1947, University of Southern California.
- WOLDT, GRACE S., Instructor in Mathematics (1946). A. B., 1927, Ohio Wesleyan University.
- WOOLF, MAURICE D., Professor of English (1945, 1946). B. S., 1929, Northeast Missouri State Teachers College (Kirksville); Ed. D., 1941, University of Missouri.
- *WORKMAN, ARVIN L., Assistant Professor of Speech (1964). B. S., 1954, M. S., 1957, Indiana State University; Ph. D., 1965, Michigan State University.
- WRIGHT, RALPH, Professor of Military Science (1965). B. S., 1962, University of Maryland; M. A., 1963, George Washington University; 1952, Army Command and General Staff College; 1960, Army War College.
- *YATES, RICHARD LEE, Assistant Professor of Mathematics (1960, 1965). B. S., 1952, Florida Southern College; M. A., 1954, Ph. D., 1957, University of Florida.
- *ZACKS, SHELEMYAHU, Professor of Statistics (1965). B. A., 1955, Hebrew University; M. S., 1960, Technion, Israel; Ph. D., 1962, Columbia University.
- ZILIUS, VALYS, Instructor in Modern Languages (1965). B. A., 1960, Boston University; M. A., 1962, University of Pennsylvania.
- *ZIMMERMAN, JOHN L., Assistant Professor of Zoology (1963). B. S., 1953, M. S., 1959, Michigan State University; Ph. D., 1963, University of Illinois.
- ZINNECKER, BENNETT B., Assistant Professor of Aerospace Studies (1966). B. S., 1955, University of Nebraska; M. B. A., 1964, Arizona State University; 1961, Squadron Officers' School.

College of Commerce

- *BARTON-DOBENIN, JOSEPH, Assistant Professor of Business Administration (1958, 1964). B. S. in Bus. Ad., 1956, M. A., 1958, Ph. D., 1966, University of Nebraska.
- BUZENBERG, MILDRED E., Assistant Dean; Instructor (1964). B. A., 1938, Michigan State University; M. S., 1951, Kansas State University.
- *CLARK, WILLIAM J., Professor of Business Administration (1946, 1961). B. S., 1929, Kansas State Teachers College (Pittsburg); M. A., 1940, State University of Iowa; C. P. A., 1954, Kansas.
- COLEMAN, RAYMOND J., Assistant Professor of Business Administration (1965). B. S., 1948, University of Kansas; M. A., 1963, Central Missouri State College.
- *ERIKSEN, CONRAD J. K., Associate Professor of Business Administration (1946, 1947). B. A., 1929, University of Kansas; M. B. A., 1931, Harvard University.
- EUBANKS, CLIFFORD L., Assistant Professor of Business Administration (1965). B. S., 1962, Arkansas State College; M. B. A., 1964, University of Arkansas.
- FERLEMANN, GLEN R., Assistant Professor of Business Administration (1966). B. S., 1953, Kansas State University; M. B. A., 1959, University of Pennsylvania.
- *GILKISON, PAUL D., Assistant Professor of Business Administration (1962). B. S., 1959, M. B. A., 1960, University of Kansas; D. B. A., 1964, University of Colorado.
- GUDGELL, DOROTHY B., Assistant Professor of Business Administration (1943, 1954). B. S., 1938, M. S., 1946, Kansas State University.
- *GUGLER, MERLE E., Associate Professor of Business Administration (1947, 1959). B. S., 1940, Kansas State Teachers College (Emporia); M. S., 1948, Kansas State University; C. P. A., 1956, Kansas.
- *HOEKE, ROBERT S., Director of Graduate Studies, Associate Professor of Business Administration (1966). B. S. I. E., 1954, M. S., 1958, University of Tennessee; M. S., 1961, Ph. D., 1966, University of Wisconsin.
- HOLLINGER, ROBERT D., Instructor in Business Administration (1966). B. A., 1966, Kansas State University.
- JENKINS, MARY H., Instructor (1965). B. S., 1957, Virginia State College; Ed. M., 1962, Temple University.
- *JONES, C. CLYDE, Acting Dean; Professor of Business Administration (1960, 1962). B. A., 1944, Marshall College; M. A., 1950, Ph. D., 1954, Northwestern University.
- JONES, DONALD A., Assistant Professor of Business Administration (1966). B. A., 1963, Kansas State University; J. D., 1966, Washburn University of Topeka.
- *KOLASA, BLAIR J., Associate Dean; Professor of Business Administration (1966). B. S., 1948, Allegheny College; M. S., 1950, Ph. D., 1954, University of Pittsburgh; LL. B., 1960, Duquesne University.
- *LAUGHLIN, EUGENE J., Associate Professor of Business Administration (1955, 1961, 1964). B. S., 1951, Rockhurst College; M. S., 1959, Kansas State University; C. P. A., 1960, Kansas; Ph. D., 1965, University of Illinois.
- *MULANAX, ALVIN EDGAR, Assistant Professor of Business Administration (1947, 1966). B. S., 1946, M. S., 1951, Kansas State University.
- RAPP, CHARLES WILLIAM, Instructor in Business Administration (1955). B. S., 1931, M. S., 1946, Kansas State Teachers College (Emporia).
- RICHARDS, VERLYN D., Assistant Professor of Business Administration (1965). B. S., 1956, M. S., 1960, Kansas State University; C. P. A., 1961, Kansas.
- RILEY, MERRILL J., Assistant Professor of Business Administration (1966). B. S., 1951, John Brown University; M. B. A., 1955, University of Arkansas.
- SWANSON, DONNA C., Instructor (1964). B. E., 1961, Wisconsin State University.
- SWISHER, JR., RHA E. M., Director of Management Services; Associate Professor of Business Administration (1965). B. S., 1943, J. D., 1950, Indiana University.
- *TIDWELL, VICTOR H., Assistant Professor of Business Administration (1964). B. S., 1960, Illinois College; M. B. A., 1962, D. B. A., 1966, Indiana University.
- TUXBURY, WILLIAM D., Assistant Professor of Business Administration (1961). B. B. A., 1946, Southern Methodist University; M. B. A., 1954, Northwestern University; C. P. A., 1954, Texas.
- *WILLIAMS, DWIGHT, Professor of Business Administration Emeritus (1926, 1939). B. A., 1916, LL. B., 1918, M. A., 1926, University of Minnesota.
- WISE, URBAN G., Instructor (1965). B. S., 1963, M. S., 1965, Kansas State University.

College of Education

- *AGAN, RAYMOND JOHN, Professor of Education (1958, 1963). B. S., 1940, M. S., 1950, Iowa State University; Ed. D., 1955, University of Missouri.
- ALBRACHT, JAMES J., Assistant Professor of Education (1966). B. S., 1948, M. S., 1954, University of Nebraska; Ph. D., 1966, Michigan State University.
- *BAKER, HARRY LEIGH, Professor of Education Emeritus (1946, 1963). A. B., 1920, LL. D., 1951, Baker University; B. S. 1922, Kansas State University; A. M., 1928, University of Chicago; Ph. D., 1934, Yale University.
- *BARTEL, ROY A., Assistant Professor of Education (1963). A. B., 1942, Bethel College; M. S. E., 1949, Ed. D., 1959, University of Kansas.

- *BAXTER, LAURA FALKENRICH, Associate Professor of Education Emerita (1927, 1962). B. S., 1915, M. S., 1930, Kansas State University.
- *BRADLEY, HOWARD RALEY, Associate Professor of Education (1951, 1963). B. S., 1930, M. S., 1937, Kansas State University.
- *CHAMPOUX, ELLEN MILES, Assistant Professor of Education (1963). B. S., 1953, Arizona State College; M. A., 1957, Arizona State University; D. Ed., 1962, Pennsylvania State University.
- *COFFIELD, WILLIAM H., Dean, Professor of Education (1963). B. S., 1948, Troy State College; M. A., 1951, George Peabody College; Ph. D., 1954, State University of Iowa.
- COPPEDGE, FLOYD L., Assistant Professor of Education (1966). B. S., 1960, M. of Teaching, 1963, Northeastern State College (Tahlequah, Oklahoma); Ed. D., 1965, University of Oklahoma.
- CRAIG, M. DOROTHY, Assistant Professor of Education (1959). B. M., 1931, Bethany College; B. S., 1941, Kansas State Teachers College (Emporia); M. A., 1944, Columbia University.
- *DeMAND, JOHN WESLEY, Professor of Education (1940, 1959). A. B., 1937, University of Kansas; M. S., 1940, Kansas State University; Ed. D., 1953, University of Colorado.
- DONALD, RICHARD J., Assistant Professor of Education (1966). B. S., 1957, East Stroudsburg State College (Pennsylvania); M. S., 1965, Kansas State University.
- *FRIESEN, WALTER S., Associate Dean of Students, Men's Affairs; Assistant Professor of Education (1961, 1965). A. B., 1953, Tabor College; M. S., 1957, Kansas State Teachers College; Ed. D., 1963, Colorado State College.
- *GREEN, FINIS McCRADY, Professor of Education (1948, 1963). B. S., 1922, Kansas State Teachers College (Pittsburg); M. S., 1929, University of Kansas; Ed. D., 1949, University of Colorado.
- *HALL, LAWRENCE FENOR, Associate Professor of Education Emeritus (1926, 1966). B. S., 1923, M. S., 1927, Kansas State University.
- HAUSE, RICHARD G., Assistant Professor of Education (1966). A. B., 1954, M. A., 1955, Colorado State College; Ed. D., 1966, University of Colorado.
- HUDSON, WANDA L., Instructor in Education (1966). B. S., 1949, M. Ed., 1957, University of Texas.
- *KAISER, HERBERT EMIL, Assistant Professor of Education (1961). B. S., 1941, Concordia Teachers College; M. S., 1943, Oklahoma State University; Ph. D., 1959, University of Nebraska.
- *LITTELL, J. HARVEY, Professor of Education (1954, 1966). B. A., 1935, Iowa State Teachers College; M. A., 1939, State University of Iowa; Ed. D., 1950, University of Missouri.
- *LOEB, JOE HENRY, Assistant Professor of Education (1956). B. A., 1948, Northeastern State College; M. S., 1951, Kansas State Teachers College (Pittsburg); Ed. D., 1957, University of Arkansas.
- *McANARNEY, HARRY EDWARD, Associate Professor of Education (1957, 1966). B. S., 1943, Kansas State Teachers College (Emporia); M. S., 1947, Ed. D., 1958, University of Kansas.
- MILLER, BARBARA JEANETTE, Instructor in Education (1965). B. S., 1963, M. S., 1964, Florida State University.
- *MOGGIE, MAURICE CHARLES, Professor of Education (1930, 1945). B. S., 1929, M. S., 1931, Kansas State University; Ph. D., 1941, Ohio State University.
- *O'FALLON, OWEN KENNETH, Professor of Education (1950, 1958). A. B., 1937, M. A., 1941, Western State College of Colorado; Ed. D., 1952, University of Colorado.
- *OLSON, GEORGE ARTHUR, Professor of Education (1949, 1957). A. B., 1928, A. M., 1931, University of Kansas; Ph. D., 1953, Northwestern University.
- *OWENS, RICHARD E., Assistant Professor of Education (1964). A. B., & B. S., 1949, Northwest Missouri State College; M. A., 1953, Ed. D., 1964, Colorado State College.
- *PECCOLO, CHARLES M., Associate Professor of Education (1962, 1965). A. B., 1949, M. A., 1949, Adams State College; Ph. D., 1962, University of Iowa.
- *PRICE, FLOYD HAMILTON, Assistant Professor of Education and Assistant to Dean (1963, 1965). A. B., 1951, Friends University; M. Ed., 1957, Wichita State University; Ed. S., 1960, George Peabody College; Ed. D., 1965, University of Oklahoma.
- *RUST, LUCILE OSBORN, Professor of Education Emerita (1924, 1960). B. S., 1921, Kansas State Teachers College (Pittsburg); M. S., 1922, Kansas State University.
- SHELL, LEO M., Assistant Professor of Education (1966). A. B., 1955, Bethany College; M. S., 1962, University of Kansas; Ph. D., 1964, University of Iowa.
- *STRICKLAND, VIVAN LEWIS, Professor of Education Emeritus (1917, 1950). A. B., 1906, M. S., 1915, Ph. D., 1925, University of Nebraska.
- SULLIVAN, RITA J., Instructor in Education (1966). B. S., 1956, Kansas State Teachers College (Pittsburg); M. S., 1964, University of Kansas.
- TEAGUE, FRED A., Assistant Professor of Education (1966). B. S., 1959, Central State College (Edmond, Oklahoma); Ed. M., 1963, Ed. D., 1966, University of Oklahoma.
- *TRENNEPOHL, HARLAN JEAN, Associate Professor of Education (1956, 1963). B. S., 1947, M. S., 1951, Kansas State Teachers College (Emporia); Ed. D., 1956, University of Colorado.
- *TRENT, CURTIS, Professor of Education and Extension (1961, 1964). B. S., 1948, Oklahoma State University; M. S., 1960, Ph. D., 1961, University of Wisconsin.
- *WEINSTOCK, HENRY R., Assistant Professor of Education (1966). B. S., 1956, University of Tampa; M. A., 1963, Ed. D., 1965, University of Georgia.

College of Engineering

- *AGUILAR, ANTONIO MANUEL, Assistant Professor of Civil Engineering (1965). B. S., 1951, University of Havana; M. S., 1965, Purdue University.
- *AKINS, RICHARD GLENN, Assistant Professor of Chemical Engineering (1963). B. S., 1957, M. S., 1958, University of Louisville; Ph. D., 1962, Northwestern University.
- *ANNIS, JASON CARL, Instructor in Mechanical Engineering (1959). B. S., 1953, University of Minnesota; M. S., 1956, Michigan College of Mining and Technology.
- *APPL, FREDRIC CARL, Professor of Mechanical Engineering (1960, 1964). B. S., 1954, M. S., 1955, Ph. D., 1958, Carnegie Institute of Technology.
- ARDON, MENACHEM T., Instructor in Electrical Engineering (1965, 1966). B. S., 1965, M. S., 1966, Kansas State University.
- ARNOLD, RICHARD C., Instructor in Applied Mechanics (1966). B. S., 1961, Kansas State University.
- *AZER, NAIM ZAKI, Associate Professor of Mechanical Engineering (1958, 1964). B. S., 1950, M. S., 1954, University of Alexandria, Egypt; Ph. D., 1959, University of Illinois.
- BALL, HERBERT DEAN, Instructor in Mechanical Engineering (1958). B. S., 1956, M. S., 1958, University of Nebraska.
- *BATES, HERBERT TEMPLETON, Professor of Chemical Engineering (1958, 1960). B. S., 1935, Iowa State University; M. S., 1938, Virginia Polytechnic Institute; Ph. D., 1941, Iowa State University.
- BERNS, HENRY DONALD, Instructor in Mechanical Engineering (1964, 1966). B. S., 1961, M. S., 1963, University of Nebraska.
- *BEST, CECIL HAMILTON, Professor of Applied Mechanics (1961, 1964). B. S., 1955, M. S., 1956, Ph. D., 1960, University of California. Professional Engineer, 1962.
- *BLACKBURN, JACK BAILEY, Professor; Head, Department of Civil Engineering; Civil Engineer, Engg. Exp. Sta. (1963). B. S., 1947, Oklahoma University; M. S., 1949, Ph. D., 1955, Purdue University. Professional Engineer, 1950.
- *BOWYER, JR., JAMES MARSTON, Professor of Mechanical Engineering (1963, 1965). B. S., 1942, M. S., 1949, Kansas State University; Ph. D., 1956, University of California.
- *BRAINARD, ROYD BERTRAND, Professor of Mechanical Engineering (1923, 1938). B. S., 1922, University of Colorado; S. M., 1931, Massachusetts Institute of Technology. Professional Engineer, 1945.
- BYERS, EARL CONRAD, Assistant Professor of Industrial Arts (1946, 1956). A. B., 1941, Greenville College; M. S., 1954, Kansas State University.
- CAMERON, CHARLES FRANKLIN, Professor of Electrical Engineering, AID/Egypt—Off Campus (1965). B. S., 1923, Oklahoma A and M; M. S., 1939, Purdue University.
- CARTER, DONALD L., Instructor in Mechanical Engineering (1966). B. S., 1965, University of Missouri at Rolla.
- CHENG, CHEN-YEN, Assistant Professor of Chemical Engineering (1965, 1966). B. S., 1950, National Taiwan University; M. S., 1952, University of Michigan.
- CHUNG, DO SUP, Assistant Professor of Agricultural Engineering (1965, 1966). B. S., 1958, Purdue University; M. S., 1960, Ph. D., 1966, Kansas State University.
- CLACK, ROBERT WYNANDUS, Assistant Professor of Nuclear Engineering (1955, 1959). B. S., 1943, U. S. Naval Academy. Professional Engineer, 1956.
- *CLIFTON, JOHN PAUL, Associate Professor of Industrial Engineering; Industrial Engineer, Engg. Exp. Sta. (1947, 1956). B. S., 1929, University of Kansas; M. S., 1956, Kansas State University. Professional Engineer, 1956.
- CLOUD, HAROLD ARTHUR, Assistant Professor of Agricultural Engineering, AID/Egypt—Off Campus (1966). B. S., 1949, M. S., 1950, Ph. D., 1966, University of Minnesota.
- CONVERSE, HARRY HUNT, Associate Professor of Agricultural Engineering (1966). B. S., 1946, M. S., 1947, Kansas State University.
- COOPER, PETER B., Assistant Professor of Civil Engineering (1966). B. S., 1957, M. S., 1960, Ph. D., 1965, Lehigh University.
- *COPIC, MILAN, Visiting Professor of Nuclear Engineering (1965). B. S., 1950, Ph. D., 1955, University of Ljubljana, Yugoslavia.
- *COTTON, MELVIN CLYDE, Assistant Professor of Electrical Engineering (1955). B. S., 1945, M. S., 1948, University of Kansas. Professional Engineer in Kansas, 1947; in Missouri, 1952.
- *CRANK, ROBERT EUGENE, Associate Professor of Mechanical Engineering (1947, 1951). B. S., 1947, M. S., 1950, Kansas State University. Professional Engineer, 1949.
- CRARY, JAMES FRED, Assistant Professor of Applied Mechanics (1947, 1952). B. S., 1947, Kansas State University. Professional Engineer, 1948.
- DAGUE, RICHARD R., Assistant Professor of Civil Engineering (1966). B. S., 1959, M. S., 1960, Iowa State University; Ph. D., 1966, University of Kansas.
- DICKEY, GEORGE L., Instructor in Industrial Engineering (1964). B. S., 1961, M. S., 1963, Kansas State University.
- DIETRICH, HARVEY F., Assistant Professor of Industrial Arts (1948, 1957). B. S., 1957, Kansas State University.
- DOLLAR, JOHN PAUL, Instructor in Electrical Engineering (1960). B. S., 1956, M. S., 1966, Kansas State University.
- *DUNCAN, ALLEY HUGH, Professor of Mechanical Engineering (1942, 1954). B. S., 1937, M. S., 1949, Kansas State University. Professional Engineer, 1948.

