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**KANSAS
STATE
UNIVERSITY
BULLETIN**

general catalog

1964-1966

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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, 1964-65

- Sept. 1, Tues. Beginning of pay period for 9-months staff.
Sept. 7, Mon. Holiday—Labor Day.
Sept. 13, 3:00 p.m., Sun. Convocation for new students and their parents.
Sept. 14-16, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
Sept. 17, Thurs. Classes begin. Late enrollment fee, \$2.50.
Sept. 19, 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. 26, Noon, Sat. Last day to enroll without special permission from student's dean (2nd week).
Oct. 7, Wed. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
Oct. 31, Noon, Sat. Deficiency reports due in deans' offices (7th week).
Nov. 14, Noon, Sat. Last day for new freshmen and new transfer students to drop courses without a Wd or failure being recorded (9th week).
Nov. 24, 10 p.m., Tues. Thanksgiving student recess begins.
Nov. 26, Thurs. Holiday—Thanksgiving Day.
Nov. 30, Mon. Classes resume.
Dec. 19, Noon, Sat. Christmas student recess begins.
Dec. 25, Fri. University holiday for Christmas Day.
Jan. 1, Fri. University holiday for New Year's Day.
Jan. 4, Mon. Classes resume.
Jan. 16, Noon, Sat. Last day subject may be dropped before end of semester.
Jan. 25-29, 8:00 a.m. Mon.-9:00 p.m. Fri. Semester examinations for all students.
Feb. 1, 12:00 Noon, Mon. Grade reports to Registrar.
Feb. 3, 8:00 a.m., Wed. Reports of failures from Registrar to deans' offices.

SECOND SEMESTER, 1964-65

- Feb. 4-6, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
Feb. 8, Mon. Classes begin. Late enrollment fee, \$2.50.
Feb. 13, 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.
Feb. 20, Sat. Last day to enroll without special permission from student's dean (2nd week).
Feb. 27, Sat. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
Mar. 27, Noon, Sat. Deficiency reports due in deans' offices (7th week).
April 10, Noon, Sat. Last day for new freshmen and new transfer students to drop courses without a Wd or failure being recorded (9th week). Spring student recess begins.
April 19, Mon. Classes resume.
May 22, Noon, Sat. Last day a subject may be dropped before end of semester.
May 31-June 4, 8:00 a.m. Mon.-9:00 p.m. Fri. Semester examinations for all students except graduating seniors.
May 31, Noon, Mon. Grades to Registrar for all candidates for degrees.
June 3, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
June 6, 2:30 p.m., Sun. Commencement, Fieldhouse.
June 7, 5:00 p.m., Mon. Grade reports to Registrar.
June 10, 8:00 a.m., Thurs. Reports of failures from Registrar to deans' offices.

8-WEEK SUMMER SESSION, 1965

- June 14, 8:00 a.m., Mon. Registration of all students including physical examinations, testing, and orientation for new students.
June 15, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
June 19, Noon, Sat. 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 25, 5:00 p.m., Fri. Last day for dropping courses without a Wd or failure being recorded (9th class day), except for new students.
July 5, Mon. Holiday—Independence Day.
July 9, 5:00 p.m., Fri. Deficiency reports due in deans' offices (4th week).
July 17, Noon, Sat. Last day for new freshmen and new transfer students to drop courses without a Wd or failure being recorded (5th week).
Aug. 3, 4:00 p.m., Tues. Last day subject may be dropped before end of session.
Aug. 6, 5:00 p.m., Friday. Last day for examinations.
Aug. 7, Noon, Sat. Grade reports to Registrar.

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

CALENDAR (Continued)

FIRST SEMESTER, 1965-66

- Sept. 1, Wed. Beginning of pay period for 9-months staff.
 Sept. 6, Mon. Holiday—Labor Day.
 Sept. 12, 3:00 p.m., Sun. Convocation for new students and their parents.
 Sept. 13-15, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
 Sept. 16, Thurs. Classes begin. Late enrollment fee, \$2.50.
 Sept. 18, 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. 25, Sat. Last day to enroll without special permission from student's dean (2nd week).
 Oct. 6, Wed. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
 Oct. 30, Noon, Sat. Deficiency reports due in deans' offices (7th week).
 Nov. 13, Noon, Sat. Last day for new freshmen and new transfer students to drop courses without a Wd or failure being recorded (9th week).
 Nov. 23, 10:00 p.m., Tues. Thanksgiving student recess begins.
 Nov. 25, Thurs. Holiday—Thanksgiving Day.
 Nov. 29, Mon. Classes resume.
 Dec. 18, Noon, Sat. Christmas student recess begins.
 Dec. 25, Sat. Holiday—Christmas Day.
 Jan. 1, Sat. Holiday—New Year's Day.
 Jan. 3, Mon. Classes resume.
 Jan. 15, Noon, Sat. Last day subject may be dropped before end of semester.
 Jan. 26-30, 8:00 a.m. Mon.-9:00 p.m. Fri. Semester examinations for all students including candidates for degrees.
 Jan. 31, 5:00 p.m., Mon. Grade reports to Registrar for all students including candidates for degrees.
 Feb. 2, 8:00 a.m., Wed. Deficiency reports from Registrar to deans' offices.