- *DURLAND, MERRILL AUGUSTUS. Dean and Director Emeritus; Professor of Mechanical Engineering (1919, 1961). B. S., 1918, M. S., 1923, Kansas State University. Professional Engineer, 1935.
- ECKHOFF, NORMAN DEAN. Instructor in Nuclear Engineering (1961, 1964). Assoc. in Arts, 1958, Pratt Junior College; B. S., 1961, M. S., 1963, Kansas State University.
- ERICKSON, LARRY EUGENE. Assistant Professor of Chemical Engineering (1964, 1965). B. S., 1960, Ph. D., 1964, Kansas State University.
- *FAIRBANKS, GUSTAVE EDMUND. Professor of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1941, 1957). B. S., 1941, M. S., 1950, Kansas State University. Professional Engineer, 1948.
- *FAN, LIANG-TSENG. Professor of Chemical Engineering (1957, 1963). B. S., 1951, National Taiwan University; M. S., 1954, Kansas State University; Ph. D., 1957, West Virginia University. Professional Engineer in China, 1951.
- *FAW, RICHARD EARL. Associate Professor of Nuclear Engineering (1962, 1966). B. S., 1959, University of Cincinnati; Ph. D., 1962, University of Minnesota.
- *FENTON, FREDERICK CHARLES. Professor of Agricultural Engineering Emeritus; Agricultural Engineer, Agr. Exp. Sta. (1928, 1961). B. S., 1914, M. S., 1930, Iowa State University. Professional Engineer, 1947.
- *FLINNER, ARTHUR ORAN. Professor of Mechanical Engineering (1929, 1947). B. S., 1929, M. S., 1934, Kansas State University; S. M., 1937, Massachusetts Institute of Technology.
- FOX, VIRGIL GRANT. Instructor in Chemical Engineering (1963, 1966). B. S., 1961, Iowa State University.
- FUNK, JOHN WILLIAM. Assistant Professor of Agricultural Engineering; Assistant to the Dean; Assistant Agricultural Engineer, Agr. Exp. Sta. (1947, 1951, 1966). B. S., 1947, M. S., 1950, Kansas State University. Professional Engineer, 1951.
- FUNK, MONROE LYLE. Assistant Professor of Civil Engineering (1956, 1961). B. S., 1956, M. S., 1960, Kansas State University. Professional Engineer, 1960.
- GORTON, ROBERT LESTER. Assistant Professor of Mechanical Engineering (1960, 1966). B. S., 1953, Louisiana Polytechnic Institute; M. S., 1960, Louisiana State University; Ph. D., 1966, Kansas State University.
- GOUDY, ROBERT SCHWALM. Instructor in Applied Mechanics (1963). B. S., 1957, Duke University; S. M., 1958, Massachusetts Institute of Technology; M. S., 1963, Kansas State University.
- *GOWDY, KENNETH KING. Assistant Professor of Mechanical Engineering and Assistant Dean of Engineering (1957, 1962, 1965). B. S., 1955, M. S., 1961, Kansas State University; Ph. D., 1965, Oklahoma State University.
- GRAY, PAUL EUGENE. Instructor in Electrical Engineering (1965). B. S., 1962, M. S., 1964, Virginia Polytechnic Institute.
- *GROSH, LOUIS E. Associate Professor of Industrial Engineering (1965, 1966). B. S., 1944, Louisiana State University; B. S., 1947, M. S., 1949, Ph. D., 1954, Purdue University.
- *HAFT, EVERETT EUGENE. Professor of Applied Mechanics (1961). B. S., 1947, M. S., 1951, Ph. D., 1955, University of Wisconsin. Professional Engineer in Wisconsin, 1952.
- *HALL, RAYMOND CLARENCE. Assistant Professor of Chemical Engineering (1950, 1952). B. S., 1941, Iowa State University; M. S., 1951, Kansas State University.
- HANSEN, CARL ULLMAN. Assistant Professor of Industrial Engineering (1957, 1962). B. S., 1936, Kansas State University; M. S., 1961, University of Nebraska. Professional Engineer, 1961.
- *HARRIS, FLOYD WAYNE. Assistant Professor of Electrical Engineering (1965). B. S., 1956, University of Oklahoma; M. S., 1960, Ph. D., 1965, Oklahoma State University.
- *HAYNIE, RICHARD MARION. Assistant Professor of Civil Engineering (1964). B. S., 1959, Iowa State University; M. S., 1960, University of Arizona; Ph. D., 1964, Colorado State University.
- HEARN, JR., NORVAL KELLY. Instructor in Industrial Engineering (1964, 1966). B. A., 1957, M. S., 1966, Kansas State University.
- HEGLER, BURNS EDWARD. Instructor in Electrical Engineering (1957). B. S., 1943, M. S., 1958, Kansas State University. Professional Engineer, 1959.
- *HELANDER, LINN. Professor of Mechanical Engineering Emeritus (1935, 1961). B. S., 1915, University of Illinois. Professional Engineer, 1941.
- HIGHTOWER, RAY E. Instructor in Nuclear Engineering (1961, 1966). B. S., 1964, Kansas State University.
- HOBSON, LELAND STANFORD. Professor of Industrial Engineering; Director, Engg. Exp. Sta. (1946, 1961). B. S., 1927, Kansas State University. Professional Engineer, 1946.
- *HODGES, TEDDY OMAR. Professor of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1959). B. S., 1950, Texas A and M; M. S., 1951, Iowa State University; Ph. D., 1959, Michigan State University. Professional Engineer in Iowa, 1952.
- HOLM, FRANCIS WILFORD. Instructor in Mechanical Engineering (1964). B. S., 1959, M. S., 1961, University of Missouri.
- *HONSTEAD, WILLIAM HENRY. Professor; Head, Department of Chemical Engineering; Chemical Engineer, Engg. and Agr. Exp. Sta. (1943, 1960). B. S., 1939, M. S., 1946, Kansas State University; Ph. D., 1956, Iowa State University. Professional Engineer, 1948.
- *HOSTETTER, ABRAM ELDRED. Professor of Industrial Engineering; Metallurgist, Engg. Exp. Sta. (1931, 1952). B. S., 1925, McPherson College; M. S., 1932, Ph. D., 1938, Kansas State University.

- *HUANG, CHI-LUNG, Assistant Professor of Applied Mechanics (1964). B. S., 1954, National Taiwan University; M. S., 1960, University of Illinois; Dr. of Engg., 1964, Yale University.
- *HUNT, ORVILLE DON, Professor of Electrical Engineering (1923, 1947). B. S., 1923, Washington State University; M. S., 1930, Kansas State University. Professional Engineer, 1947.
- *HWANG, CHING-LAI, Assistant Professor of Industrial Engineering (1959, 1962). B. S., 1953, National Taiwan University; M. S., 1960, Ph. D., 1962, Kansas State University.
- *JACOBS, CLINTON OTTO, Assistant Professor of Farm Mechanics (1949, 1955). B. S., 1940, M. S., 1953, Kansas State University; Ph. D., 1966, University of Missouri.
- JOHNSON, GARY L., Assistant Professor of Electrical Engineering (1966). B. S., 1961, M. S., 1963, Kansas State University; Ph. D., 1966, Oklahoma State University.
- KENNY, DEAN R., Instructor in the Engineering Experiment Station (1964). B. A., 1953, University of Iowa.
- *KIMEL, WILLIAM ROBERT, Professor; Head, Department of Nuclear Engineering; Nuclear Engineer, Engg. Exp. Sta. (1946, 1958). B. S., 1944, M. S., 1950, Kansas State University; Ph. D., 1956, University of Wisconsin. Professional Engineer, 1948.
- *KIPP, JOHN EDWARD, Assistant Professor of Applied Mechanics (1956). B. S., 1951, M. S., 1955, University of Kansas. Professional Engineer, 1960.
- *KIRMSE, PHILIP GEORGE, Professor; Head, Department of Applied Mechanics (1942, 1958). B. S., 1939, M. S., 1944, Ph. D., 1958, University of Minnesota. Professional Engineer, 1961.
- KNOSTMAN, HARRY DANIEL, Assistant Professor of Applied Mechanics (1957, 1965). B. S., 1955, M. S., 1961, Kansas State University; Ph. D., 1966, University of Colorado. Professional Engineer, 1959.
- *KOEPSSEL, WELLINGTON WESLEY, Professor; Head, Department of Electrical Engineering; Electrical Engineer, Engg. Exp. Sta. (1964). B. S., 1944, M. S., 1951, University of Texas; Ph. D., 1960, Oklahoma State University. Professional Engineer in Texas, 1952.
- *KONZ, STEPHAN A., Associate Professor of Industrial Engineering (1964). B. S., 1956, M. B. A., 1956, University of Michigan; M. S., 1960, State University of Iowa; Ph. D., 1964, University of Illinois.
- KRISHNEN, KUMAR, Instructor in Electrical Engineering (1965, 1966). B. A., 1959, Kashmir University; B. Tech., 1962, M. Tech., 1963, Calcutta University; M. S., 1966, Kansas State University.
- *KYLE, BENJAMIN GAYLE, Professor of Chemical Engineering (1958, 1964). B. S., 1950, Georgia Institute of Technology; M. S., 1955, Ph. D., 1958, University of Florida.
- *LARSON, GEORGE HERBERT, Professor; Head, Department of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1939, 1956). B. S., 1939, M. S., 1940, Kansas State University; Ph. D., 1955, Michigan State University. Professional Engineer, 1947.
- LENIERT, DONALD H., Assistant Professor of Electrical Engineering (1966). B. S., 1956, Kansas State University; M. S., 1958, Syracuse University; Ph. D., 1966, University of New Mexico.
- *LINDHOLM JOHN C., Associate Professor of Mechanical Engineering (1960). B. S. B. A., B. S. M. E., 1949, Kansas State University; M. S., 1957, University of Kansas; Ph. D., 1961, Purdue University. Professional Engineer, 1954.
- *LINDLY, EDWIN CURGUS, Associate Professor of Applied Mechanics (1949, 1954, 1965). B. S., 1942, Oklahoma State University; M. S., 1949, Purdue University; M. S., 1957, Kansas State University; Ph. D., 1964, Iowa State University. Professional Engineer, 1950.
- *LIPPER, RALPH IDEN, Associate Professor of Agricultural Engineering; Associate Agricultural Engineer, Agr. Exp. Sta. (1946, 1957). B. S., 1941, M. S., 1950, Kansas State University. Professional Engineer, 1953.
- *MALIK, NORBERT RICHARD, Assistant Professor of Electrical Engineering (1965). B. S., 1959, M. S., 1960, University of Iowa; Ph. D., 1964, Iowa State University.
- MANGES, HARRY LEO, Assistant Professor of Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1946, 1963). B. S., 1949, M. S., 1959, Kansas State University. Professional Engineer, 1960.
- *MATTHEWS, JOHN C., Assistant Professor of Chemical Engineering (1962). B. S., 1959, D. Sc., 1965, Washington University.
- *McCORMICK, FRANK JAMES, Professor of Applied Mechanics (1939, 1947). B. S., 1927, M. S., 1931, Iowa State University. Professional Engineer, 1944.
- *McNALL, PRESTON ESSEX, Professor of Mechanical Engineering; Associate Director, Environmental Research Lab. (1965). B. S., 1947, University of Wisconsin; M. S., 1949, Ph. D., 1951, Purdue University.
- MENSCH, ROBERT LEON, Instructor in Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1962). B. S., 1959, Iowa State University; M. S., 1962, Oklahoma State University.
- MESSENHEIMER, ALVA ERNEST, Associate Professor of Mechanical Engineering (1942, 1963). B. S., 1924, Kansas State University. Professional Engineer, 1948.
- *MEYER, WALTER, Associate Professor of Nuclear Engineering (1964, 1966). B. S., 1956, M. S., 1957, Syracuse University; Ph. D., 1964, Oregon State University.
- MILLER, JR., PAUL LEROY, Assistant Professor of Mechanical Engineering (1958, 1961). B. S., 1957, M. S., 1961, Kansas State University; Ph. D., 1966, Oklahoma State University. Professional Engineer, 1962.
- *MINGLE, JOHN ORVILLE, Professor of Nuclear Engineering (1956, 1965). B. S., 1953, M. S., 1958, Kansas State University; Ph. D., 1960, Northwestern University. Professional Engineer, 1961.

- *MONDAY, WILLIAM C., Assistant Professor of Mechanical Engineering (1965). B. S., 1952, M. S., 1956, University of Kansas; Ph. D., 1965, Oklahoma State University.
- *MORSE, REED FRANKLIN, Professor of Civil Engineering (1923, 1947). B. A., 1921, Cornell College; B. S., 1923, Iowa State University; M. S., 1933, Kansas State University; Ph. D., 1941, Cornell University. Professional Engineer, 1939.
- *MUNGER, HAROLD HAWLEY, Associate Professor of Applied Mechanics Emeritus (1939, 1954, 1961). B. S., 1939, M. S., 1941, Kansas State University. Professional Engineer, 1941.
- NELSON, CLARENCE LESLIE, Instructor in Industrial Arts (1943).
- NESMITH, DWIGHT ALVIN, Associate Professor of Engineering; Assistant Director, Engg. Exp. Sta. (1948, 1965). B. S., 1948, Northwestern University; M. S., 1952, Kansas State University. Professional Engineer, 1962.
- *NEVINS, RALPH GRIFFITH, Professor; Head, Department of Mechanical Engineering; Mechanical Engineer, Engg. Exp. Sta.; Director, Environmental Research Lab. (1948, 1957, 1963). B. M. E., 1947, M. S., 1948, University of Minnesota; Ph. D., 1953, University of Illinois. Professional Engineer, 1948.
- PAULI, ROSS IRWIN, Assistant Professor of Mechanical Engineering (1947, 1954). B. A., 1941, Westmar College; M. S., 1947, Kansas State College of Pittsburg.
- *PEARCE, CLINTON ELLICOTT, Professor of Machine Design Emeritus (1917, 1922, 1961). B. S., 1913, Massachusetts Institute of Technology; M. S., 1937, Cornell University. Professional Engineer.
- POSEY, R. L., Instructor in Mechanical Engineering (1966). B. S., 1951, New Mexico State University; M. S., 1965, University of New Mexico.
- ROBINSON, M. JOHN, Assistant Professor of Nuclear Engineering (1966). B. S., 1960, M. S., 1962, Ph. D., 1965, University of Michigan.
- *ROHLES, JR., FREDERICK HENRY, Professor of Mechanical Engineering; Associate Director, Environmental Research Lab. (1963, 1965). B. S., 1942, Roosevelt University, Chicago; M. A., 1949, Ph. D., 1956, University of Texas.
- *ROSEBRAUGH, VERNON HART, Associate Professor of Civil Engineering (1953, 1954). B. S., 1933, Oregon Institute of Technology; B. S., 1938, Oregon State College; M. A., 1952, University of Portland. Professional Engineer, 1954.
- ROTH, THOMAS A., Assistant Professor of Industrial Engineering (1965). B. S., 1960, M. S., 1961, Ph. D., 1966, University of Wisconsin.
- *RUSSELL, PAUL EDGAR, Dean; Professor of Electrical Engineering (1963). B. S. E. E., 1946, B. S. M. E., 1947, New Mexico College of A. and M. A.; M. S., 1950, Ph. D., 1951, University of Wisconsin. Professional Engineer, 1955.
- RYAN, PATRICK WILLIAM, Instructor in Mechanical Engineering (1965, 1966). B. S., 1964, Kansas State University.
- SCHLEGEL, JAY CHARLES, Instructor in Mechanical Engineering (1966). B. S., 1965, Kansas State University.
- *SEATON, ROY ANDREW, Dean and Director Emeritus; Professor of Applied Mechanics Emeritus (1904, 1920, 1954). B. S., 1904, M. S., 1910, Kansas State University; S. B., 1911, Massachusetts Institute of Technology; Sc. D., 1942, Northeastern University. Professional Engineer, 1931.
- *SINGLETON, LAUREN WOODROW, Associate Professor of Applied Mechanics (1956). B. S., 1933, Citadel College; M. S., 1934, Vanderbilt; M. S., 1952, University of Illinois. Professional Engineer in South Carolina, 1953; in Kansas, 1956.
- *SITZ, EARL LeROY, Professor of Electrical Engineering (1927, 1948). B. S., 1927, Iowa State University; M. S., 1932, Kansas State University. Professional Engineer, 1947.
- *SMALTZ, JACOB JAY, Professor of Industrial Engineering (1939, 1952). B. S., 1939, Bradley Polytechnic Institute; M. S., 1946, Kansas State University. Professional Engineer, 1960.
- SMETHERS, HOWARD DEWIGHT, Assistant Professor of Industrial Arts (1947, 1951). B. S., 1927, Kansas State Teachers College, Emporia; M. S., 1935, Kansas State University.
- *SMITH, BOB LEE, Professor of Civil Engineering (1948, 1965). B. S., 1944, M. S., 1953, Kansas State University; Ph. D., 1963, Purdue University. Professional Engineer, 1953.
- SMUTZ, FLOYD ALONZO, Professor of Machine Design Emeritus (1918, 1934, 1960). B. S., 1914, Kansas State University.
- *SNELL, ROBERT ROSS, Associate Professor of Civil Engineering (1957, 1965). B. S., 1954, M. S., 1961, Kansas State University; Ph. D., 1963, Purdue University. Professional Engineer, 1959.
- SPRAGUE, CLYDE HOWARD, Assistant Professor of Mechanical Engineering (1963, 1964). B. S., 1958, M. S., 1963, Kansas State University.
- *STEVENSON, PAUL NELSON, Associate Professor of Farm Mechanics (1957). B. S., 1948, University of Missouri; M. S., 1957, Iowa State University.
- SWEARINGEN, THOMAS BURKE, Assistant Professor of Mechanical Engineering (1965). B. S., 1954, Kansas State University; M. S., 1961, Washington State University; Ph. D., 1966, University of Arizona.
- TANGER, GERALD E., Professor of Mechanical Engineering, AID/Egypt—Off Campus (1966). B. S., 1950, M. S., 1951, South Dakota School of Mines and Technology; Ph. D., 1958, Oklahoma State University.
- *TAYLOR, DELOS CLIFTON, Professor of Applied Mechanics (1931, 1956). B. S., 1925, M. S., 1937, Kansas State University. Professional Engineer, 1948.
- TEN EYCK, GEORGE ROBERT, Instructor in Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1965). B. S., 1951, Kansas State University.

- *TILLMAN, FRANK A., Associate Professor. Head, Department of Industrial Engineering (1965, 1966). B. S., 1960, M. S., 1961, University of Missouri; Ph. D., 1965, State University of Iowa.
- TOLIVER, JOE WILLARD, Instructor in Electrical Engineering (1965). B. S., 1962, Prairie View A and M College.
- *TRIPP, WILSON, Professor of Mechanical Engineering (1936, 1947). B. S., 1930, M. S., 1933, University of California; Ph. D., 1955, University of Illinois. Professional Engineer, 1946.
- TURNER, EDWARD L., Instructor in Civil Engineering (1966). B. S., 1966, Kansas State University.
- *TURNQUIST, RALPH OTTO, Assistant Professor of Mechanical Engineering (1959, 1965). B. S., 1952, M. S., 1961, Kansas State University; Ph. D., 1965, Case Institute of Technology.
- WAKABAYASHI, ISAAC, Instructor in Electrical Engineering (1955). B. S., 1953, University of California.
- *WALKER, HUGH SANDERS, Assistant Professor of Mechanical Engineering (1964, 1965). B. S., 1957, M. S., 1960, Louisiana State University; Ph. D., 1965, Kansas State University.
- WARD, E. DAWSON, Instructor in Mechanical Engineering (1965). B. S., 1964, Kansas State University; M. S., 1965, Massachusetts Institute of Technology.
- *WARD, JR., JOSEPH EVANS, Professor of Electrical Engineering (1940, 1961). B. S., 1937, University of Texas; M. S., 1940, University of Illinois. Professional Engineer, 1948.
- WILLIAMS, WAYNE WATSON, Associate Professor of Civil Engineering (1965). B. S., 1951, M. S., 1953, Iowa State University.
- WILSON, CHARLES EDWARD, Instructor in Mechanical Engineering (1963). B. S., 1962, M. S., 1964, Kansas State University.
- *WIRTZ, LEO ANDREW, Associate Professor of Electrical Engineering (1947, 1962). B. S., 1947, B. S., 1951, M. S., 1957, Kansas State University. Professional Engineer, 1954.
- WOOD, JOE NATE, Professor of Mechanical Engineering (1936, 1947). B. S., 1936, University of Iowa. Professional Engineer, 1948.
- WOODARD, CLAUDE LOWELL, Assistant Professor of Industrial Engineering (1949, 1954). B. S., 1948, Kansas State University; M. S., 1961, University of Missouri School of Mines.
- YOUNG, DALE T., Assistant Professor of Electrical Engineering (1966). B. S., 1956, M. S., 1960, Ph. D., 1966, University of Oklahoma.

College of Home Economics

- *AGAN, ANNA TESSIE, Associate Professor of Family Economics; Agr. Exp. Sta. (1929, 1944). B. S., 1927, University of Nebraska; M. S., 1930, Kansas State University.
- *ALDOUS, CORAL KERR, Associate Professor of Family and Child Development Emerita (1940, 1958). B. S., 1911, Utah State Agricultural College; M. A., 1940, Columbia University.
- *ALSUP, E. BETHI, Associate Professor of Foods and Nutrition; Agr. Exp. Sta. (1959). B. S., 1945, University of New Mexico; M. S., 1949, Ohio State University; Ph. D., 1959, Michigan State University.
- *ANNIS, PATTY SMITH, Assistant Professor of Family Economics, Agr. Exp. Sta. (1958, 1961). B. S., 1955, Mississippi State College for Women; M. S., 1957, University of Tennessee.
- *ASCHAM, LEAH, Professor of Foods and Nutrition Emerita (1927, 1951). A. B., 1903, Ohio Northern University; B. S., 1918, Ohio State University; Ph. D., 1929, Yale University.
- BARNES, JANE WILSON, Assistant Professor Emerita (1939, 1963). B. S., 1912, M. S., 1932, Kansas State University.
- BLOCK, SUSAN HYLAND, Instructor in Family and Child Development (1966). B. S., 1964, University of Nebraska.
- BOLLMAN, STEVE RAY, Assistant Professor of Family and Child Development (1966). B. S., 1957, M. S., 1963, Ph. D., 1966, Iowa State University.
- *BROWNING, NINA MYRTLE, Associate Professor of Foods and Nutrition (1930, 1943). B. S., 1923, M. S., 1927, Kansas State University.
- *CORMANY, ESTHER MARGARET, Associate Professor of Clothing and Textiles; Agr. Exp. Sta. (1936, 1941). B. S., 1926, M. S., 1932, Kansas State University.
- *CRAIGIE, BARBARA, Assistant Professor of Clothing and Textiles (Fashion Design) (1954, 1963). B. A., 1932, University of Minnesota; M. A., 1942, University of Missouri.
- DAVIS, IRENE IL, Instructor in Family and Child Development (1963). B. S., 1944, Oklahoma State University; M. S., 1948, Purdue University.
- *HARRIS, VIDA AGNES, Associate Professor of Art Emerita (1924, 1963). B. S., 1914, Kansas State University; A. M., 1927, University of Chicago.
- *HARRISON, DOROTHY LUCILE, Professor of Foods and Nutrition; Agr. Exp. Sta. (1947, 1963). B. S., 1938, Dakota Wesleyan University; M. S., 1943, Ph. D., 1947, Iowa State University.
- *HAWES, DONICE A., Associate Professor of Clothing and Textiles; Agr. Exp. Sta. (1965). B. S., 1943, M. S., 1951, Kansas State University; Ph. D., 1965, Ohio State University.
- HIEFTER, JUNE LOUISE, Assistant Professor of Clothing and Textiles (1966). B. S., 1960, M. S., 1963, University of Illinois.
- *HEMPHILL, MARJORIE McCALL, Assistant Professor of Institutional Management; Agr. Exp. Sta. (1939, 1954). B. S., 1937, M. S., 1941, Kansas State University.
- *HESS, KATHARINE PADDOCK, Associate Professor of Clothing and Textiles Emerita (1925, 1950). B. S., 1900, M. S., 1925, Kansas State University.
- *HILL, OPAL BROWN, Associate Professor of Clothing and Textiles (Interior Design) (1944, 1954, 1965). B. S., 1944, M. S., 1950, Kansas State University.

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- *HOEFLIN, RUTH, Professor; Associate Dean of Home Economics (1957, 1960). B. S., 1940, Iowa State University; M. A., 1945, University of Michigan; Ph. D., 1950, Ohio State University.
- *HOFFMAN, DORETTA SCHLAPHOFF, Dean; Professor of Home Economics; Assistant Director, Agr. Exp. Sta. (1954). B. S., 1941, University of Nebraska; M. S., 1943, Michigan State University; Ph. D., 1949, Cornell University.
- *HOWE, HAZEL DELL, Associate Professor of Clothing and Textiles (1936, 1947). B. S., 1921, M. S., 1935, Kansas State University.
- *JUSTIN, MARGARET M., Professor of Home Economics Emerita; Dean Emerita (1923, 1956). B. S., 1909, Kansas State University; B. Ed., 1917, Columbia University; Ph. D., 1923, Yale University.
- *KELL, LEONE BOWER, Professor of Family and Child Development Emerita; Agr. Exp. Sta. (1927, 1947, 1965). B. S., 1923, M. S., 1928, Kansas State University.
- KITTERMAN, MARGARET S., Instructor in Family and Child Development (1963). B. S., 1942, M. S., 1965, Kansas State University.
- *KRAMER, MARTHA MORRISON, Professor of Home Economics Emerita (1922, 1960). B. S., 1916, University of Chicago; M. S., 1919, Ph. D., 1922, Columbia University.
- LARSON, SUSAN SPEARIE, Assistant Professor of Family and Child Development (1950, 1962). B. A., 1940, University of Iowa; M. S., 1942, University of Wisconsin.
- *LATZKE, ALPHA CORINNE, Professor of Clothing and Textiles Emerita (1927, 1960, 1965). B. S., 1919, M. S., 1928, Kansas State University.
- *LIENKAEMPER, GERTRUDE ELISE, Associate Professor of Clothing and Textiles Emerita (1941, 1948, 1966). B. S., 1921, Oregon State College; M. A., 1938, University of Washington.
- *McCORD, IVALEE HEDGE, Associate Professor of Family and Child Development (1957, 1963). B. S., 1933, M. S., 1951, Kansas State University; Ph. D., 1964, Purdue University.
- *McMILLAN, EVA M., Associate Professor of Foods and Nutrition Emerita (1930, 1937, 1939, 1958). Ph. B., 1918, M. S., 1929, University of Chicago.
- *MEYER, DOROTHY DeLAINE, Associate Professor of Foods and Nutrition; Agr. Exp. Sta. (1965). B. S., 1957, South Dakota State University; M. S., 1961, Kansas State University; Ph. D., 1966, Purdue University.
- *MIDDLETON, RAYMONA, Assistant Professor of Institutional Management; Agr. Exp. Sta. (1962, 1966). B. S., 1937, University of Nebraska; M. S., 1941, Kansas State University.
- MOBERLY, M. BETSY, Instructor in Family and Child Development (1966). A. B., 1949, Ottawa University; M. S., 1964, Kansas State University.
- *MORRIS, MARIA, Associate Professor of Art Emerita (1925, 1963). B. S., 1911, M. S., 1927, Kansas State University.
- *MORSE, RICHARD L. D., Professor; Head, Department of Family Economics; Agr. Exp. Sta. (1955). B. A., 1938, University of Wisconsin; Ph. D., 1942, Iowa State University.
- *MULLEN, IVA MANILLA, Assistant Professor of Foods and Nutrition Emerita (1936, 1964). B. S., 1925, Kansas State University; M. S., 1928, Iowa State University.
- NEWBY, FRANCES ANN, Instructor in Clothing and Textiles (Interior Design) (1963). B. F. A., 1961, Kansas City Art Institute.
- NEWELL, KATHLEEN, Assistant Professor of Foods and Nutrition (1962). B. S., 1944, Kansas State University; M. S., 1951, University of Wisconsin.
- O'SHEA, JOHN WILLIAM, Instructor in Clothing and Textiles (Design) (1956). B. F. A., 1954, Denver University; M. F. A., 1956, State University of Iowa.
- OTT, PEGGY SUE, Assistant Professor of Clothing and Textiles (1966). B. S., 1954, Southeastern Louisiana College; M. S., 1959, University of North Carolina (Greensboro).
- RAFFINGTON, MARGARET ELIZABETH, Assistant Professor of Family and Child Development (1938, 1939, 1966). B. S., 1924, M. S., 1928, Kansas State University; Professional Diploma, 1954, Columbia University.
- RASMUSSEN, ALBIE C., Instructor in Family Economics (1966). B. S., 1942, University of Alaska; M. S., 1964, Kansas State University.
- REEHLING, JEAN ELIZABETH, Instructor (1964). B. S., 1962, Kansas State University; M. A., 1963, Colorado State College.
- RIGGS, JEAN M., Associate Professor of Institutional Management (1960). B. S., 1939, M. S., 1956, Iowa State University.
- ROACH, FAITH RUSSELL, Instructor in Institutional Management (1965). B. S., 1947, M. S., 1966, Kansas State University.
- SCHULZE, CAROLE SUE, Instructor in Foods and Nutrition (1964, 1966). B. S., 1962, University of Missouri; M. S., 1964, Cornell University.
- *SHUGART, GRACE SEVERANCE, Professor; Head, Department of Institutional Management; Agr. Exp. Sta. (1951, 1961). B. S., 1931, State College of Washington; M. S., 1938, Iowa State University.
- *STITH, MARJORIE MAY, Professor; Head, Department of Family and Child Development; Agr. Exp. Sta. (1961). B. S., 1943, Alabama State College for Women; M. S., 1958, Ph. D., 1961, Florida State University.
- *TINKLIN, GWENDOLYN LaVERNE, Professor of Foods and Nutrition; Agr. Exp. Sta. (1943, 1956). B. S., 1940, M. S., 1944, Kansas State University.
- *WAKEFIELD, LUCILLE MARIAN, Professor; Head, Department of Foods and Nutrition (1966). Agr. Exp. Sta. (1966). B. S., 1949, M. S., 1956, University of Connecticut; Ph. D., 1965, Ohio State University.

- *WARDEN, JESSIE A., Professor; Head, Department of Clothing and Textiles; Agr. Exp. Sta. (1960). B. S., 1940, Northeast Missouri State Teachers College; M. A., 1946, Columbia University; Ph. D., 1955, Pennsylvania State University.
- *WEST, BESSIE BROOKS, Professor of Institutional Management Emerita (1928, 1960). A. B., 1924, M. A., 1928, University of California; M. S., 1951, Michigan State Normal College.
- *WILLIAMS, JENNIE, Professor of Family and Child Development Emerita (1932, 1959). B. S., 1910, M. S., 1933, Kansas State University; Graduate, 1925, University of Michigan School of Nursing.
- *ZEIGLER, MERNA MILLER, Associate Professor of Institutional Management; Director of Food Service of the Student Union (1940, 1957). B. S., 1932, M. S., 1941, Kansas State University.

College of Veterinary Medicine

- *ANTHONY, HARRY D., Associate Professor of Medicine (1955, 1964). D. V. M., 1952, M. S., 1957, Kansas State University.
- BAILIE, WAYNE E., Instructor in Pathology, Parasitology and Public Health (1966). B. S., D. V. M., 1957, Kansas State University.
- BLAUCH, BRUCE, Instructor in Medicine (1965). B. S., 1946, Pennsylvania State University; D. V. M., 1956, University of Pennsylvania.
- BLOGG, ROWAN, Instructor in Surgery (1966). B. V. S., 1955, University of Melbourne.
- *BURROUGHS, ALBERT L., Associate Professor of Pathology, Parasitology and Public Health (1960). B. S., 1938, University of Wyoming; D. V. M., 1958, Texas A and M College; M. S., 1941, Montana State College; Ph. D., 1946, University of California.
- *CARDINET III, GEORGE H., Assistant Professor of Anatomy (1966). A. A., 1957, Diablo Valley College; B. S., 1960, D. V. M., 1963, Ph. D., 1966, University of California.
- CARNAHAN, DAVID L., Assistant Professor of Surgery and Medicine (1961, 1964). B. S., 1959, D. V. M., 1959, M. S., 1964, Kansas State University.
- CLARENBURG, RUDOLF, Associate Professor of Physiology (1966). B. S., 1954, Ph. D., 1959, State University of Utrecht.
- CLIFFORD, JR., JOHN R., Instructor in Medicine (1966). B. S., 1962, D. V. M., 1964, Kansas State University.
- COFFMAN, JAMES, Instructor in Medicine (1965). B. S., 1960, D. V. M., 1962, Kansas State University.
- *COLES, JR., EMBERT H., Professor; Head of Pathology, Parasitology and Public Health (1954, 1964). D. V. M., 1945, Ph. D., 1958, Kansas State University; M. S., 1946, Iowa State University.
- *CORNELIUS, CHARLES E., Dean, Professor of Physiology and Associate Director of Agricultural Experiment Station (1966). B. S., 1949, D. V. M., 1953, Ph. D., 1958, University of California.
- *CUMMINGS, BRIAN CHRISTOPHER, Associate Professor of Anatomy, Associate Professor, Agr. Exp. Sta. (1958, 1963). B. S., 1957, D. V. M., 1957, M. S., 1960, Kansas State University.
- *DENNIS, STANLEY M., Professor of Pathology, Parasitology and Public Health (1966). M. R. C. V. S., 1962; B. V. Sc., 1949, Ph. D., 1961, University of Sidney.
- DILLMAN, RICHARD C., Instructor in Pathology, Parasitology and Public Health (1965). B. S., 1961, D. V. M., 1961, Iowa State University; M. S., 1964, Kansas State University.
- EVERS, HARRY, Instructor in Surgery (1965). B. S., 1965, D. V. M., 1965, Texas A and M College.
- *EWING, SIDNEY A., Associate Professor of Pathology, Parasitology and Public Health (1965). B. S. A., 1958, D. V. M., 1958, University of Georgia; M. S., 1960, University of Wisconsin; Ph. D., 1964, Oklahoma State University.
- *FEDDE, MARION ROGER, Assistant Professor of Physiology (1964). B. S., 1957, Kansas State University; M. S., 1959, Ph. D., 1963, University of Minnesota.
- FISHBURN, FRANK, Assistant Professor of Medicine (1966). D. V. M., 1949, Kansas State University.
- *FOLSE, DEAN SYDNEY, Associate Professor of Pathology, Parasitology and Public Health (1959). B. S., 1945, D. V. M., 1945, Texas A and M College; M. S., 1946, Kansas State University.
- *FRANK, EDWARD RAYMOND, Professor of Surgery Emeritus (1926, 1935, 1962). B. S., 1918, D. V. M., 1924, M. S., 1929, Kansas State University.
- *FREY, RUSSELL A., Instructor in Physiology (1963). D. V. M., 1952, Kansas State University.
- *FRICK, EDWIN JACOB, Professor, Department of Surgery and Medicine Emeritus (1919, 1935, 1966). D. V. M., 1918, Cornell University.
- GRAY, ANDREW P., Assistant Professor of Pathology, Parasitology and Public Health (1966). D. V. M., 1953, M. S., 1963, Ph. D., 1966, Kansas State University.
- *GRONWALL, RONALD R., Assistant Professor of Physiology (1966). B. S., 1960, D. V. M., 1962, Ph. D., 1966, University of California.
- GUFFY, MARK MITCHELL, Assistant Professor of Radiology (1963). D. V. M., 1949, M. S., 1966, Colorado State University.
- HARRIS, STANLEY, Instructor in Medicine (1958). B. S., 1960, D. V. M., 1960, Kansas State University.
- HARTKE, GLEN THEODORE, Instructor in Anatomy (1962). B. S., 1958, D. V. M., 1960, M. S., 1965, Kansas State University (AID Nigeria, 1966-1968).

* Graduate faculty.

- *HIBBS, CLAIR M., Assistant Professor of Pathology, Parasitology and Public Health (1962, 1965). B. S., 1949, D. V. M., 1953, University of Missouri; M. S., 1962, Ph. D., 1965, Kansas State University.
- HUMBURG, JAY M., Assistant Professor of Physiology (1966). D. V. M., 1957, M. S., 1964, Kansas State University.
- JERNIGAN, LOYCE D., Temporary Assistant Professor of Medicine (1965). D. V. M., 1945, Kansas State University.
- *KELLEY, DONALD CLIFFORD, Associate Professor of Pathology, Parasitology and Public Health (1958). Diplomate American Board of Veterinary Public Health. D. V. M., 1935, M. S., 1952, Kansas State University.
- KIMBALL, ALICE DAY, Instructor in Pathology, Parasitology and Public Health Emeritus (1934, 1955). B. S., 1935, Kansas State University.
- KIRKBRIDE, CLYDE ARNOLD, Assistant Professor of Medicine (1963). D. V. M., 1953, Oklahoma State University.
- *KITSELMAN, CHARLES HOWARD, Professor of Pathology, Parasitology and Public Health Emeritus (1919, 1933, 1965). V. M. D., 1918, University of Pennsylvania; M. S., 1927, Kansas State University.
- *KODRAS, RUDOLPH, Associate Professor of Physiology (1964). B. S., 1947, Iowa State University; M. S., 1949, Oklahoma State University; Ph. D., 1952, Oregon State University; D. V. M., 1963, University of Illinois.
- KRUCKENBERG, SAMUEL M., Instructor in Surgery (1966). D. V. M., 1963, M. S., 1965, Kansas State University.
- *KRULL, WENDELL H., Professor of Pathology, Parasitology and Public Health (1965). A. B., 1921, Upper Iowa University; M. S., 1924, Iowa University; Ph. D., 1931, University of Michigan; D. V. M., 1945, Colorado State University; Honorary Doctor of Science, 1954, Upper Iowa University.
- *LARSEN, JAMES STANLEY, Assistant Professor of Surgery (1959). B. S., 1955, D. V. M., 1955, University of Illinois; M. S., 1961, Michigan State University.
- *LEASURE, ELDEN E., Dean Emeritus; Professor of Pathology, Parasitology and Public Health (1926, 1948, 1964). D. V. M., 1923, M. S., 1930, Kansas State University.
- LINGLE, CHARLES EDWARD, Instructor in Anatomy (1964). B. S., 1960, D. V. M., 1962, Kansas State University.
- *LUMB, JOHN WALLACE, Professor of Anatomy Emeritus (1924, 1957). D. V. M., 1910, M. S., 1930, Kansas State University.
- MILLERET, ROY JOSEPH, Assistant Professor of Surgery and Medicine (1960, 1964). D. V. M., 1944, M. S., 1959, Kansas State University.
- *MOSIER, JACOB EUGENE, Professor; Head, Department of Surgery and Medicine (1945, 1954). D. V. M., 1945, M. S., 1948, Kansas State University.
- *NOORDSY, JOHN LEROY, Professor of Surgery (1966). B. S., 1943, South Dakota State College; D. V. M., 1946, M. S., 1962, Kansas State University.
- *OEHME, FREDERICK W., Assistant Professor of Medicine (1959). B. S., 1957, D. V. M., 1958, Cornell University; M. S., 1962, Kansas State University.
- RAILSBACK, LEE T., Assistant to the Dean; Assistant Professor (1961). B. S., 1936, D. V. M., 1937, Kansas State University.
- REDDY, VENKAT KRISHNA, Instructor in Anatomy (1965). B. V. Sc., 1957, Osmania University; M. S., 1961, Kansas State University.
- ROGERS, VERA POHLENA, Instructor in Anatomy (1963). B. S., 1960, D. V. M., 1962, Kansas State University.
- SAGARTZ, JOHN W., Instructor in Medicine (1966). B. S., 1962, D. V. M., 1964, M. S., 1966, University of Illinois.
- SANTALA, DWANE, Instructor in Medicine (1964). B. S., 1956, D. V. M., 1964, Kansas State University.
- SHIPLEY, WAYNE D., Assistant Professor of Pathology, Parasitology and Public Health (1965). D. V. M., 1935, Colorado State University.
- TAUSSIG, ROBERT A., Instructor in Medicine (1966). D. V. M., 1945, Colorado State University.
- *TROTTER, DONALD McLEAN, Acting Dean; Professor; Head, Department of Anatomy (1946, 1957). Fellow, American College of Veterinary Pathologists. D. V. M., 1946, M. S., 1957, Kansas State University.
- *UNDERBJERG, GRAVERS K. L., Professor, Physiologist, Agr. Exp. Sta. (1948). B. S., 1926, Royal Veterinary and Agricultural College, Copenhagen; D. V. M., 1943, Ph. D., 1939, Iowa State University.
- *UPSON, DAN W., Instructor in Physiology (1959). D. V. M., 1952, M. S., 1962, Kansas State University.
- *WEIDE, KENNETH D., Associate Professor of Pathology (1962). B. S., 1956, D. V. M., 1958, M. S., 1958, Kansas State University; Ph. D., 1962, Michigan State University.
- *WEST, JOHN L., Professor of Pathology, Parasitology and Public Health (1953). D. V. M., 1936, Kansas State University; M. S., 1946, Ph. D., 1950, University of Wisconsin.
- WREN, WALLACE B., Instructor in Pathology, Parasitology and Public Health (1965). B. S., 1958, D. V. M., 1958, M. S., 1961, Kansas State University.

* Graduate faculty.

Division of Extension

RESIDENCE STAFF

- AHLSCHWEDE, GEORGE ALLEN, Instructor; Extension Specialist in Meats (1965). B. S., 1962, M. S., 1965, Kansas State University.
- ALLEN, GERTRUDE EDNA, Professor Emeritus; Specialist in Foods and Nutrition (1929, 1947). B. S., 1923, University of Minnesota; M. S., 1936, Kansas State University.
- AMSTEIN, WILLIAM GERALD, Professor; Extension Specialist in Horticulture (1929, 1965), B. S., 1927, University of Massachusetts; M. S., 1928, Kansas State University.
- ANDERSON, ELINOR, Assistant Professor; Extension Specialist, Home Management (1957, 1963). B. S., 1939, M. S., 1952, Kansas State University.
- APEL, J. DALE, Assistant Professor; Extension Specialist in 4-H Club Work (1962). B. S., 1950, Kansas State University; M. S., 1961, The American University; Ph. D., 1966, University of Chicago.
- APPLEBY, MARIELLEN J., Assistant Professor; District Home Economics Agent (1955, 1965). B. S., 1955, Kansas State University; M. S., 1965, University of Maryland.
- ATCHISON, FRED DOWNS, Instructor; District Extension Forester (1964). B. S., 1954, University of Georgia.
- ATKINSON, DAISY ELIENE, Assistant Professor; Extension Specialist in Foods and Nutrition (1959). B. A., 1938, University of Iowa; M. S., 1954, University of Alabama.
- BAIRD, HARRY CHARLES, Professor Emeritus; District Agricultural Agent (1920, 1952). B. S., 1914, Kansas State University.
- *BAIRD, MAE, Professor; Coordinator of Extension Studies (1954, 1965). B. S., 1930, University of Nebraska; M. A., 1943, Columbia University.
- BAKER, E. KIRK, Assistant Professor; Extension Economist, Resource Development (1955, 1966). B. S., 1949, Oklahoma State University; M. S., 1966, Kansas State University.
- BALDING, JAMES LEWIS, Extension Assistant; Manufacturing Specialist in Extension Formula Feeds (1965). B. S., 1960, Kansas State University.
- BARTLETT, CLARENCE EDWARD, Instructor; Extension Economist in Farm Management (1947). B. S., 1929, University of Nebraska.
- BATES, JR., CHARLES THOMAS, Assistant Professor; Extension Specialist in 4-H Club Work (1956, 1961). B. S., 1951, Oklahoma A and M; M. S., 1960, University of Wisconsin.
- BEASON, EDDIE J., Instructor; Area Extension Specialist, Crops and Soils (1966). B. S., 1965, Iowa State University; M. S., 1966, Kansas State University.
- BERGSRUD, FREDERICK GORDON, Instructor; Extension Agricultural Engineer in Rural Civil Defense (1964). B. A., 1960, University of Minnesota.
- *BEVINS, ROBERT JACKSON, Associate Professor; Extension Economist in Public Affairs (1961). B. S., 1949, M. S., 1955, University of Tennessee; Ph. D., 1960, Michigan State University.
- BIEBERLY, FRANK GEARHARD, Professor; Section Leader, Extension Specialist in Agronomy (1941, 1949). B. S., 1938, M. S., 1949, Kansas State University.
- BISWELL, CLIFFORD RANDOLPH, Assistant Professor; Area Extension Forester (1957, 1965). B. S., 1954, M. S., 1965, University of Missouri.
- BLANKENHAGEN, ELMER WARFORD, Assistant Professor; District Agent (1950, 1956). B. S., 1948, Kansas State University.
- BLECHA, FRANK OTTO, Professor Emeritus; District Agricultural Agent (1919, 1948). B. S., 1918, M. S., 1924, Kansas State University.
- *BOHANNON, ROBERT ARTHUR, Professor; Assistant to Director of Extension (1951, 1961). B. S., 1949, Michigan State University; M. S., 1951, Kansas State University; Ph. D., 1957, University of Illinois.
- BONEWITZ, EDWIN RALPH, Associate Professor; Extension Specialist in Dairy Science (1943, 1949). B. S., 1941, M. S., 1955, Kansas State University.
- BRIGGS, VIVIAN BAHR, Assistant Professor; Extension Specialist in Family Life Emerita (1946, 1951). B. S., 1942, University of Nebraska; M. S., 1952, Kansas State University.
- BRILL, MARTHA ESTHER, Assistant Professor; Extension Specialist in Health (1946, 1948). B. S., 1940, Kansas State University; R. N., 1940, University of Kansas.
- BROOKS, HOWARD LEROY, Instructor; Extension Specialist in Insecticides (1965). B. S., 1960, M. S., 1963, University of Arkansas.
- BURKE, JACK MERRIL, Associate Professor, Director of Radio Station KSAC (1958). B. S., 1953, M. E., 1958, North Dakota Agricultural College.
- BUSSET, GLENN MORTON, Professor; Department Head; State Club Leader (1941, 1966). B. S., 1941, Kansas State University; M. S., 1957, Cornell University; Ph. D., 1965, University of Wisconsin.
- CALEY, HOMER KAY, Associate Professor; Extension Specialist in Veterinary Medicine (1965). D. V. M., 1952, Kansas State University.
- CALL, EDWARD P., Instructor; Extension Specialist, Dairy Science (1963). B. S., 1951, Ohio State University, M. S., 1963, Ph. D., 1966, Kansas State University.
- CARLSON, JEAN K., Assistant Professor; District Extension Specialist, Home Management (1950, 1966). B. S., 1950, Kansas State University; M. S., 1965, Oklahoma State University.
- CLEAVINGER, EUGENE ARTHUR, Professor; Extension Specialist in Crops and Soils (1926, 1947). B. S., 1925, Kansas State University.
- COLLINS, BILL D., Instructor; Extension Economist, Farm Management (1954, 1965). B. S., 1951, Kansas State University; M. S., 1962, University of Wisconsin.

* Graduate faculty.

- COOLIDGE, JOHN HERBERT, Professor: Extension Economist in Farm Management (1926, 1948). B. S., 1925, M. S., 1932, Kansas State University.
- *COPPERSMITH, ROBERT LEON, Professor of Livestock Marketing (1960). B. S., 1948, Kentucky State College; M. S., 1950, University of Kentucky; Ph. D., 1953, University of Illinois.
- COX, LAWRENCE JOSEPH, Associate Professor: District Agent (1952, 1959). B. S., 1948, Oklahoma State University; M. S., 1960, Kansas State University.
- CREWS, JOYCE T., Instructor: Extension Specialist, Foods and Nutrition (1966). B. S., 1966, Kansas State University.
- CRIST, ROSEMARY ALTHEA, Instructor; District Home Economics Agent (1950, 1965). B. S., 1947, Kansas State University.
- DEUTSCH, HENRY ANTHONY, Assistant Professor: District Extension Forester (1964). B. S., 1957, M. S., 1964, University of Missouri.
- DeWEESE, PAUL F., Assistant Professor: Extension Specialist in Radio and Television (1948, 1966). B. S., 1947, Kansas State University.
- DEXTER, MIRIAM LENORE, Associate Professor; Assistant Extension Editor (1944, 1959). B. S., 1926, M. S., 1933, Kansas State University.
- DICKEN, D. DEAN, Assistant Professor: Area Extension Agronomist (1942, 1963). B. S., 1937, Kansas State University; M. S., 1942, University of Illinois.
- DICKINSON, ANNABELLE JEANETTE, Assistant Professor: Assistant to State Leader, Home Economics (1940, 1959). B. S., 1933, Fort Hays Kansas State College; M. S., 1954, University of Missouri.
- DICKSON, WILLIAM M., Instructor: Extension Economist, Farm Management (1961, 1966). B. S., 1956, M. S., 1961, Kansas State University.
- DIERKING, GARY ROGER, Instructor; Visual Instructor (1961). B. F. A., 1958, University of Kansas.
- DUNN, MARJORIE JOANN, Assistant Professor: Extension*Specialist in 4-H Club Work (1964). B. S., 1958, Buffalo State Teachers College; M. Ed., 1964, Colorado State University.
- EDELBLUTE, DALE HENRY, Assistant Professor: Area Extension Agriculturist (1947, 1955). B. S., 1934, Kansas State University.
- ELLING, CARL GEORGE, Professor Emeritus: Extension Specialist in Animal Husbandry (1907, 1951). B. S., 1904, Kansas State University.
- ELLITHORPE, VERA MAY, Associate Professor: Extension Specialist in Home Management (1938, 1947). B. S., 1935, M. S., 1939, Kansas State University; Ph. D., 1963, Ohio State University.
- EMERT, JUDITH K., Instructor: Extension Home Economist, C. A. P. (1966). B. S., 1961, Kansas State University.
- ERICKSON, DONALD B., Associate Professor: Section Leader and Extension Economist, Resource Development (1966). B. S., 1955, M. S., 1960, University of Wyoming; Ph. D., 1964, Purdue University.
- EYESTONE, CECIL LAVERNE, Associate Professor: Extension Specialist in 4-H Club Work (1943, 1958). B. S., 1944, Kansas State University; M. S., 1958, Colorado State University.
- FAIDLEY, DONALD L., Instructor: Extension Economist, Farm Management (1956, 1966). B. S., 1953, Kansas State University.
- FERGUSON, JOHN MOSES, Professor: State Leader, Extension Engineers (1937, 1958). B. S., 1934, Kansas State University.
- FIGURSKI, DONALD LEO, Assistant Professor: District Extension Economist; Farm Management (1966). B. S., 1952, M. S., 1959, Colorado State University.
- FITZGERALD, LYNDALL WORTH, Assistant Professor: Area Extension Engineer (1959). B. S., 1951 and 1959, Kansas State University.
- FRAZIER, LESLIE PAUL, Assistant Professor: Extension Specialist, Area Development Studies (1943, 1965). B. S., 1942, Oklahoma State University; M. A., 1962, Colorado State University.
- FREDERICK, HOBART, Instructor: Extension Economist in Farm Management (1941, 1960). B. S., 1941, Kansas State University.
- GALLAHER, HAROLD GREEN, Associate Professor: Section Leader, State Extension Forester (1951, 1965). B. S., 1949, University of Missouri; M. S., 1959, Kansas State University.
- GATES, DELL EDWARD, Associate Professor: Extension Specialist in Entomology (1948, 1964). B. S., 1948, M. S., 1952, Kansas State University.
- GEISLER, JAMES C., Instructor: Area Extension Forester (1966). B. S., 1964, University of Missouri.
- GLOVER, OTIS BENTON, Associate Professor: District Agent Emeritus (1929, 1963). B. S., 1917, Kansas State University.
- GOULD, LEONARD KEITH, Instructor: Area Extension Forester in Marketing and Utilization (1963, 1965). B. S., 1956, Colorado State University.
- GRAHAM, RALF ORLIN, Assistant Professor: Assistant Extension Editor (1961). A. B., 1948, Peru State Teachers College; M. A., 1955, University of Minnesota.
- GREENE, LAURENZ STEPHEN, Instructor: Extension Economist in Farm Management (1952, 1960). B. S., 1950, Kansas State University.
- GREY, GENE WILLIAM, Assistant Professor: District Extension Forester (1962). B. S., 1956, University of Missouri.
- *GRIFFITH, PAUL WILSON, Professor: Associate Director (1935, 1950). B. S., 1934, M. S., 1948, Kansas State University; Ph. D., 1961, University of Wisconsin.

* Graduate faculty.

- GUY, WILLIAM DONALD, Instructor; Extension Economist in Farm Management (1951, 1953). Chanute. B. S., 1942, Kansas State University.
- HACKLER, RAYMOND F., Instructor; Extension Economist, Farm Management (1960, 1965). B. S., 1952, M. S., 1966, Oklahoma State University.
- HAGANS, FRANK ALEXANDER, Associate Professor Emeritus; District Agent (1930, 1956). B. S., 1925, Kansas State University.
- HAGEMAN, CHARLES ADRIAN, Instructor, Extension Economist in Farm Management (1936, 1953). Hutchinson. B. S., 1936, Kansas State University.
- HALAZON, GEORGE CHRIST, Assistant Professor; Extension Specialist in Wildlife Management (1954, 1956). Ph. B., 1943, M. S., 1953, University of Wisconsin.
- HAMILTON, ROBERT J., Instructor; Extension Economist, Farm Management (1956, 1964). B. S., 1956, Kansas State University.
- HANNA, JOHN BONAR, Associate Professor; Extension Specialist in 4-H Club Work (1934, 1960). B. S., 1932, M. S., 1954, Kansas State University.
- HARPER, HAROLD BYRON, Assistant Professor; Extension Specialist in Soil Conservation (1932, 1946). B. S., 1933, M. S., 1957, Kansas State University.
- HERPICH, RUSSELL LOUIS, Professor; Extension Irrigation Engineer (1951, 1958). B. S., 1950, M. S., 1953, Kansas State University.
- HILL, JR., HOWARD TEMPLETON, Assistant Professor; Extension Specialist in Radio and Television (1962). B. S., 1955, Kansas State University; M. A., 1957, Pennsylvania State University.
- HOBBLE, DEBORAH, Assistant Professor; Extension Specialist, Family Life (1946, 1963). B. S., 1941, M. S., 1963, Kansas State University.
- HONSTEAD, ARLISS EVELYN, Assistant Professor; Extension Specialist in 4-H Club Work (1946, 1961). B. S., 1937, Kansas State University; M. S., 1960, Columbia University.
- HOSS, RAY MITCHELL, Associate Professor; District Agent (1935, 1958). B. S., 1930, Kansas State University.
- HOWE, JERELENE EVELYN, Instructor; Extension Specialist in Clothing and Textiles (1965). B. S., 1951, M. S., 1965, Kansas State University.
- HYDE, ROBERT M., Assistant Professor; Extension Specialist, Range Management (1966). B. S., 1959, M. S., 1961, Fort Hays Kansas State College; Ph. D., 1963, University of Wyoming.
- JACCARD, CLARENCE ROY, Professor Emeritus; Coordinator of Extension Program Planning (1922, 1957). B. S., 1914, Kansas State University.
- JACKSON, MARION EVERT, Assistant Professor; Extension Specialist in Poultry and Egg Marketing (1945). B. S., 1941, Purdue University; M. S., 1955, Kansas State University.
- JEPSEN, RICHARD L., Assistant Professor; Extension Specialist, Rural Civil Defense (1953, 1962). B. S., 1950, M. S., 1963, Kansas State University.
- JOHNSON, JOHN HAROLD, Professor Emeritus; State Club Leader (1927, 1958). B. S., 1927, Kansas State University; M. S., 1942, George Washington University.
- JOHNSON, NAOMI MARIE, Associate Professor; Extension Specialist in Clothing and Textiles (1938, 1950). B. S., 1932, M. S., 1949, Kansas State University.
- *JOHNSON, ROBERT LEE, Professor; Coordinator of Extension Personnel Training (1965). B. S., 1951, University of Nebraska; M. S., 1956, Ph. D., 1958, University of Wisconsin.
- *JONES, HAROLD EUGENE, Professor; Director of Extension (1946, 1956). B. S., 1940, Kansas State University; M. S., 1942, Ph. D., 1949, Purdue University.
- JONES, MILAM T., Instructor; Area Extension Horticulturist (1966). B. S., 1964, M. S., 1966, Kansas State University.
- KEMP, PHYLLIS EILEEN, Instructor; Assistant to State Leader, Home Economics (1962, 1965). B. S., 1962, Ottawa University; M. S., 1965, University of Maryland.
- KEPLER, JACK E., Assistant Professor; District Extension Forester (1963). B. S., 1960, University of Connecticut; M. S., 1962, Iowa State University.
- KING, CLAUDE LEWIS, Professor; Extension Specialist in Plant Pathology (1934, 1954). B. S., 1932, M. S., 1953, Kansas State University.
- KING, JR., RICHARD FRANKLIN, Associate Professor; District Agent (1938, 1962). B. S., 1938, M. S., 1957, Kansas State University.
- KOENIG, MARGARET ANNABELLE, Professor; Associate Home Economics Leader (1929, 1959). B. S., 1928, Kansas State University; M. S., 1958, University of Wisconsin.
- KOONS, PATRICIA G., Instructor; Assistant Extension Editor (1965, 1966). B. S., 1965, Kansas State University.
- KUEHN, LOWELL D., Instructor; Extension Television Producer (1962). B. S., 1950, Iowa State University.
- LEUTHOLD, LARRY D., Instructor; Extension Specialist, Ornamental Horticulture (1966). B. S., 1959, M. S., 1966, Kansas State University.
- LIND, REUBEN CARL, Professor Emeritus; Extension Specialist in Soil Conservation (1933, 1950). B. S., 1923, Kansas State University.
- McADAMS, VERL EPHRIAM, Assistant Professor; Extension Specialist in Animal Husbandry (1934, 1952). B. S., 1928, M. S., 1957, Kansas State University.
- McCLELLAND, EVERETT LYNN, Instructor; Extension Economist in Farm Management (1936, 1954). B. S., 1928, Kansas State University.
- McDONALD, HUGH JOHN, Assistant Professor; Extension Specialist in Grain Marketing (1955, 1959). B. S., 1955, M. S., 1961, Kansas State University.

* Graduate faculty.

- McGAUGH, VELMA MAYSEE, Assistant Professor; District Home Economics Agent (1943, 1959). B. S., 1940, Kansas State University; M. Ed., 1953, Cornell University.
- McREYNOLDS, KENNETH L., Assistant Professor; Extension Economist in Farm Management (1949, 1960). B. S., 1950, M. S., 1954, Kansas State University.
- MANN, RAY H., Assistant Professor; District Agricultural Agent (1956, 1966). B. S., 1951, Oklahoma State University; M. S., 1965, Kansas State University.
- MARSH, SHIRLEY ANNE, Professor; State Leader, Home Economics (1965). B. S., 1953, University of Nebraska; M. S., 1960, University of Wisconsin; Ph. D., 1966, Michigan State University.
- MEANS, EARL T., Instructor Emeritus; Extension Economist in Farm Management (1944, 1952). B. S., 1922, Kansas State University.
- MEYER, ELLA MARIE, Assistant Professor Emeritus; District Home Economics Agent (1925, 1956). B. S., 1907, Kansas State University.
- MILLER, CAROL E., Instructor; Extension Home Economist, C. A. P. (1965, 1966). B. S., 1966, Kansas State University.
- MILLER, ELSIE LEE, Assistant Professor; Extension Specialist, Foods and Nutrition (1941, 1962). B. S., 1934, M. S., 1942, Kansas State University.
- MORRISON, FRANK D., Associate Professor; Extension Specialist, Horticulture (1966). B. S., 1951, M. S., 1959, University of Idaho; Ph. D., 1966, Michigan State University.
- MOYER, WENDELL AUSTIN, Professor; Section Leader, Extension Specialist in Animal Husbandry (1941, 1956). B. S., 1941, M. S., 1955, Kansas State University.
- MULLEN, WESLEY GALE, Instructor; Extension Economist in Farm Management (1961). B. S., 1950, Kansas State University.
- MYERS, GLADYS, Associate Professor Emeritus; Extension Specialist in Home Management (1930, 1947). B. S., 1923, Kansas State University; M. S., 1939, Cornell University.
- NAUGHTON, GARY GRANT, Instructor; District Extension Forester (1966). B. S., 1959, Utah State University.
- NEFF, LEONARD FAY, Associate Professor Emeritus; Coordinator of Extension Personnel Training (1924, 1958). B. S., 1922, Purdue University.
- NEUFELD, DOROTHY HARBIN, Assistant Professor; District Home Management Specialist (1957, 1962). B. S., 1950, Texas Technological College; M. S., 1964, Kansas State University.
- NIGHTSWONGER, JAMES JAY, Instructor; Extension Specialist in Landscape Architecture (1961, 1965). B. S., 1960, Kansas State University.
- NILSON, ERICK BOGSETH, Assistant Professor; Extension Specialist in Herbicides (1965). B. S., 1950, M. S., 1955, University of Nebraska; Ph. D., 1963, Kansas State University.
- *NORBY, OSCAR WOODROW, Professor; Department Head, State Leader in Field Operations (1942, 1961). B. S., 1942, Kansas State University; M. S., 1959, Ph. D., 1961, University of Wisconsin.
- NORRIS, BETTY LOUISE, Instructor; Extension Specialist in Radio and TV (1961). B. A., 1948, University of Washington.
- NUGENT, GARY KENT, Extension Assistant; Extension Motion Picture Producer (1966). B. A., 1961, Michigan State University.
- OLSON, DUANE ARNOLD, Assistant Professor; Area Extension Economist in Resource Development (1963, 1966). B. S., 1961, University of Minnesota; M. S., 1964, Purdue University.
- OSBURN, MELVIN WILLIAM, Associate Professor Emeritus; Extension Specialist in Veterinary Medicine (1952, 1954). D. V. M., 1934, Iowa State University.
- OVERLEY, FRANK LEON, Assistant Professor; Extension Economist in Farm Management (1960). B. S., 1950, Kansas State University; M. S., 1957, Michigan State University.
- PARKER, LEONARD CALVIN, Instructor; Extension Economist in Farm Management (1956, 1961). B. S., 1952, Kansas State University.
- PARRIS, FRED M., Associate Professor; Assistant Extension Editor (1963). B. S., 1942, Kansas State University; M. A., 1951, Iowa State University.
- PASS, INEZ, Assistant Professor; Extension Specialist in Foods and Nutrition (1961). B. S., 1941, M. S., 1960, Oklahoma State University.
- PECK, ERNEST GEORGE, Instructor; Visual Assistant (1955, 1961). B. S., 1950, M. S., 1965, Kansas State University.
- PETERSON, EDMOND J., Administrative Assistant (1966). B. S., 1959, Kansas State University.
- PETERSON, VERLIN HOWARD, Assistant Professor; Area Extension Specialist in Crops and Soils (1948, 1965). B. S., 1948, M. S., 1949, Kansas State University.
- PRAWL, WARREN L., Associate Professor; Extension Specialist in 4-H Club Work (1952, 1966). B. S., 1954, Kansas State University; M. S., 1958, Ed. D., 1962, Cornell University.
- PRETZER, DON D., Instructor; Extension Economist, Farm Management (1958, 1964). B. S., 1955, Kansas State University.
- REED, CHARLES EWING, Instructor; Extension Economist in Market Development and Plant Feasibility (1965). B. S., 1947, M. S., 1948, Kansas State University.
- REGNIER, ROGER ELI, Professor; Extension Specialist, Resource Development (1934, 1966). B. S., 1924, M. S., 1932, Kansas State University.
- *RINGLER, WILBER EUROY, Professor; Assistant Director of Extension (1957). B. S., 1948, M. S., 1949, University of Nebraska; Ph. D., 1958, University of Wisconsin.
- ROBERTS, CLARENCE RICHARD, Associate Professor; Extension Specialist in Horticulture (1954, 1964). B. S., 1949, M. S., 1950, Oklahoma State University; Ph. D., 1963, Texas A and M University.

* Graduate faculty.

- ROSS, EUGENE, Associate Professor; District Agricultural Agent (1955, 1966). B. S., 1952, Oklahoma State University; M. S., 1962, Kansas State University; Ph. D., 1966, University of Wisconsin.
- SANDER, DONALD HENRY, Assistant Professor; Extension Specialist in Crops and Soils (1964). B. S., 1954, M. S., 1958, University of Nebraska.
- SCHINDLER, DALE EUGENE, Assistant Professor; Extension Architect (1955, 1961). B. Arch., 1953, M. S., 1960, Kansas State University. Registered Architect, M. A., 1960, Kansas State University.
- SCHLENDER, JOHN RALPH, Assistant Professor; Extension Economist in Farm Management (1961). B. S., 1951, Kansas State University; M. S., 1960, Oregon State University.
- SCHLESENER, NORMAN EDWARD, Instructor; Extension Specialist in 4-H Club Work (1956, 1965). B. S., 1956, M. S., 1966, Kansas State University.
- *SCHOEFF, ROBERT WAYNE, Professor; Section Leader, Extension Economist in Marketing and Utilization of Formula Feed (1960). B. S., 1942, M. S., 1947, Ph. D., 1952, Purdue University.
- SCHROEDER, MARY M., Instructor; District Home Economics Agent (1961, 1966). B. S., 1938, Kansas State University.
- SELBY, WALTER ELLSWORTH, Assistant Professor; Extension Agricultural Engineer (1944, 1947). B. S., 1929, Kansas State University; M. S., 1957, University of Nebraska.
- SELF, ETHEL WATSON, Associate Professor; Extension Specialist in Home Management (1929, 1953). B. S., 1926, M. S., 1952, Kansas State University.
- SHANKLAND, HAROLD GLEASON, Associate Professor; Associate Extension Editor (1943, 1949). A. B., 1924, College of Emporia.
- SHREVE, LOY WILLIAM, Instructor; Area Extension Forester, Fire Control (1964, 1965). B. S., 1951, West Virginia University.
- SHUYLER, LYNN ROWE, Extension Assistant; Extension Irrigation Engineer (1965). B. S., 1961, Kansas State University.
- SLUSHER, JOHN PAUL, Instructor; Area Extension Forester, Tree Distribution (1961, 1965). B. S., 1957, University of Missouri.
- SMERCHEK, JOHN FREDERICK, Instructor; Extension Economist in Farm Management (1942, 1950). B. S., 1929, Kansas State University.
- SMURTHWAITE, GEORGIANA HOPE, Professor Emeritus; Extension Specialist in Home Economics Program Development (1924, 1954). B. S., 1911, Utah State College; M. S., 1931, Kansas State University.
- SMYTHE, PATRICK EDWARD, Assistant Professor; Extension Economist, Resource Development (1956, 1966). B. S., 1953, M. S., 1958, Kansas State University.
- SPRINGER, DONALD M., Instructor; Extension Television Producer (1957, 1962). B. S., 1957, M. S., 1966, Kansas State University.
- STARKEY, WINONA McNEIGHT, Assistant Professor; Extension Specialist in Home Furnishings (1944, 1956). B. S., 1947, M. S., 1954, Kansas State University.
- STOCKARD, JOHN R., Extension Assistant; Extension Motion Picture Producer (1966). B. A., 1955, University of North Carolina.
- STOVER, HAROLD EARL, Professor; Extension Agricultural Engineer (1936, 1954). B. S., 1929, Kansas State University.
- STRICKLER, JOHN KEMPER, Instructor; Assistant State Extension Forester (1961, 1965). B. S., 1957, University of Missouri.
- SUGHRUE, KATHRYN EILEEN, Assistant Professor; District Home Economics Agent (1937, 1961). B. S., 1936, Kansas State University; M. S., 1963, Colorado State University.
- TEAGARDEN, EARL HICKS, Professor Emeritus; Coordinator, Extension Studies (1929, 1952). B. S., 1920, Kansas State University.
- TENNANT, MARJORIE ANN, Assistant Professor; Assistant Extension Editor (1947, 1952). B. S., 1946, M. S., 1957, Kansas State University.
- *THOMAS, KENNETH EUGENE, Professor; Head, Department of Extension Information (1951, 1963). A. B., 1951, Southwestern College; M. S., 1952, Kansas State University; Ph. D. 1961, University of Wisconsin.
- THOMAS, WILTON BRADLEY, Associate Professor; Section Leader, Extension Economist in Farm Management (1946, 1960). B. S., 1937, M. S., 1952, Kansas State University.
- TITUS, RALPH SEASE, Assistant Professor; Assistant Manager, Radio Station KSAC (1961, 1965). B. S., 1955, M. S., 1964, Kansas State University.
- TOMKINSON, RICHARD BRUCE, Assistant Professor; Extension Specialist in 4-H Club Work (1961). B. S., 1959, Manchester College; M. S., 1961, Purdue University.
- TRAYER, DANNY DALE, Instructor; Extension Economist in Farm Management (1950, 1960). Garden City. B. S., 1951, Kansas State University.
- TREAT, JAY LEONARD, Assistant Professor; Extension Economist in Farm Management (1960). B. S., 1949, University of Arkansas; M. A., 1952, University of Missouri.
- *TRENT, CURTIS, Professor, on Leave; Coordinator of Extension Personnel Training (1961, 1964). B. S., 1948, Oklahoma State University; M. S., 1960, Ph. D., 1961, University of Wisconsin.
- TRIEB, SYKES EMIL, Associate Professor; Extension Economist in Retail Marketing (1954, 1964). B. S., 1950, M. S., 1960, Kansas State University.
- TRUE, JOHN ANDREWS, Assistant Professor; Extension Agricultural Engineer (1962). B. S., 1951, M. S., 1962, Michigan State University.
- UNRUH, CHESTER RAY, Assistant Professor; Assistant Extension Editor (1961). A. B., 1940, Bethel College; M. S., 1956, Kansas State University.

* Graduate faculty.

- URBAN, KENNETH E., Instructor; Extension Economist, Farm Management (1954, 1966). B. S., 1952, M. S., 1957, Kansas State University.
- URICH, JUDITH R., Assistant Professor; District Extension Specialist, Home Management (1962, 1964). B. S., 1958, Iowa State University; M. S., 1962, Kansas State University.
- WALKER, MILDRED LUCILLE, Assistant Professor; Extension Specialist in Consumer Information (1956). B. S., 1952, Kansas State University; M. S., 1960, Pennsylvania State University.
- WALLACE, ALLENA F., Instructor; Extension Economist, Marketing Information for Consumers (1962, 1966). B. S., 1962, Arkansas State Teachers College.
- WARNER, EUGENE DECATUR, Professor; Extension Editor (1935, 1947). B. S., 1934, Kansas State University.
- WELLS, RUTH IRENE, Assistant Professor; District Home Economics Agent (1953, 1958). B. S., 1943, Central Missouri State College; M. S., 1948, Kansas State University.
- WENDLING, LEO THEODORE, Professor; Extension Agricultural Engineer (1947, 1958). B. S., 1947, M. S., 1956, Kansas State University.
- WESTMEYER, HERMAN WILLIAM, Assistant Professor; Extension Specialist in Animal Husbandry (1936, 1961). B. S., 1936, University of Missouri; M. S., 1965, Kansas State University.
- WHIPPS, LOREN E., Assistant Professor; District Extension Economist (1946, 1966). B. S., 1938, Kansas State University; M. S., 1953, Colorado State University.
- *WHITEHAIR, NORMAN VINCENT, Professor; Assistant Head Department of Economics, State Leader in Marketing (1946, 1961). B. S., 1943, M. S., 1953, Kansas State University; Ph. D., 1964, Purdue University.
- WHITNEY, DAVID A., Assistant Professor; Extension Specialist in Soil Testing (1966). B. S., 1961, M. S., 1963, University of Nebraska; Ph. D., 1966, Iowa State University.
- WIGGINS, MARY CHRISTINE, Associate Professor; Extension Specialist in Clothing and Textiles (1930, 1947). B. S., 1929, Kansas State University; M. A., 1938, Columbia University.
- WILCOX, ROBERT ALVIN, Professor; Quality Control Specialist in Extension Formula Feeds (1965). B. S., 1945, M. S., 1949, Ph. D., 1960, South Dakota State University.
- WILKINS, HOWARD DENSER, Assistant Professor; Extension Specialist in Crops and Soils (1959). B. S., 1953, M. S., 1954, Kansas State University.
- *WILKOWSKE, ROGER HAROLD, Associate Professor; Extension Economist in Dairy Marketing (1957). B. S., 1948, Kansas State University; M. S., 1950, Michigan State University; Ph. D., 1954, Pennsylvania State University.
- WILLIS, WILLIAM GRANT, Instructor; Extension Specialist in Plant Pathology (1951, 1962). B. S., 1951, M. S., 1964, Kansas State University.
- ZOELLNER, KEITH O., Assistant Professor; District Extension Specialist, Animal Husbandry (1962). B. S., 1953, M. S., 1957, South Dakota State College; Ph. D., 1962, University of Missouri.

Division of Continuing Education

RESIDENCE STAFF

- BILLINGS, ADA GRACE, Professor Emeritus (1921, 1946). B. S., 1916, M. S., 1927, Kansas State University.
- BOWMAKER, LEE E., Instructor; Civil Defense Training Contract (1963). B. S., 1951, Kansas State University.
- DEYOE, DUANE RALPH, Assistant Instructor; Assistant Coordinator, Conferences and Short Courses (1965). B. S., 1964, Kansas State University.
- HAGAN, JAMES EDWARD, Instructor; Assistant Coordinator, Extension Classes (1966). B. S., 1950, B. A., 1966, Kansas State University.
- HAROLD, E. NORMAN, Assistant Professor; Coordinator, Contracts and Grants (1963, 1966). B. A., 1960, Kansas State Teachers College; M. A., 1962, Vanderbilt University.
- KITCHENS, JOHN EDWARD, Professor; Director, Division of Continuing Education (1956, 1966). B. A., 1949, New Mexico Western College; M. A., 1954, Ph. D., 1964, University of New Mexico.
- LARSEN, EMERSON W., Itinerant Teacher; Job Training and Safety Program (1963).
- LOCKE, KENNETH N., Instructor; Civil Defense Training Contract (1965). B. S., 1958, Sam Houston State College; M. A., 1964, University of Texas.
- MILLER, MAX BYRON, Assistant Professor; Coordinator of Conferences and Short Courses (1946, 1964). B. S., 1946, M. S., 1950, Kansas State University.
- MORDY, LUCILLE ERNA, Assistant Professor; Coordinator, Home Study (1947, 1966). B. S., 1928, Kansas State Teachers College (Emporia); M. S., 1951, Kansas State University.
- PATTISON, FLOYD HOLMES, Professor Emeritus (1919, 1927). B. S., 1912, Kansas State University; M. S., 1929, Massachusetts Institute of Technology.
- REICHOW, RONALD W., Instructor; Civil Defense Training Contract (1964). B. S., 1963, Kansas State University.
- SAVAGE, RUSSELL FRANK, Itinerant Teacher; Job Training and Safety Program (1957).
- SWEGLE, WILLIAM FORREST, Instructor; Coordinator, Community Services (1966). B. A., 1950, University of Kansas; M. B. A., 1965, University of Missouri at Kansas City.
- WILLIAMSON, MICHAEL M., Instructor; Coordinator, Extension Classes (1962, 1966). B. S., 1956, M. S., 1962, Kansas State University.

* Graduate faculty.

Division of Extension COUNTY CLUB AGENTS

BILES, JIMMY L., Cherokee County (1966). Columbus.
 BONINE, DAN R., Lyon County (1966). Emporia.
 BORST, WILLIAM H., Wyandotte County (1953). Kansas City.
 CLAWSON, ELDON L., Marshall County (1965). Marysville.
 DUNNING, BEVERLY K., Sedgwick County (1964). Wichita.
 FLORY, JOSEPH R., Harvey County (1965). Newton.
 FULTZ, WILLIAM E., Greenwood County (1962, 1963). Eureka.
 GARTON, GAIL E., Ellis County (1965, 1966). Hays.
 GILLMORE, RALPH E., Marion County (1966). Marion.
 HARTSFIELD, GEORGE F., Saline County (1964). Salina.
 HECHT, ROGER, Shawnee County (1952, 1960). Topeka.
 HENDERSHOT, ROYAL C., Kingman County (1956, 1960). Kingman.
 HENSLEY, DALE, Montgomery County (1957). Independence.
 HUNDLEY, JR., WILLIAM C., Butler County (1955, 1966). El Dorado.
 LOTZ, WILLIAM R., Ford County (1964). Dodge City.
 McCAMMON, RONALD W., Crawford County (1966). Girard.
 MCGINNESS, KENNETH E., Johnson County (1945). Olathe.
 MEIREIS, CLIFFORD L., Sumner County (1955, 1962). Wellington.
 NYHART, SYLVESTER O., Russell County (1958, 1959). Russell.
 OLTMANN, PAUL G., Rice County (1964). Lyons.
 PLILER, JAMES E., Labette County (1964, 1965). Altamont.
 RECTOR, RALPH B., Leavenworth County (1949, 1956). Leavenworth.
 REIMER, ERVIN C., Riley County (1965, 1966). Manhattan.
 RIAT, LARRY D., Dickinson County (1961). Abilene.
 STAIGER, GARY L., Seward County (1964, 1966). Liberal.
 STUDER, RAYMOND L., McPherson County (1966). McPherson.
 UMSCHIED, SYLVESTER C., Reno County (1962, 1966). Hutchinson.
 UTERMÖHLEN, RALPH E., Douglas County (1964, 1965). Lawrence.
 VAN SKIKE, WILLIAM V., Barton County (1950, 1956). Great Bend.
 WREN, THURMAN S., Sedgwick County (1949, 1955). Wichita.

COUNTY HOME ECONOMICS AGENTS

AKIN, MARIDENE W., Grant County (1965). Ulysses.
 ARGANBRIGHT, MAHALA M., McPherson County (1949, 1960). McPherson.
 AUGUSTINE, SANDRA L., Ellsworth County (1965). Ellsworth.
 BAKER, SHIRLEY F., Jefferson County (1959, 1961). Oskaloosa.
 BARNES, HELEN L., Linn County (1964). Mound City.
 BERGDALL, NANCY J., Hamilton County (1963). Syracuse.
 BIEHL, FLORENCE F., Johnson County (1962). Olathe.
 BIRKBECK, MARY B., McPherson County (1965). McPherson.
 BLACKWELL, CORA A., Ottawa County (1948, 1962). Minneapolis.
 BLACKWOOD, HELEN H., Reno County (1960, 1962). Hutchinson.
 BLATTNER, LYLA M., Rooks County (1964, 1966). Stockton.
 BLEVINS, OLETHA L., Douglas County (1959). Lawrence.
 BRANDEN, ELSIE PAINTER, Finney County (1955, 1961). Garden City.
 BUFFINGTON, MARY K., Sumner County (1960). Wellington.
 CAIN, MARCIA J., Saline County (1965). Salina.
 CARLSON, LOIS O., Neosho County (1964). Erie.
 CARR, LINDA J., Montgomery County (1963). Independence.
 CLINE, LUCILE G., Pawnee County (1951, 1963). Larned.
 COLGLAZIER, ELIN M., Ellis County (1958, 1965). Hays.
 CONLEY, JOSEPHINE, Johnson County (1955). Olathe.
 CRESS, JEANICE A., Allen County (1955, 1956). Iola.
 CRUM, MONA RUTH, Butler County (1958). El Dorado.
 CURRIE, TRELLA, Cloud County (1955). Concordia.
 DAVIS, HELEN C., Anderson County (1965). Garnett.
 DAVIS, OLIVE, Morton County (1955). Elkhart.
 DE GEER, KATHARINE A., Chautauqua County (1966). Sedan.
 DOMSCH, L. ANN, Rawlins County (1959). Atwood.
 DUGGAN, MARGARET H., Graham County (1963). Hill City.
 EDWARDS, MARY LEE, Woodson County (1961). Yates Center.
 FAIR, LINDA C., Pottawatomie County (1963, 1966). Westmoreland.

FEIST, MARY L., Kiowa County (1966). Greensburg.
 FELL, NADA L., Miami County (1965). Paola.
 FISHER, SHARON GAY, Meade County (1959). Meade.
 FLENTIE, MARY F., Jewell County (1964, 1965). Mankato.
 FREELAND, SUSAN F., Douglas County (1966). Lawrence.
 GASTON, GLORIA J., Marshall County (1960). Marysville.
 GEMAELICH, MARGARET J., Scott County (1963). Scott City.
 GOLDSMITH, PATRICIA E., Harvey County (1963, 1964). Newton.
 GRABER, VIVIAN E., Kingman County (1955). Kingman.
 GRIESHABER, ALICE A., Barber County (1966). Medicine Lodge.
 GRIGSBY, CAROLE M., Franklin County (1966). Ottawa.
 GUTHRIE, GERSILDA, Hodgeman County (1958). Jetmore.
 HAYES, MARY M., Sheridan County (1962). Hoxie.
 HEINLY, FREDA K., Rice County (1957). Lyons.
 HERNDON, MAY BETH, Rush County (1953). La Crosse.
 HESTER, MARION V., Barton County (1953). Great Bend.
 HODGES, R. JEAN, Sedgwick County (1964). Wichita.
 HOVE, GERTRUDE, Cherokee County (1949, 1961). Columbus.
 HOWERTON, PHYLLIS Y., Reno County (1966). Hutchinson.
 HUND, MARGARET ANN, Jackson County (1960). Holton.
 HUNZIKER, VERA S., Wilson County (1966). Fredonia.
 HUSTON, MARY J., Thomas County (1964, 1966). Colby.
 IRVIN, VICKY N., Pratt County (1966). Pratt.
 JOHNSON, DONA H., Clark County (1964). Ashland.
 JOHNSON, JUANITA B., Crawford County (1948). Girard.
 JOHNSTON, VIRGINIA C., Lane County (1966). Dighton.
 KANDT, BETTY L., Geary County (1964). Junction City.
 KATZER, CAROL A., Doniphan County (1965). Troy.
 KENT, NANCY JO, Ford County (1959, 1964). Dodge City.
 KINDLER, BEVERLY L., Norton County (1951, 1960). Norton.
 KNIGHT, PERRY C., Sedgwick County (1965). Wichita.
 KRUMSICK, MARY E., Brown County (1963, 1966). Hiawatha.
 LAWLESS, VIVIAN J., Lincoln County (1964). Lincoln.
 LEIKAM, ELEANORA, Gray County (1954). Cimarron.
 LINDBERG, CASANDRA S., Lyon County (1966). Emporia.
 LOEPPKE, WILDA L., Wichita County (1966). Leoti.
 LONG, ANNABELLE B., Shawnee County (1955). Topeka.
 MCLEARY, KAY M., Washington County (1965). Washington.
 MCKINNEY, MARJORIE H., Edwards County (1966). Kinsley.
 MANINGER, SHARON H., Russell County (1966). Russell.
 MANSFIELD, EVA P., Leavenworth County (1953). Leavenworth.
 MANTZ, HELEN M., Smith County (1942, 1966). Smith Center.
 MEEK, MARY E., Dickinson County (1953). Abilene.
 MEISINGER, JANET N., Marion County (1964). Marion.
 MERIWETHER, NANCY A., Nemaha County (1958, 1960). Seneca.
 MOLZ, DIXIE IRENE, Stafford County (1953). St. John.
 NEELLY, ERMA M., Trego County (1950). Wakeeney.
 NEUSCHWANDER, OCIE A., Greeley County (1957). Tribune.
 OLSON, ELEANOR A., Mitchell County (1960). Beloit.
 PALMER, RACHEL F., Sedgwick County (1941). Wichita.
 PEARSON, GLENDA N., Republic County (1965). Belleville.
 PELTIER, STELLA A., Atchison County (1964). Effingham.
 PEMBER, SHARON H., Ness County (1966). Ness City.
 PENNY, JUDITH C., Sherman County (1965). Goodland.
 PRICE, BETTY J., Wyandotte County (1961, 1963). Kansas City.
 PRICE, MARJORIE E., Coffey County (1957, 1960). Burlington.
 PROFFITT, JOANNA M., Rice County (1963). Lyons.
 REDIKER, JANET B., Morris County (1966). Council Grove.
 RICHARD, BARBARA K., Clay County (1966). Clay Center.
 ROBBINS, EMILY R., Logan County (1964, 1965). Oakley.
 SACK, KAREN A., Kearny County (1966). Lakin.
 SCHROEDER, DOROTHEA A., Wyandotte County (1942, 1943). Kansas City.
 SIDWELL, DIANE D., Wabaunsee County (1965). Alma.
 SMITH, BEVERLY B., Saline County (1961). Salina.

SPEARS, MARY CAROL B., Cowley County (1966). Winfield.
 SYPHER, LADEAN S., Chase County (1964). Cottonwood Falls.
 TALLY, SHARON S., Decatur County (1964). Oberlin.
 TOOT, JANICE, Haskell County (1966). Sublette.
 TRUAX, RUBY C., Sedgwick County (1959). Wichita.
 VICE, FAYE E., Labette County (1946, 1947). Altamont.
 WALKER, AWYN T., Riley County (1965). Manhattan.
 WARTMAN, EMALYN L., Stanton County (1964). Johnson.
 WEAVER, MAE K., Barton County (1952). Great Bend.
 WHITE, VERA T., Phillips County (1965). Phillipsburg.
 WILLCOCKSON, PATRICIA L., Wallace County (1964). Sharon Springs.
 WILLIAMS, DONNA E., Comanche County (1965). Coldwater.
 WILLIAMS, KAY S., Bourbon County (1961, 1965). Fort Scott.
 WILSON, REITA B., Stevens County (1966). Hugoton.
 WONER, ELIZABETH, Harper County (1949, 1950). Anthony.
 YOUNG, CAROL H., Osage County (1966). Lyndon.
 ZIMMERMAN, MURIEL G., Greenwood County (1964). Eureka.
 ZIRKLE, JOYCE L., Elk County (1966). Howard.

COUNTY AGRICULTURAL AGENTS

ALBRIGHT, KENNETH B., Ellis County (1955, 1957). Hays.
 AUFDENGARTEN, CHARLES H., Washington County (1963). Washington.
 BAKER, EDWARD F., Lincoln County (1964, 1965). Lincoln.
 BARBER, ARNOLD, Atchison County (1955). Effingham.
 BARNES, CARL L., Clark County (1964). Ashland.
 BARNES, JOHN H., Harvey County (1953, 1965). Newton.
 BEAMS, RICHARD L., Lane County (1964, 1965). Dighton.
 BIBY, VIRGIL H., Rice County (1966). Lyons.
 BLAIR, W. LAWRENCE, Linn County (1960, 1961). Mound City.
 BLISS, FRANCIS E., Elk County (1946, 1966). Howard.
 BLUME, WILLIS L., Haskell County (1948). Sublette.
 BOZWORTH, ROBERT W., Franklin County (1960, 1965). Ottawa.
 BRANSON, ROBERT B., Labette County (1966). Altamont.
 BULK, HERBERT W., Shawnee County (1949). Topeka.
 BURKHART, PEYTON H., Nemaha County (1962, 1966). Seneca.
 BYARLAY, LOWELL H., Osborne County (1959, 1960). Osborne.
 CAGLE, JOHN E., Jackson County (1964, 1965). Holton.
 CARLSON, VIRGIL P., Ellsworth County (1957, 1966). Ellsworth.
 COX, M. LESTER, Gove County (1955, 1962). Gove.
 COX, WILLIAM E., Crawford County (1957, 1958). Girard.
 DAUBER, DONALD D., Rice County (1960). Lyons.
 DAVIES, DAVID R., Kiowa County (1960, 1961). Greensburg.
 DELANO, FREDRICK D., Neosho County (1964). Erie.
 DUCKERS, JR., HARRY, Wyandotte County (1943). Kansas City.
 DUNAVAN, WILBUR J., Smith County (1960). Smith Center.
 ETHERIDGE, RAY W., Barber County (1954, 1959). Medicine Lodge.
 FISH, G. KEITH, Trego County (1958, 1959). Wakeeney.
 FORD, ROY D., Stanton County (1964). Johnson.
 FROMM, KENNETH W., Mitchell County (1953, 1965). Beloit.
 GEBHART, JEWELL O., Sheridan County (1945, 1963). Hoxie.
 GEIST, WAYNE D., Osage County (1962, 1965). Lyndon.
 GERMANN, RALPH, Hodgeman County (1956, 1958). Jetmore.
 GOERTZ, HARVEY E., Brown County (1937). Hiawatha.
 GOLLADAY, RICHARD E., Hamilton County (1957). Syracuse..
 GOTTSCH, ALBERT HAROLD, Butler County (1954, 1964). El Dorado.
 GREENWOOD, WILLIAM L., Scott County (1960, 1962). Scott City.
 GRIFFITH, LESTER E., Marion County (1949, 1960). Marion.
 GRIGGS, OTIS R., Reno County (1951, 1960). Hutchinson.
 GUNTER, JIMMY M., Jewell County (1964). Mankato.
 HALL, C. T., Johnson County (1934, 1939). Olathe.
 HAMILTON, DONALD F., Saline County (1960, 1964). Salina.
 HARDING, WARREN G., Rooks County (1955). Stockton.
 HARRINGTON, MAURICE C., Anderson County (1958, 1960). Garnett.
 HARRIS, A. EUGENE, Meade County (1938, 1940). Meade.
 HEDSTROM, EDWIN, Marshall County (1935). Marysville.

HENDERSHOT, ROGER L., Harper County (1941, 1951). Anthony.
 HENRY, LARRY G., Cheyenne County (1956, 1966). St. Francis.
 HEROD, JON, Morton County (1957). Elkhart.
 HINKLE, JR., EDGAR N., Decatur County (1960). Oberlin.
 HOLLINGSWORTH, CLARENCE A., Greenwood County (1937, 1953). Eureka.
 HONER, HAROLD DEAN, Edwards County (1965, 1966). Kinsley.
 INGLE, DONALD W., Sedgwick County (1930, 1947). Wichita.
 JEFFREY, FORREST DUANE, Chautauqua County (1965, 1966). Sedan.
 JEPSEN, DELBERT D., Russell County (1962, 1966). Russell.
 JOHNSON, ARTHUR R., Jefferson County (1958, 1960). Oskaloosa.
 KEPLEY, LARRY R., Stevens County (1964). Hugoton.
 KIVETT, HARRY L., Rawlins County (1957, 1966). Atwood.
 KRAISINGER, WILBUR S., Pratt County (1951). Pratt.
 KUBIK, RICHARD W., Thomas County (1949). Colby.
 LINE, MERLIN E., Kearny County (1946, 1949). Lakin.
 LINN, JACK A., Wilson County (1966). Fredonia.
 LUGINSLAND, RAE C., Reno County (1959). Hutchinson.
 McCULLY, WILLIAM B., Gray County (1959, 1960). Cimarron.
 McKAY, BEN D., Ness County (1954, 1960). Ness City.
 McMASTER, GERALD O., Norton County (1951). Norton.
 McWILLIAMS, DONALD D., Wallace County (1956, 1966). Sharon Springs.
 MADDUX, ALBERT G., Finney County (1959, 1965). Garden City.
 MALEY, ALVIN E., Lyon County (1953, 1963). Emporia.
 MANRY, E. CLIFFORD, Pawnee County (1940, 1947). Larned.
 MARLAR, MONTY G., Morris County (1965, 1966). Council Grove.
 MARLOW, DAROLD DEAN, Wabaunsee County (1950). Alma.
 MAXWELL, THOMAS R., Allen County (1954, 1956). Iola.
 MORRIS, MAX B., Shawnee County (1965). Topeka.
 NEILL, JOE P., Cloud County (1946, 1960). Concordia.
 NELSON, ROSS M., Logan County (1959, 1966). Oakley.
 NEWCOMER, GLENN A., Bourbon County (1965, 1966). Fort Scott.
 NEWSOME, B. W., Riley County (1955, 1960). Manhattan.
 NUTTELMAN, R. F., Montgomery County (1941, 1944). Independence.
 ORR, BRYCE, Coffey County (1952, 1953). Burlington.
 ORWIG, THOMAS W., Dickinson County (1955, 1960). Abilene.
 PAIR, JOHN CARL, Sedgwick County (1961). Wichita.
 PETERSON, DONALD K., Stafford County (1955, 1961). St. John.
 PHERIGO, DAN L., Douglas County (1958, 1966). Lawrence.
 POELMA, JOHN C., Greeley County (1965, 1966). Tribune.
 ROBERTSON, JOHN F., Comanche County (1956, 1959). Coldwater.
 ROWE, JR., SAMUEL S., Sumner County (1965). Wellington.
 SALLEE, LESLIE H., Clay County (1957, 1960). Clay Center.
 SISK, ENSLEY J., Miami County (1960). Paola.
 SMITH, CHARLES W., Cowley County (1955). Winfield.
 SMITH, JIMMIE W., Graham County (1958, 1966). Hill City.
 SMITH, JOHN F., Leavenworth County (1956). Leavenworth.
 SPENCER, ALBERT E., Pottawatomie County (1960, 1962). Westmoreland.
 STAGG, BEVERLY R., McPherson County (1940, 1960). McPherson.
 STOUSE, LAWRENCE D., Johnson County (1966). Olathe.
 STRAWN, AUBREY L., Cherokee County (1962, 1966). Columbus.
 STROADE, RICHARD E., Republic County (1959, 1962). Belleville.
 STROUD, NELSON E., Geary County (1952). Junction City.
 THOLE, H. THOMAS, Barton County (1965, 1966). Great Bend.
 TOWNSEND, JR., LAWRENCE W., Ottawa County (1962). Minneapolis.
 VAN CLEVE, JOSEPH E., Seward County (1948). Liberal.
 VAN METER, EARL L., Rush County (1960, 1964). La Crosse.
 WAGNER, VERNON D., Sherman County (1961, 1966). Goodland.
 WALKER, JR., MARSHALL F., Grant County (1951). Ulysses.
 WARY, JR., RAYMOND E., Woodson County (1958, 1960). Yates Center.
 WEST, JAY A., Doniphan County (1952). Troy.
 WILES, DON K., Ford County (1956, 1964). Dodge City.
 WILSON, JACK H., Wichita County (1951). Leoti.
 WILSON, PAUL H., Barton County (1946, 1947). Great Bend.
 YAUK, DON O., Phillips County (1963, 1966). Phillipsburg.

Statistical Summary for 1963-64

Students by States, Foreign Countries, and Kansas Counties

States					
Alabama	13	Louisiana	18	Oklahoma	49
Alaska	5	Maine	5	Oregon	8
Arizona	7	Maryland	15	Pennsylvania	46
Arkansas	22	Massachusetts	15	Rhode Island	5
California	66	Michigan	18	South Carolina	10
Colorado	42	Minnesota	24	South Dakota	28
Connecticut	12	Mississippi	16	Tennessee	8
Delaware	3	Missouri	266	Texas	47
Florida	17	Montana	5	Utah	7
Georgia	8	Nebraska	151	Vermont	7
Hawaii	21	New Hampshire	3	Virginia	25
Idaho	8	New Jersey	56	Washington	10
Illinois	112	New Mexico	13	West Virginia	7
Indiana	31	New York	117	Wisconsin	36
Iowa	61	North Carolina	7	Wyoming	9
Kansas	8595	North Dakota	9		
Kentucky	7	Ohio	31	Total	10,110

Foreign Countries and Territories Outside the Continental

United States					
Afghanistan	2	Hong Kong	2	Peru	6
Argentina	2	India	200	Philippines	19
Australia	1	Indonesia	2	Poland	1
Austria	1	Iran	17	Puerto Rico	13
Bolivia	2	Iraq	13	Rumania	1
Brazil	4	Israel	1	Saudi Arabia	1
Cambodia	3	Italy	1	Southern Rhodesia	3
Cameroun	1	Ivory Coast	1	South Vietnam	1
Canada	6	Jamaica	2	Spain	1
Canal Zone	3	Japan	7	Sudan	1
China	103	Jordan	6	Sweden	2
Colombia	3	Kenya	3	Switzerland	2
Cyprus	3	Korea	12	Syria	3
District of Columbia	4	Kuwait	1	Thailand	16
Ecuador	1	Lebanon	4	Trinidad	1
Egypt	15	Malaya	1	Tunisia	1
England	5	Mexico	8	Turkey	1
Ethiopia	1	Morocco	1	USSR	1
Formosa	16	Netherlands	3	Venezuela	3
France	1	Nicaragua	2	Vietnam	2
Germany	5	Nigeria	17	Zanzibar	1
Ghana	3	Northern Rhodesia	1		
Greece	4	Pakistan	11	Total	588
Honduras	2	Panama	1		

Kansas Counties

Allen	34	Greenwood	42	Pawnee	40
Anderson	21	Hamilton	15	Phillips	35
Atchison	84	Harper	33	Pottawatomie	147
Barber	28	Harvey	93	Pratt	72
Barton	128	Haskell	21	Rawlins	26
Bourbon	24	Hodgeman	7	Reno	203
Brown	76	Jackson	77	Republic	79
Butler	113	Jefferson	36	Rice	74
Chase	22	Jewell	63	Riley	1280
Chautauqua	16	Johnson	486	Rooks	33
Cherokee	30	Kearny	16	Rush	30
Cheyenne	38	Kingman	62	Russell	66
Clark	17	Kiowa	31	Saline	250
Clay	146	Labette	41	Scott	42
Cloud	115	Lane	32	Sedgwick	660
Coffey	35	Leavenworth	95	Seward	37
Comanche	15	Lincoln	43	Shawnee	315
Cowley	102	Linn	23	Sheridan	21
Crawford	29	Logan	14	Sherman	28
Decatur	35	Lyon	69	Smith	41
Dickinson	208	McPherson	126	Stafford	51
Doniphan	25	Marion	66	Stanton	6
Douglas	51	Marshall	151	Stevens	14
Edwards	41	Meade	20	Sumner	88
Elk	13	Miami	40	Thomas	69
Ellis	39	Mitchell	61	Trego	24
Ellsworth	74	Montgomery	84	Wabaunsee	57
Finney	63	Morris	71	Wallace	17
Ford	73	Morton	6	Washington	104
Franklin	39	Nemaha	96	Wichita	18
Geary	260	Neosho	42	Wilson	37
Gove	12	Ness	32	Woodson	19
Graham	15	Norton	63	Wyandotte	235
Grant	16	Osage	58		
Gray	17	Osborne	34	Total	8595
Greeley	8	Ottawa	66		

Statistical Summary for 1964-65

Students by States, Foreign Countries, and Kansas Counties

States			
Alabama	8	Maine	4
Alaska	4	Maryland	22
Arizona	10	Massachusetts	27
Arkansas	27	Michigan	25
California	81	Minnesota	32
Colorado	47	Mississippi	11
Connecticut	17	Missouri	271
Delaware	3	Montana	6
Florida	21	Nebraska	157
Georgia	7	Nevada	4
Hawaii	21	New Hampshire	4
Idaho	10	New Jersey	79
Illinois	121	New Mexico	18
Indiana	43	New York	173
Iowa	69	North Carolina	7
Kansas	9449	North Dakota	14
Kentucky	7	Ohio	32
Louisiana	14	Oklahoma	53
		Oregon	9
		Pennsylvania	52
		Rhode Island	4
		South Carolina	4
		South Dakota	37
		Tennessee	8
		Texas	64
		Utah	7
		Vermont	1
		Virginia	29
		Washington	12
		West Virginia	7
		Wisconsin	49
		Wyoming	7
		Total	11,181

Foreign Countries and Territories Outside the Continental

United States			
Afghanistan	1	Honduras	2
Argentina	1	Hong Kong	9
Australia	2	India	121
Belgium	1	Indonesia	5
Brazil	5	Iran	18
Cambodia	3	Iraq	11
Canada	10	Ireland	1
Canal Zone	2	Israel	1
China	89	Italy	1
Colombia	2	Ivory Coast	1
Cyprus	4	Jamaica	1
District of Columbia	5	Japan	6
Ecuador	1	Jordan	6
Egypt	14	Kenya	4
England	6	Korea	15
Ethiopia	2	Lebanon	3
Formosa	13	Malaysia	2
France	1	Mexico	5
Germany	6	Netherlands	2
Ghana	3	New Zealand	2
Greece	3	Nicaragua	3
		Nigeria	21
		Northern Rhodesia	1
		Okinawa	2
		Pakistan	10
		Peru	3
		Philippines	17
		Puerto Rico	13
		Southern Rhodesia	3
		Sudan	1
		Switzerland	2
		Syria	2
		Tanganyika	1
		Thailand	8
		Trinidad	1
		Turkey	3
		Venezuela	3
		Viet Nam	1
		Zanzibar	1
		Total	466

Kansas Counties

Allen	38	Greenwood	42	Pawnee	44
Anderson	24	Hamilton	14	Phillips	34
Atchison	100	Harper	39	Pottawatomie	183
Barber	38	Harvey	104	Pratt	60
Barton	151	Haskell	12	Rawlins	29
Bourbon	24	Hodgeman	13	Reno	195
Brown	71	Jackson	75	Republic	100
Butler	109	Jefferson	49	Rice	77
Chase	30	Jewell	63	Riley	1443
Chautauqua	13	Johnson	631	Rooks	31
Cherokee	25	Kearny	18	Rush	34
Cheyenne	32	Kingman	60	Russell	79
Clark	16	Kiowa	37	Saline	306
Clay	160	Labette	44	Scott	37
Cloud	132	Lane	22	Sedgwick	653
Coffey	37	Leavenworth	115	Seward	45
Comanche	15	Lincoln	41	Shawnee	308
Cowley	108	Linn	21	Sheridan	24
Crawford	42	Logan	24	Sherman	37
Decatur	42	Lyon	63	Smith	42
Dickinson	230	McPherson	129	Stafford	55
Doniphan	20	Marion	74	Stanton	7
Douglas	57	Marshall	170	Stevens	19
Edwards	43	Meade	27	Sumner	90
Elk	13	Miami	40	Thomas	66
Ellis	38	Mitchell	75	Trego	24
Ellsworth	78	Montgomery	99	Wabaunsee	76
Finney	80	Morris	78	Wallace	17
Ford	79	Morton	26	Washington	112
Franklin	48	Nemaha	99	Wichita	16
Geary	299	Neosho	45	Wilson	42
Gove	10	Ness	44	Woodson	17
Graham	17	Norton	64	Wyandotte	270
Grant	14	Osage	58		
Gray	14	Osborne	35		
Greeley	9	Ottawa	71		
				Total	9449

Degrees Conferred in the Year 1964

COLLEGE OR SCHOOL	Men	Women	Total
COLLEGE OF AGRICULTURE.....	107	2	109
Agriculture.....	92	2	94
Feed Technology.....	9		9
Milling Technology.....	6		6
COLLEGE OF ARCHITECTURE.....	61	3	64
Architecture.....	48	2	50
Architectural Engineering.....	5	4	5
Landscape Architecture.....	8	1	9
COLLEGE OF ARTS AND SCIENCES.....	181	195	376
Bachelor of Arts.....	82	95	177
Bachelor of Science.....	97	93	190
Music Education.....	2	4	6
Bachelor of Music.....		3	3
COLLEGE OF COMMERCE.....	132	8	140
Commerce.....	132	8	140
COLLEGE OF EDUCATION.....	36	176	212
Bachelor of Science.....	36	33	69
Elementary Education.....		143	143
COLLEGE OF ENGINEERING.....	246	2	248
Agricultural Engineering.....	10		10
Chemical Engineering.....	29		29
Civil Engineering.....	42		42
Electrical Engineering.....	84		84
Industrial Engineering.....	13		13
Industrial Technology.....	1		1
Mechanical Engineering.....	45	1	46
Nuclear Engineering.....	22	1	23
COLLEGE OF HOME ECONOMICS.....	5	132	137
Home Economics.....	126	1	127
Home Economics and Journalism.....		3	3
Restaurant Management.....	4	3	7
COLLEGE OF VETERINARY MEDICINE.....	53	3	56
Veterinary Medicine.....	53	3	56
GRADUATE SCHOOL (Master of Architecture).....	3		3
GRADUATE SCHOOL (Master of Arts)			
Art (Architecture).....	1		1
Economics.....	10	1	11
English.....	5	5	10
History.....	2		2
Mathematics.....	2		2
Political Science.....	1		1
Speech.....	2	2	4
GRADUATE SCHOOL (Master of Regional Planning).....	2		2
GRADUATE SCHOOL (Master of Science)			
Accounting.....	2		2
Agricultural Economics.....	14		14
Agricultural Education.....	8		8
Agricultural Engineering.....	2		2
Agronomy.....	8		8
Animal Husbandry.....	4		4
Applied Mechanics.....	1		1
Architectural Engineering.....	1		1
Bacteriology.....	1	1	2
Business Administration.....	6		6
Chemical Engineering.....	4		4
Chemistry.....	2	1	3
Civil Engineering.....	9	1	10
Clothing and Textiles.....		7	7
Dairy Science.....	3		3
Education.....	21	10	31
Electrical Engineering.....	18		18
Entomology.....	1		1
Extension Education.....	2		2
Family and Child Development.....		5	5
Family Economics.....		2	2
Farm Mechanics.....	1		1
Feed Technology.....	3		3
Foods and Nutrition.....		2	2

Degrees Conferred in the Year 1964—Concluded

COLLEGE OR SCHOOL	Men	Women	Total
Geology.....	4		4
Home Economics Education.....		5	5
Horticulture.....	1		1
Industrial Engineering.....	12		12
Institutional Management.....	4		4
Landscape Architecture.....	2		2
Mathematics.....	10		10
Mechanical Engineering.....	7		7
Milling Industry.....	2		2
Music.....	1	2	3
Nuclear Engineering.....	4		4
Pathology.....	2		2
Physical Science Teaching.....	2		2
Physics.....	6		6
Physiology.....	1		1
Plant Pathology.....	3		3
Poultry Science.....	4		4
Psychology.....	2		2
Statistics.....	6		6
Surgery and Medicine.....	6		6
Technical Journalism.....	1	4	5
Zoology.....	2		2
GRADUATE SCHOOL (Doctor of Philosophy)			
Agricultural Economics.....	2		2
Agronomy.....	4		4
Animal Nutrition.....	5		5
Applied Mechanics.....	1		1
Bacteriology.....	1	1	2
Biochemistry.....	1		1
Botany.....	1		1
Chemistry.....	7		7
Electronics.....	2		2
Entomology.....	6		6
Foods and Nutrition.....		1	1
Genetics.....	2		2
Horticulture.....	1		1
Mechanical Engineering.....	2		2
Milling Industry.....	3		3
Parasitology.....	1		1
Physics.....	5		5
Plant Pathology.....	3		3
Psychology.....	3		3
Veterinary Medicine (Pathology).....	4		4
Grand Total.....	1,096	571	1,667

Degrees Conferred in the Year 1965

COLLEGE OR SCHOOL	Men	Women	Total
COLLEGE OF AGRICULTURE.....	149	2	151
Agriculture.....	123	1	124
Bakery Management.....	1		1
Biochemistry.....		1	1
Feed Technology.....	14		14
Milling Technology.....	11		11
COLLEGE OF ARCHITECTURE.....	57		57
Architecture.....	42		42
Architectural Engineering.....	5		5
Landscape Architecture.....	10		10
COLLEGE OF ARTS AND SCIENCES.....	310	136	446
Bachelor of Arts.....	126	81	207
Bachelor of Science.....	155	33	188
Bachelor of Music.....	1	1	2
Music Education.....	4	10	14
Physical Education.....	24	11	35
COLLEGE OF EDUCATION.....	41	189	230
Bachelor of Science.....	40	46	86
Elementary Education.....	1	143	144
COLLEGE OF COMMERCE.....	139	11	150
Business Administration.....	139	11	150
COLLEGE OF ENGINEERING.....	177		177
Agricultural Engineering.....	8		8
Chemical Engineering.....	18		18
Civil Engineering.....	23		23
Electrical Engineering.....	66		66
Industrial Engineering.....	6		6
Mechanical Engineering.....	35		35
Nuclear Engineering.....	21		21
COLLEGE OF HOME ECONOMICS.....	2	143	145
Home Economics.....		136	136
Home Economics and Journalism.....		7	7
Restaurant Management.....		2	2
COLLEGE OF VETERINARY MEDICINE.....	60	2	62
Veterinary Medicine.....	60	2	62
GRADUATE SCHOOL (Master of Architecture).....	2	1	3
GRADUATE SCHOOL (Master of Arts)			
Art (Architecture).....	3		3
Economics.....	2		2
English.....	1	4	5
Geography.....	2		2
Geology.....	1		1
History.....	6	1	7
Modern Language.....	1		1
Political Science.....	1		1
Sociology.....	1	2	3
Speech.....	6	1	7
GRADUATE SCHOOL (Master of Regional Planning).....	6		6
GRADUATE SCHOOL (Master of Science)			
Accounting.....	5		5
Agricultural Economics.....	9		9
Agricultural Education.....	12		12
Agricultural Engineering.....	3		3
Agronomy.....	2		2
Anatomy.....	2		2
Animal Husbandry.....	5		5
Applied Mechanics.....	6		6
Architectural Engineering.....	1		1
Bacteriology.....	1		1
Biochemistry.....	1	1	2
Botany.....	2	2	4
Business Administration.....	8	2	10
Chemical Engineering.....	8		8
Chemistry.....	8	2	10
Civil Engineering.....	7		7
Clothing and Textiles.....		8	8
Dairy Science.....	3		3
Education.....	23	12	35

Degrees Conferred in the Year 1965—Concluded

COLLEGE OR SCHOOL	Men	Women	Total
Electrical Engineering.....	10	.....	10
Entomology.....	4	.....	4
Extension Education.....	7	.....	7
Family and Child Development.....	.....	6	6
Family Economics.....	1	3	4
Farm Mechanics.....	1	.....	1
Feed Technology.....	4	.....	4
Foods and Nutrition.....	.....	7	7
Genetics.....	2	1	3
Geology.....	8	1	9
Home Economics Education.....	.....	5	5
Horticulture.....	7	.....	7
Industrial Engineering.....	9	.....	9
Institutional Management.....	.....	3	3
Landscape Architecture.....	1	.....	1
Mathematics.....	9	.....	9
Mechanical Engineering.....	7	.....	7
Milling Industry.....	4	.....	4
Music.....	.....	2	2
Nuclear Engineering.....	4	.....	4
Pathology.....	4	.....	4
Physical Education.....	8	2	10
Physics.....	5	.....	5
Plant Pathology.....	3	.....	3
Poultry Science.....	2	.....	2
Statistics.....	8	2	10
Surgery and Medicine.....	2	.....	2
Technical Journalism.....	1	2	3
Zoology.....	3	.....	3
GRADUATE SCHOOL (Doctor of Philosophy)			
Agricultural Economics.....	2	.....	2
Agronomy.....	4	.....	4
Animal Breeding.....	2	.....	2
Animal Nutrition.....	1	.....	1
Applied Mechanics.....	1	.....	1
Bacteriology.....	1	.....	1
Biochemistry.....	1	.....	1
Botany.....	1	1	2
Chemical Engineering.....	1	1	2
Chemistry.....	8	1	9
Economics.....	1	.....	1
Electronics.....	1	.....	1
English.....	.....	1	1
Entomology.....	4	.....	4
Genetics.....	.....	1	1
Horticulture.....	4	.....	4
Mechanical Engineering.....	3	.....	3
Milling Industry.....	1	.....	1
Physics.....	3	.....	3
Plant Pathology.....	3	.....	3
Psychology.....	1	.....	1
Veterinary Medicine (Pathology).....	1	.....	1
Zoology.....	2	.....	2
GRADUATE SCHOOL (Specialist in Education).....	1	.....	1
Grand Total.....	1,233	538	1,791

Tabulation for First Semester 1963-64

COLLEGE OF AGRICULTURE

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	133	7	119	1	84	1	86	1	(5)	.....	427	10	437
Agricultural Economics	1	.....	.....	.....	.....	.....	9	.....	.....	.....	10	.....	10
Agricultural Education	19	.....	23	.....	22	.....	23	.....	(1)	.....	88	.....	88
Bakery Management	3	.....	2	.....	.....	.....	.....	.....	.....	.....	5	.....	5
Dairy Manufacturing	2	.....	3	.....	1	.....	3	.....	.....	.....	9	.....	9
Feed Technology	16	.....	22	.....	14	.....	13	.....	.....	.....	65	.....	65
Landscape Architecture	7	.....	11	.....	13	.....	11	2	(1)	.....	43	2	45
Milling Technology	15	.....	9	1	12	.....	13	.....	.....	.....	49	1	50
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	6	5	6	5	11
TOTAL	196	7	189	2	146	1	153	3	6 (7)	5	702	18	720

COLLEGE OF ARTS AND SCIENCES

Biological Science	157	54	252	40	33	28	45	13	(13)	(1)	500	136	636
Humanities	20	59	20	50	20	59	21	47	(6)	(4)	87	219	306
Physical Science	41	11	58	13	41	12	65	13	(2)	(1)	207	50	257
Social Science	43	36	61	31	73	28	69	24	(3)	(3)	249	122	371
General	208	147	116	70	56	11	29	5	(7)	(2)	416	235	651
Applied Music	3	5	3	1	1	1	.....	3	.....	.....	7	10	17
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	35 (1)	53	36	53	89
TOTAL	472	312	510	205	224	139	229	105	35 (32)	53 (11)	1502	825	2327

COLLEGE OF COMMERCE

Business Administration	91	23	76	23	90	8	92	9	(5)	(1)	354	64	418
Accounting	50	10	45	2	45	8	63	1	(1)	.....	204	21	225
Special .....	.....	.....	.....	.....	.....	.....	.....	.....	2	3	2	3	5
TOTAL	141	33	121	25	135	16	155	10	2 (6)	3 (1)	560	88	648

COLLEGE OF EDUCATION

Art Education .....	.....	.....	4	2	1	1	1	3	.....	.....	6	6	12
Elementary Education	3	85	5	132	3	117	3	139	.....	(9)	14	482	496
Secondary Education	25	46	30	68	44	39	78	53	(2)	.....	179	206	385
Music Education	4	20	8	15	6	9	5	4	.....	.....	23	48	71
Physical Education	26	14	29	18	28	12	38	9	.....	(1)	121	54	175
TOTAL	58	165	76	235	82	178	125	208	(2)	(10)	343	796	1139

COLLEGE OF ENGINEERING AND ARCHITECTURE

	Fresh- men 1st year		Sopho- mores 2nd year		Juniors 3rd year		Seniors 4th year		5th year		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Agricultural Engineering	23	.....	21	.....	14	.....	13	.....	.....	.....	(1)	.....	72	.....	72
Architectural Engineering	24	.....	23	.....	17	.....	6	.....	1	.....	.....	.....	71	.....	71
Architecture	67	4	95	2	51	1	51	.....	54	2	(2)	.....	320	9	329
Chemical Engineering	41	.....	30	1	18	.....	36	1	.....	.....	.....	.....	125	2	127
Civil Engineering	61	.....	52	.....	32	.....	47	1	.....	.....	(3)	.....	195	1	196
Electrical Engineering	116	1	125	.....	91	.....	106	1	.....	.....	(4)	.....	442	2	444
Industrial Engineering	13	.....	15	.....	5	.....	13	.....	.....	.....	(1)	.....	47	.....	47
Mechanical Engineering	99	.....	71	.....	55	.....	54	.....	.....	.....	(1)	.....	280	.....	280
Nuclear Engineering	34	1	40	.....	33	.....	33	2	.....	.....	(1)	.....	141	3	144
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	2	8	2	10
TOTAL	478	6	472	3	316	1	359	5	55	2	8 (13)	2	1701	19	1720

Tabulation for First Semester 1963-64—Concluded

COLLEGE OF HOME ECONOMICS

	Freshmen		Sophomores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Home Economics.....	6	178	1	186	4	118	1	115	.....	(3)	12	600	612
Dietetics and Inst. Mngt.....	.....	5	.....	11	.....	8	.....	12	.....	.....	.....	36	36
Home Economics and Journalism.....	.....	8	.....	8	.....	7	.....	4	.....	.....	.....	27	27
Home Economics and Nursing.....	.....	42	.....	24	.....	3	.....	.....	.....	.....	.....	69	69
Restaurant Management.....	1	.....	3	2	3	.....	5	3	.....	.....	12	5	17
Home Ec. with Liberal Arts.....	.....	17	.....	10	.....	6	.....	8	.....	.....	.....	41	41
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	1	6 (1)	1	7	8
TOTAL.....	7	250	4	241	7	142	6	142	1	6 (4)	25	785	810

COLLEGE OF VETERINARY MEDICINE

	Juniors 3rd Year		Seniors 4th Year		5th Year		6th Year		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Veterinary Medicine.....	72	3	72	2	60	2	54	3	.....	.....	258	10	268

	Freshmen 1st year		Sophomores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Total Undergraduate.....	1352	773	1272	711	982	480	1104	475	169	7	52 (60)	69 (26)	5091	2541	7632
Graduate School.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	814	206	1020
Evening on Campus.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	334	172	506
Total Including Evening College Students	..	..	..	..	..	..	..	..	..	..	..	..	6239	2919	9158

Tabulation for Second Semester 1963-64

COLLEGE OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	136	9	131	1	85	1	62	.....	(4)	(1)	418	12	430
Agricultural Economics	1	.....	.....	.....	.....	.....	4	.....	.....	.....	5	.....	5
Agricultural Education	18	.....	24	.....	21	.....	19	.....	(2)	.....	84	.....	84
Bakery Management	4	.....	2	.....	.....	.....	.....	.....	.....	.....	6	.....	6
Dairy Manufacturing	3	1	2	.....	1	.....	3	.....	.....	.....	9	1	10
Feed Technology	13	.....	21	.....	14	.....	9	.....	(1)	.....	58	.....	58
Milling Technology	16	.....	8	1	12	.....	8	.....	(1)	.....	45	1	46
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	7	8	7	8	15
TOTAL	191	10	188	2	132	1	105	.....	7 (8)	8 (1)	632	22	654

COLLEGE OF ARCHITECTURE AND DESIGN

Architectural Engineering	22	.....	22	.....	13	.....	3	.....	1	.....	61	.....	61
Architecture	57	4	97	2	49	.....	52	1	47	2 (3)	305	9	314
Landscape Architecture	8	.....	12	.....	14	1	8	2	.....	.....	42	3	45
TOTAL	87	4	131	2	76	1	63	3	48	2 (3)	408	12	420

COLLEGE OF ARTS AND SCIENCES

Biological Science	18	7	37	10	28	12	39	6	(1)	.....	123	35	158
Humanities	20	57	21	55	21	65	14	33	(4)	(2)	80	212	292
Physical Science	30	11	63	14	44	13	52	13	(3)	.....	192	51	243
Social Science	30	34	51	23	49	22	50	13	(2)	(4)	182	96	278
Professional and Pre-Professional	178	66	262	49	63	30	41	13	(17)	(3)	561	161	722
General	160	125	72	44	23	4	6	2	(6)	(3)	287	178	445
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	25	57	25	57	82
TOTAL	436	300	506	195	228	146	202	80	25 (33)	57 (12)	1430	790	2220

COLLEGE OF COMMERCE

Business Administration	98	20	87	21	101	8	89	6	(9)	(1)	384	56	440
Accounting	47	7	51	5	40	10	47	.....	(3)	(2)	188	24	212
Special .....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	1	3	4
TOTAL	145	27	138	26	141	18	136	6	1 (12)	3 (3)	573	83	656

COLLEGE OF EDUCATION

Music Education	7	19	9	14	7	8	4	5	(1)	(1)	28	47	75
Physical Education (Men)	26	.....	32	.....	30	.....	31	.....	(2)	.....	121	.....	121
Physical Education (Women) .....	.....	12	.....	17	.....	12	.....	9	.....	(2)	.....	52	52
Art Education .....	.....	.....	4	2	.....	1	1	3	.....	(1)	5	7	12
Elementary Education	3	85	5	141	1	117	3	113	.....	(13)	12	469	481
Secondary Education	20	40	43	61	51	35	56	38	.....	(3)	170	177	347
TOTAL	56	156	93	235	89	173	95	168	(3)	(20)	336	752	1088

COLLEGE OF ENGINEERING

Agricultural Engineering	20	.....	12	.....	14	.....	12	.....	(2)	.....	60	.....	60
Chemical Engineering	37	.....	29	1	16	.....	28	.....	(1)	.....	111	1	112
Civil Engineering	46	.....	46	.....	32	.....	31	1	(1)	.....	156	1	157
Electrical Engineering	104	.....	111	.....	91	.....	67	.....	(3)	.....	376	.....	376
Industrial Engineering	10	.....	15	.....	6	.....	10	.....	.....	.....	41	.....	41
Mechanical Engineering	87	.....	61	.....	50	.....	43	.....	(2)	.....	243	.....	243
Nuclear Engineering	34	.....	37	.....	32	.....	30	.....	(1)	.....	134	.....	134
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	5	2	5	2	7
TOTAL	338	.....	311	1	241	.....	221	1	5 (10)	2	1126	4	1130

Tabulation for Second Semester 1963-64—Concluded

COLLEGE OF HOME ECONOMICS

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Home Economics.....		157		183	3	111	1	91		(11)	4	553	557
Dietetics and Inst. Mngt.....		7		11		9		10				37	37
Home Economics and Journalism.....		8		8		6		3				25	25
Home Economics and Nursing.....		38		23		4						65	65
Restaurant Management.....	2		2	1	1		4	2	(1)	(1)	10	4	14
Home Ec. with Liberal Arts.....		11		10		7		7				35	35
Special Students.....									1	5	1	5	6
TOTAL.....	2	221	2	236	4	137	5	113	1 (1)	5 (12)	15	724	739

COLLEGE OF VETERINARY MEDICINE

Veterinary Medicine.....	74	3	72	2	59	2	53	3			258	10	268
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	Fresh- men 1st year		Sopho- mores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Total Undergraduate.....	1255	718	1369	697	986	479	899	373	160	7	39 (70)	75 (48)	4778	2397	7175
Graduate School.....													865	246	1111
Evening on Campus.....													210	109	319
TOTAL.....													5853	2752	8605

COLLEGE OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture.....	26	4	18		16		10		(2)		72	4	76
Agricultural Education.....	2		1		3		2				8		8
Bakery Management.....			2						(1)		3		3
Biochemistry.....						1						1	1
Dairy Manufacturing.....	1		1								2		2
Feed Technology.....	1		5		4		2				12		12
Milling Technology.....	3				3		1				7		7
Special Students.....									2	6	2	6	8
TOTAL.....	33	4	27		26	1	15		2 (3)	6	106	11	117

Architectural Engineering	3	2	2	1					8	8
Architecture	11	19	16	1	21	18			85	86
Landscape Architecture	2	3	3						8	8
TOTAL	16	24	21	1	22	18			101	102

Biological Science.....	6	5	9	1	7	8	6	(1)	(2)	29	16	45
Humanities.....	6	22	5	16	6	33	10	5	(1)	(6)	28	82	110
Physical Science.....	12	5	17	1	15	6	16	2	(1)	61	14	75
Social Science.....	13	15	13	7	19	6	9	2	(2)	(1)	56	31	87
Professional and Pre-Professional	42	29	55	25	28	12	11	4	(4)	(5)	140	75	215
General.....	30	27	12	6	3	1	3	1	(4)	(2)	52	37	89
Special Students.....	56	117	56	117	173
TOTAL.....	109	103	111	56	78	66	55	14	56 (13)	117 (16)	422	372	794

Business Administration.....	20	6	16	8	31	3	43	2	(1).....	111	19	130
Accounting.....	6	7	9	4	14	2	14	1	(2).....	45	14	59
Special.....	2.....	7	2	9
TOTAL.....	26	13	25	12	45	5	57	3	2 (3)	7	158	198

Art Education.....		2	1	1		2			(1)		2	5	7
Elementary Education.....	1	44	1	43	1	61	4	58		(4)	7	210	217
Secondary Education.....	6	16	8	23	13	21	11	8			38	68	106
TOTAL.....	7	62	10	67	14	84	15	66	(1)	(4)	47	283	330

Agricultural Engineering.....	1	1	2				4	4
Chemical Engineering.....	10	4	1	2			16	17
Civil Engineering.....	8	5	8	11	(1)		33	33
Electrical Engineering.....	16	21	21	16	(2)		76	76
Industrial Engineering.....	4	1	3	4			12	12
Mechanical Engineering.....	14	11	13	9			47	47
Nuclear Engineering.....	8	11	17	9			45	45
Special Students.....					6		6	6
TOTAL.....	61	54	1 64	51	6 (3)		239	1 240

Home Economics.....		54		49	1	37		13		(3)	1	156	157
Dietetics and Inst. Mngt.....		2		3		3		3				11	11
Home Economics and Journalism.....		1		1		3		1				6	6
Home Economics and Nursing.....		31		12		1				(1)		45	45
Restaurant Management.....	1		1								2		2
Home Ec. with Liberal Arts.....		5		3		2		3				13	13
Special Students.....								2		8	2	8	10
TOTAL.....	1	93	1	68	1	46		20	2	8 (4)	5	239	244

Veterinary Medicine.....	5	2	2							9	9
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Tabulation for Summer School 1964—Concluded

	Freshmen 1st year		Sophomores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Total Undergraduate.....	253	274	252	204	254	203	217	103	20	....	68 (23)	138 (24)	1087	947	2034
Graduate School.....	....	....	....	....	....	....	....	....	....	....	....	....	878	379	1257
Evening on Campus.....	....	....	....	....	....	....	....	....	....	....	....	....	109	48	157
TOTAL.....	....	....	....	....	....	....	....	....	....	....	....	....	2074	1374	3448

NEW AND DIFFERENT STUDENTS ENROLLED AT
KANSAS STATE UNIVERSITY

First, Second Semester and Summer School, 1963-64

Freshmen.....	2,491
Sophomores.....	2,283
Juniors.....	1,630
Seniors.....	1,646
5th and 6th Years.....	175
Special and Provisional.....	441
Graduate.....	2,032
Total.....	10,698

Tabulation for First Semester 1964-65

COLLEGE OF AGRICULTURE

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture.....	178	9	119	4	96	1	88	2	(4)	(1)	485	17	502
Agricultural Economics.....	16		21		23		25				85		85
Agricultural Education.....	32		15		18		28				93		93
Bakery Management.....	9		5				2				16		16
Dairy Manufacturing.....	6		3	1	6		1				16	1	17
Feed Technology.....	11	1	13		21	1	16				61	2	63
Milling Technology.....	9		12		6	1	12		(1)		40	1	41
Special Students.....									4	7	4	7	11
TOTAL.....	261	10	188	5	170	3	172	2	4 (5)	7 (1)	800	28	828

COLLEGE OF ARCHITECTURE AND DESIGN

	Fresh- men 1st year		Sopho- mores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Architectural Engineering.....	25	1	25		15		7	1	4				76	2	78
Architecture.....	110	4	82	2	75	1	48		42	1	(3)		360	8	368
Landscape Architecture.....	9	1	10		13		18	1					50	2	52
TOTAL.....	144	6	117	2	103	1	73	2	46	1	(3)		486	12	498

COLLEGE OF ARTS AND SCIENCES

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Biological Science.....	49	13	25	6	41	13	47	11	(4)	(2)	166	45	211
Humanities.....	31	74	28	49	19	61	17	47		(1)	95	232	327
Physical Science.....	68	23	41	10	56	15	51	19	(1)	(1)	217	68	285
Social Science.....	62	53	39	32	54	25	55	13		(3)	210	126	336
Professional and Pre-Professional General.....	301	110	296	77	117	66	86	40	(13)		813	293	1106
Special Students.....	181	142	118	61	29	20	17	2	(3)	(3)	348	228	576
									34	61	34	61	95
TOTAL.....	692	415	547	235	316	200	273	132	34 (21)	61 (10)	1883	1053	2936

COLLEGE OF COMMERCE

Business Administration.....	105	30	128	24	95	12	101	7	(3)	(1)	432	74	506
Accounting.....	51	15	56	11	42	4	48	7	(1)		198	37	235
Special Students.....									3	3	3	3	6
TOTAL.....	156	45	184	35	137	16	149	14	3 (4)	3 (1)	633	114	747

COLLEGE OF EDUCATION

Elementary Education.....	4	130	3	129	10	134	2	134		(3)	19	530	549
Secondary Education.....	57	56	27	62	51	59	69	43	(2)	(3)	206	223	429
Art.....		6	3	5	3	3	6	6			12	20	32
Business.....		5		11	3	17	1	6			4	39	43
English and Journalism.....	4	17	3	15	1	9	2	12		(2)	10	55	65
Industrial Arts.....	4		3				9		(1)		20		20
Mathematics.....	14	6	7	8	6	8	7	5			34	27	61
Modern Language.....		3	1	3		3		4	(1)		2	13	15
Psychology.....	1	1		1		1		1			1	4	5
Science.....	6	1	3	4	15	7	9	3			33	15	48
Social Science.....	18	7	6	9	16	3	27	5			67	24	91
Speech.....	1	3		3	1	5	3	1		(1)	5	13	18
General.....	9	7	1	3	3	3	5				18	13	31
Special Students.....										3		3	3
TOTAL.....	61	186	30	191	61	193	71	177	(2)	3 (6)	225	756	981

Tabulation for First Semester 1964-65—Concluded

COLLEGE OF ENGINEERING

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agricultural Engineering.....	21	.....	15	.....	14	.....	16	.....	.....	.....	66	.....	66
Chemical Engineering.....	37	.....	23	1	10	.....	29	.....	.....	.....	99	1	100
Civil Engineering.....	48	2	37	1	34	.....	39	.....	(3)	.....	161	3	164
Electrical Engineering.....	117	.....	99	.....	85	.....	116	.....	(4)	.....	422	.....	422
Industrial Engineering.....	20	.....	8	.....	10	.....	13	.....	.....	.....	51	.....	51
Mechanical Engineering.....	80	.....	63	.....	61	.....	55	.....	.....	.....	259	.....	259
Nuclear Engineering.....	35	.....	33	.....	33	.....	38	.....	.....	.....	139	.....	139
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	5	.....	5
TOTAL.....	358	2	278	2	248	.....	306	.....	5 (7)	.....	1202	4	1206

COLLEGE OF HOME ECONOMICS

Home Economics.....	1	265	.....	176	1	212	1	112	1	(6)	3	713	716
Dietetics and Inst. Mngt.....	.....	14	.....	1	1	8	.....	8	.....	(1)	1	31	32
Home Economics and Journalism.....	.....	14	.....	7	.....	4	.....	8	.....	(1)	.....	34	34
Home Economics and Nursing.....	.....	54	.....	30	.....	6	.....	.....	.....	(1)	.....	91	91
Restaurant Management.....	3	.....	1	.....	2	.....	1	.....	.....	.....	7	.....	7
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	1	8	1	8	9
TOTAL.....	4	351	1	214	4	168	2	128	2	8 (9)	12	877	889

COLLEGE OF VETERINARY MEDICINE

Veterinary Medicine.....	75	5	70	3	72	20	60	2	277	12	289
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	Fresh- men 1st year		Sopho- mores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Undergraduate.....	1676	1015	1345	684	1114	586	1116	458	178	5	47 (42)	82 (26)	5518	2856	8374
Graduate School.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	980	280	1260
Evening on Campus.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160	116	276
TOTAL.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6658	3252	9910

Tabulation for Second Semester 1964-65

COLLEGE OF AGRICULTURE

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture.....	175	16	109	5	92	1	61	2	(8)	(1)	445	25	470
Agricultural Economics.....	31		29		22		19				101		101
Agricultural Education.....	33		22		22		19		(2)		101		101
Bakery Management.....	8		5				2				15		15
Dairy Manufacturing.....	7	1	3	1	8		1				19	2	21
Feed Technology.....	12		13		21	1	11		(1)		58	1	59
Milling Technology.....	8		10		5	1	10		(1)		34	1	35
Special Students.....									4	4	4	4	8
TOTAL.....	277	17	191	6	170	3	123	2	4 (12)	4 (1)	777	33	810

COLLEGE OF ARCHITECTURE AND DESIGN

	Fresh- men 1st year		Sopho- mores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Architectural Engineering.....	22		18		15		9	1	3		(1)		68	1	69
Architecture.....	110	4	74	2	71	1	50		28	1	(1)		334	8	342
Landscape Architecture.....	10	1	12		15		16		1		(1)		55	1	56
TOTAL.....	142	5	104	2	101	1	75	1	32	1	(3)		457	10	467

COLLEGE OF ARTS AND SCIENCES

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Biological Science.....	48	9	30	2	46	13	33	7	(3)		160	31	191
Humanities.....	28	71	26	64	19	64	17	34	(1)	(2)	91	235	326
Physical Science.....	71	22	41	8	58	13	49	7	(2)	(1)	221	51	272
Social Science.....	62	51	57	26	48	27	53	12	(3)	(2)	223	118	341
Professional and Pre-Professional	265	95	285	67	112	60	78	32	(13)	1 (3)	753	258	1011
General.....	186	125	94	37	19	13	14	2	(4)	(3)	317	181	498
Special Students.....									28	38	28	37	66
TOTAL.....	660	374	533	204	302	190	244	94	28 (26)	39 (11)	1793	912	2705

COLLEGE OF COMMERCE

Business Administration.....	101	23	121	17	99	7	78	6	(13)	(2)	412	55	467
Accounting.....	52	15	60	14	42	4	39	7	(5)		198	40	238
Special Students.....									6	3	6	3	9
TOTAL.....	153	38	181	31	141	11	117	13	6 (18)	3 (2)	616	98	714

COLLEGE OF EDUCATION

Elementary Education.....	4	144	4	153	12	152	3	104	(2)	(9)	25	562	587
Secondary Education.....	52	51	41	72	61	57	60	35	(3)	(5)	217	20	437
Art.....	1	4	2	6	4	1	6	2		(1)	13	14	27
Business.....		4		19	5	17	1	5	(1)	(1)	7	46	53
English and Journalism.....	3	15	7	15	3	11	4	11	(1)	(2)	18	54	72
Industrial Arts.....	4		6		4		9				23		23
Mathematics.....	14	7	3	6	6	6	4	3	(1)		28	22	50
Modern Language.....	1	3	2	2	1	4		2			4	11	15
Psychology.....	2	1	3	1		1		1			5	4	9
Science.....	5	1	9	4	15	5	10	3		(1)	39	14	53
Social Science.....	15	4	7	10	18	4	22	7			62	25	87
Speech.....	1	7	1	7	2	5	1	1			5	20	25
General.....	6	5	1	2	3	3	3				13	10	23
Special Students.....									1	8	1	8	9
TOTAL.....	56	195	45	225	73	209	63	139	1 (5)	8 (14)	243	790	1033

Tabulation for Second Semester 1964-65—Concluded

COLLEGE OF ENGINEERING

	Freshmen		Sophomores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agricultural Engineering.....	13		13		15		14				55		55
Chemical Engineering.....	31	1	19		11		27	1	(1)		89	2	91
Civil Engineering.....	38		36	1	35		35		(4)		148	1	149
Electrical Engineering.....	104		86		86		100				376		376
Industrial Engineering.....	20		9		11		10		(1)		51		51
Mechanical Engineering.....	65		58		56		42		(2)	(1)	223	1	224
Nuclear Engineering.....	34		27		33		26				120		120
Special Students.....									5		5		5
TOTAL.....	305	1	248	1	247		254	1	5 (8)	(1)	1067	4	1071

COLLEGE OF HOME ECONOMICS

Home Economics.....	1	249		175	1	136	1	97	(1)	(5)	4	662	666
Dietetics and Inst. Mngt.....		4		10		7		8	(1)		2	29	31
Home Economics and Journalism.....		12		5		4		6				27	27
Home Economics and Nursing.....		47		26		5				(2)		80	80
Restaurant Management.....	3		1		3	1					7	1	8
Special Students.....										10		10	10
TOTAL.....	4	312	1	216	4	153	1	111	(2)	10 (7)	13	809	822

COLLEGE OF VETERINARY MEDICINE

Veterinary Medicine.....	74	4	69	2	74	2	61	2			278	10	288
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	Freshmen 1st year		Sophomores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Undergraduate.....	1597	942	1303	685	1113	571	946	363	167	5	44 (74)	63 (36)	5244	2665	7909
Graduate School.....													991	268	1259
Evening on Campus.....													245	113	359
TOTAL.....													6480	3046	9526

Tabulation for Summer School 1965

COLLEGE OF AGRICULTURE

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture.....	16	5	10	.....	13	.....	14	1	.....	1	50	7	57
Agricultural Economics.....	1	.....	3	.....	2	.....	3	.....	.....	.....	9	.....	9
Agricultural Education.....	4	.....	2	.....	4	.....	3	.....	.....	.....	13	.....	13
Bakery Management.....	1	.....	1	.....	.....	.....	1	.....	.....	.....	3	.....	3
Dairy Manufacturing.....	2	.....	.....	.....	3	.....	1	.....	.....	.....	6	.....	6
Feed Technology.....	7	.....	2	.....	2	.....	4	.....	.....	.....	15	.....	15
Milling Technology.....	.....	.....	1	.....	1	.....	2	.....	.....	.....	4	.....	4
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	1
TOTAL.....	31	5	19	.....	25	.....	25	1	1	1	101	7	108

COLLEGE OF ARCHITECTURE AND DESIGN

	Fresh- men 1st year		Sopho- mores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Architectural Engineering.....	4	.....	1	.....	.....	.....	6	1	.....	.....	.....	.....	11	1	12
Architecture.....	19	2	12	.....	18	.....	21	.....	5	1	.....	.....	75	3	78
Landscape Architecture.....	1	.....	3	.....	5	.....	12	.....	1	.....	.....	.....	22	.....	22
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4	.....	4
TOTAL.....	24	2	16	.....	23	.....	39	1	6	1	4	.....	112	4	116

COLLEGE OF ARTS AND SCIENCES

	Freshmen		Sopho- mores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Biological Science.....	2	3	6	1	11	5	3	1	(2)	.....	24	10	34
Humanities.....	8	27	8	18	5	19	6	4	(1)	.....	28	68	96
Physical Science.....	17	8	8	2	21	6	20	2	.....	.....	66	18	84
Social Science.....	12	12	14	9	15	11	9	2	.....	(1)	50	35	85
Professional and Pre-Professional	59	31	45	20	25	16	16	5	(2)	.....	147	72	219
General.....	33	54	8	3	4	2	2	2	.....	(3)	47	64	111
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	40	104	40	104	144
TOTAL.....	131	135	89	53	81	59	56	16	50 (5)	104 (4)	402	371	773

COLLEGE OF COMMERCE

Business Administration.....	16	5	18	4	18	3	28	2	(2)	(1)	82	15	97
Accounting.....	5	5	5	4	12	1	7	.....	.....	.....	29	10	39
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	5	5	10
TOTAL.....	21	10	23	8	30	4	35	2	5 (2)	5 (1)	116	30	146

COLLEGE OF EDUCATION

Elementary Education.....	1	50	3	40	7	70	4	36	.....	(7)	15	203	218
Secondary Education.....	9	25	7	25	28	26	12	6	(1)	(1)	57	83	140
Art.....	.....	3	.....	2	.....	.....	1	1	.....	.....	3	6	9
Business.....	.....	5	.....	7	.....	7	.....	1	.....	.....	3	20	23
English and Journalism.....	1	9	1	6	2	6	1	1	(1)	.....	5	22	27
Industrial Arts.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	4	.....	4
Mathematics.....	4	4	1	3	1	1	2	.....	.....	.....	8	8	16
Modern Language.....	2	1	1	.....	2	2	.....	.....	(1)	.....	5	4	9
Psychology.....	.....	1	.....	.....	.....	2	.....	.....	.....	.....	.....	3	3
Science.....	.....	.....	1	3	8	3	2	1	.....	.....	11	7	18
Social Science.....	2	.....	1	.....	7	3	5	2	.....	.....	15	5	20
Speech.....	.....	2	1	3	1	1	.....	.....	.....	.....	2	6	8
General.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	1	2	3
Special Students.....	.....	.....	.....	.....	.....	.....	.....	.....	4	24	4	24	28
TOTAL.....	10	75	10	65	35	96	16	42	4 (2)	24 (8)	76	310	386

Tabulation for Summer School 1965—Concluded

COLLEGE OF ENGINEERING

	Freshmen		Sophomores		Juniors		Seniors		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agricultural Engineering.....			1		1		1				3		3
Chemical Engineering.....	10		8		6		5				29		29
Civil Engineering.....	4		6		6		7		(1)		24		24
Electrical Engineering.....	21		18		20		29				88		88
Industrial Engineering.....	5		3		2		6		(1)		17		17
Mechanical Engineering.....	9		16		13		12				50		50
Nuclear Engineering.....	12		10		14		3		(1)		40		40
Special Students.....									3		3		3
TOTAL.....	61		62		62		63		3 (3)		254		254

COLLEGE OF HOME ECONOMICS

Home Economics.....	1	79		47		58	1	15		(1)	2	200	202
Dietetics and Inst. Mngt.....		2		3				2		(1)		13	13
Home Economics and Journalism.....		3		1		3						7	7
Home Economics and Nursing.....		26		15		2						43	43
Restaurant Management.....	1										1		1
Special Students.....									10			10	10
TOTAL.....	2	110		66		68	1	17		10 (2)	3	273	276

COLLEGE OF VETERINARY MEDICINE

Veterinary Medicine.....	9	1	1	1							10	2	12
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SUMMARY

	Freshmen 1st year		Sophomores 2nd year		Juniors 3rd year		Seniors 4th year		5th and 6th years		(Prov.) Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	M	W	
Undergraduate.....	280	337	219	192	265	228	236	80	6	1	57 (11)	144 (15)	1074	997	2071
Graduate.....													981	364	1345
Evening College.....													76	27	103
TOTAL.....													2131	1388	3519

NEW AND DIFFERENT STUDENTS ENROLLED AT
KANSAS STATE UNIVERSITY

First, Second Semester and Summer School, 1964-65

Freshmen.....	3,256
Sophomores.....	2,317
Juniors.....	1,841
Seniors.....	1,626
5th and 6th Years.....	41
Special and Provisional.....	352
Graduate.....	2,258
Total.....	11,771

Record of Enrollment and Degrees Conferred, 1863-1965

YEAR	Summer school	Housekeepers' short course	Dairy Mfg. short course	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshman	Vocational school	Freshman	Sophomore	Junior	Senior	Graduate	Counted twice	Net total	Degrees granted
1863-'64								92			14						106	
1864-'65								91			14	8	1				114	
1865-'66								99			21	3	5				127	
1866-'67								118			11	7	1	5			142	5
1867-'68								103			6	5	1				115	1
1868-'69								137			10	10	2		1		160	
1869-'70								119			10	12	1				142	
1870-'71								118			13	5	4	5			145	10
1871-'72								129			20	11	3	5	2	2	168	4
1872-'73																	173	3
1873-'74								137			24	14	3	6			184	5
1874-'75								103			26	10	2	2			143	3
1875-'76																	238	5
1876-'77																	232	10
1877-'78								75			42	23	5	5			152	4
1878-'79							1				89	89	16	12			214	11
1879-'80							1				166	61	35	11	2		276	9
1880-'81							6				178	48	24	9	2		267	8
1881-'82							5				227	50	19	11			312	11
1882-'83							4				241	60	30	12			347	15
1883-'84							2				255	92	26	18	2		395	17
1884-'85							2				271	71	36	16	5		401	15
1885-'86							1				273	91	35	24	4		428	23
1886-'87											303	100	44	24	10		481	26
1887-'88											305	92	46	27	2		472	23
1888-'89											266	103	41	28	7		445	26
1889-'90							1				307	105	63	28	10		514	29
1890-'91											343	135	50	53	12		593	54
1891-'92											336	139	62	37	10		584	35
1892-'93											339	110	66	43	29		587	48
1893-'94											275	141	72	42	25		555	45
1894-'95							5				276	108	89	64	39		572	60
1895-'96							3				353	121	67	71	32		647	71
1896-'97							6	67			321	163	69	62	46		734	63
1897-'98				6		9	15	77			316	174	77	82	57	10	803	79
1898-'99				26		35	40	110			306	177	92	65	40	21	871	63
1899-1900		24		57	47	50	32	162			376	163	109	69	27	22	1094	61
1900-'01		47		72	109	79	23	318			348	183	80	74	40	52	1321	69
1901-'02		41		66	125	87	19	298			396	206	120	65	32	59	1396	55
1902-'03		63		38	123	78	36	342			471	229	141	86	24	57	1574	55
1903-'04	17	51		16	122	72	33	443			403	206	161	114	20	36	1605	103
1904-'05	15	88		24	99	12	30	500			289	198	122	117	26	43	1462	109
1905-'06	18	92		28	118		46	598			373	214	145	110	30	64	1690	100
1906-'07	18	134		23	179		48	144	511		411	269	149	133	24	88	1937	124
1907-'08	29	188		26	173		42	134	528		450	357	202	148	26	82	2192	120
1908-'09	25	168		18	197		42	134	521		491	381	243	171	28	86	2308	151
1909-'10	22	152	4	111	124		87	89	453		456	417	286	170	26	70	2305	146
1910-'11	31	160	9	26	285		107		364		533	412	288	248	34	59	2407	207
1911-'12	94	160	14		280		85		580		337	461	283	261	44	81	2523	236
1912-'13	282	175	11		289		129		654		444	432	355	268	55	166	2928	234
1913-'14	370	149	12		223		112			658	516	431	324	327	64	159	3027	291
1914-'15	472	127	18		199	98	120			560	575	368	383	321	48	200	3089	229
1915-'16	536	85	17		207	188	175			484	605	454	305	491	76	219	3314	359
1916-'17	586	103	14		228	191	172			422	693	471	378	282	68	279	3339	210
1917-'18	481	84		8	119	135	138			231	483	349	294	238	36	190	2406	233
1918-'19	519	25	5		160	400	199			216	810	322	254	201	34	144	2991	174
1919-'20	415	57	3	6	117	362	271			224	894	400	297	273	44	167	3376	271
1920-'21	604	30	10		96	278	270	8		280	878	602	318	273	42	294	3395	263
1921-'22	820	19	10		59	173	221			297	931	628	422	296	125	813	3560	300
1922-'23	884	19	8		55	83	163	12		220	1004	656	460	401	118	457	3626	372
1923-'24	978	12	7		43	57	161	3		167	1160	657	458	413	171	475	3812	385
1924-'25	1120	14	14		55	54	139	5		47	1391	679	467	347	185	486	4031	388
1925-'26	947	12	11		41	29	89				1494	725	512	344	182	384	4019	392
1926-'27	959		18		52		71		19		1311	854	509	411	179	300	4083	434
1927-'28	966		20		57		88		7		1039	819	584	500	167	418	3878	498
1928-'29	920		18		51		57		9		1084	743	584	537	197	321	3879	545
1929-'30	902		13		59		70		9		1128	787	581	554	*432	548	3987	560
1930-'31	995		24		52		50		7		1077	790	605	528	506	589	4045	515
1931-'32	1059		12		29		54				933	752	633	572	572	688	3928	605
1932-'33	995						72				666	596	552	590	518	630	3350	641
1933-'34	655						61				707	558	520	522	327	422	2928	493
1934-'35	722						52				1081	616	548	557	316	456	3436	522

Record of Enrollment and Degrees Conferred, 1863-1965—Concluded

YEAR	Summer school	Housekeepers' short course	Dairy Mfg. short course	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshman	Vocational school	Freshman	Sophomore	Junior	Senior	Graduate	Counted twice	Net total	Degrees granted
1935-'36 ...	989	.....	.....	.....	.....	.....	69	.....	.....	.....	1330	820	660	574	391	572	4261	550
1936-'37 ...	917	.....	.....	.....	.....	.....	64	.....	.....	.....	1326	947	774	623	440	634	4457	611
1937-'38 ...	890	.....	.....	.....	.....	.....	67	.....	.....	.....	1297	972	810	787	409	537	4695	729
1938-'39 ...	911	.....	.....	.....	.....	.....	61	.....	.....	.....	1246	959	864	855	463	559	4800	806
1939-'40 ...	920	.....	.....	.....	.....	.....	61	.....	.....	.....	1306	958	926	871	490	622	4910	789
1940-'41 ...	935	.....	.....	.....	.....	.....	40	.....	.....	.....	1284	969	905	900	524	655	4902	819
1941-'42 ...	880	.....	.....	.....	.....	.....	17	.....	.....	.....	1274	926	807	748	417	590	4479	685
1942-'43 ...	1178	.....	.....	.....	.....	.....	21	.....	.....	.....	1234	717	587	717	253	846	3861	674
1943-'44† ...	1181	.....	.....	.....	.....	.....	21	.....	.....	.....	1234	717	587	717	217	888	3786	.....
1943-'44 ...	911	.....	.....	.....	.....	.....	18	.....	.....	.....	483	371	312	440	193	619	2109	418
1944-'45 ...	881	.....	.....	.....	.....	.....	48	.....	.....	.....	601	383	289	260	196	594	2064	288
1945-'46 ...	2785	.....	.....	.....	.....	.....	227	.....	.....	.....	1730	771	524	468	331	1784	5052	519
1946-'47 ...	2859	.....	.....	.....	.....	.....	183	.....	.....	.....	3453	1910	1019	856	333	2849	7814	881
1947-'48 ...	2446	.....	.....	.....	.....	.....	97	.....	.....	.....	2100	2325	1595	1123	456	1976	8166	1106
1948-'49† ...	2246	.....	.....	.....	.....	.....	64	.....	.....	.....	1883	1768	1927	1753	550	1825	8366	1666
1949-'50 ...	1808	.....	.....	.....	.....	.....	44	.....	.....	.....	1941	1692	1512	1952	775	82	7834	2121
1950-'51 ...	1582	.....	.....	.....	.....	.....	42	.....	.....	.....	1802	1487	1263	1446	850	58	6867	1643
1951-'52 ...	1043	.....	.....	.....	.....	.....	36	.....	.....	.....	1670	1167	1026	1097	649	47	5598	1210
1952-'53 ...	1032	.....	.....	.....	.....	.....	47	.....	.....	.....	1987	1170	950	1009	650	82	5731	1116
1953-'54 ...	1246	.....	.....	.....	.....	.....	94	.....	.....	.....	1976	1287	916	960	759	62	5930	1098
1954-'55 ...	1513	.....	.....	.....	.....	.....	175	.....	.....	.....	1950	1501	825	1178	812	65	6376	1095
1955-'56 ...	1712	.....	.....	.....	.....	.....	154	.....	.....	.....	2025	1788	912	1411	912	77	7125	1181
1956-'57 ...	1796	.....	.....	.....	.....	.....	164	.....	.....	.....	1939	1912	1519	1308	894	.....	7735	1346
1957-'58 ...	1973	.....	.....	.....	.....	.....	185	.....	.....	.....	1838	1767	1595	1584	1077	.....	8046	1615
1958-'59 ...	2008	.....	.....	.....	.....	.....	251	.....	.....	.....	1814	1626	1473	1576	1188	.....	7928	1731
1959-'60 ...	2135	.....	.....	.....	.....	.....	274	.....	.....	.....	1827	1681	1447	1494	1342	.....	8065	1533
1960-'61 ...	2460	.....	.....	.....	.....	.....	327	.....	.....	.....	2197	1692	1466	1541	1517	.....	8740	1620
1961-'62 ...	2724	.....	.....	.....	.....	.....	364	.....	.....	.....	2363	1871	1517	1486	1634	.....	9235	1521
1962-'63 ...	2930	.....	.....	.....	.....	.....	378	.....	.....	.....	2775	1986	1625	1649	1845	...	10258	1628
1963-'64 ...	3448	.....	.....	.....	.....	.....	441	.....	.....	.....	2491	2283	1639	1821	2032	.....	10698	1707
1964-'65 ...	3519	.....	.....	.....	.....	.....	352	.....	.....	.....	3256	2317	1841	1667	2258	.....	11771	1791

° Figures above this column include neither graduate students in summer session, nor undergraduate students pursuing undergraduate work.

† Beginning with this year this summary is made at the close of the summer session instead of at the close of the spring semester as before.

‡ Beginning with this year, summer school students are included under the captions: Special, Freshman, Sophomore, Junior, Senior, and Graduate.



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