SECOND SEMESTER, 1965-66

- Feb. 3-5, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
 Feb. 7, Mon. Classes begin. Late enrollment fee, \$2.50.
 Feb. 12, 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.
 Feb. 19, Sat. Last day to enroll without special permission from student's dean (2nd week).
 Feb. 26, Noon, Sat. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
 Mar. 26, Noon, Sat. Deficiency reports due in deans' offices (7th week).
 Apr. 2, Noon, Sat. Spring student recess begins (following the 9th week).
 Apr. 11, Mon. Classes resume.
 Apr. 16, Noon, Sat. Last day for new freshmen and new transfer students to drop courses without a Wd or failure being recorded (9th week).
 May 21, Noon, Sat. Last day a subject may be dropped before end of semester.
 May 30-June 3, 8:00 a.m. Mon.-9:00 p.m. Fri. Semester examinations for all students except graduating seniors.
 May 30, Noon, Mon. Grades to Registrar for all candidates for degrees.
 June 2, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
 June 4-5, Commencement weekend.
 June 6, 5:00 p.m., Mon. Grade reports to Registrar.
 June 9, 8:00 a.m., Thurs. Deficiency reports from Registrar to deans' offices.

8-WEEK SUMMER SESSION, 1966

- June 13, 8:00 a.m., Mon. Registration of all students including physical examinations, testing, and orientation for new students.
 June 14, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
 June 18, Noon, Sat. 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 24, 5:00 p.m., Fri. Last day for dropping courses without a Wd or failure being recorded (9th class day), except for new students.
 July 4, Mon. Holiday—Independence Day.
 July 8, 5:00 p.m., Fri. Deficiency reports due in deans' offices (4th week).
 July 16, Noon, Sat. Last day for new freshmen and new transfer students to drop courses without a Wd or failure being recorded (5th week).
 Aug. 2, 4:00 p.m., Tues. Last day subject may be dropped before end of session.
 Aug. 5, 5:00 p.m., Fri. Last day for examinations.
 Aug. 6, Noon, Sat. Grade reports to Registrar.

NOTE: Registration for short courses will be announced in the Summer School Catalog for the individual courses. Registration in each case is the morning of 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 153 acres carefully landscaped, while beyond the campus there are 3,853 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 4,408 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 53.
 - (Agricultural Economics major), page 53.
 - (Agricultural Journalism major), page 53.
 - (Agricultural Mechanization major), page 53.
 - (Agronomy major), page 53.
 - (Animal Husbandry major), page 54.
 - (Dairy Science major), page 54.
 - (Entomology major), page 54.
 - (Horticulture major), page 54.
 - (Plant Pathology major), page 55.
 - (Poultry Science major), page 55.
- (E) Agricultural Education (Teachers), B. S. in Agriculture, page 56.
- (E) Bakery Management, B. S. in Bakery Management, page 57.
 - (Administration option), page 57.
 - (Science option), page 57.
 - (Operations option), page 57.
- (E) Biochemistry, B. S. in Biochemistry, page 60.
- (E) Dairy Manufacturing, B. S. in Agriculture, page 61.
- (E) Feed Technology, B. S. in Feed Technology, page 58.
 - (Administration option), page 58.
 - (Chemistry option), page 58.
 - (Operations option), page 58.
- (E) Milling Technology, B. S. in Milling Technology, page 59.
 - (Administration option), page 59.
 - (Chemistry option), page 59.
 - (Operations option), page 59.

IN THE COLLEGE OF ARCHITECTURE AND DESIGN

- (F) Architecture (five years), Bachelor of Architecture, page 95.
- (F) Architectural Engineering, B. S. in Architectural Engineering, page 96.
- (G) Landscape Architecture, B. S. in Landscape Architecture, page 97.

IN THE COLLEGE OF ARTS AND SCIENCES

- (A) Applied Music, Bachelor of Music, page 117.
- (E) Biological Sciences (including Pre-veterinary), Bachelor of Science, page 108.
- (D) General (Biological Sciences major), Bachelor of Arts, page 114.
- (E) General (Physical Sciences, Pre-medicine, Pre-dentistry majors), Bachelor of Arts, page 114.
- (A) General (Social Sciences, Humanities majors), Bachelor of Arts, page 114.
- (A) Humanities, Bachelor of Arts, page 116.
- (A) Music Education, Bachelor of Science in Music Education, page 110.
- (A) Physical Education, Bachelor of Science in Physical Education, page 167.
- (E) Physical Sciences, Bachelor of Science, page 118.
- (B) Social Sciences, Bachelor of Arts, page 119.

IN THE SCHOOL OF EDUCATION

- (A) Art Education, Bachelor of Science, pages 110-111.
- (A) Elementary Education, Bachelor of Science in Elementary Education, page 112.
- (A) Secondary Education, Bachelor of Science, page 113.

IN THE COLLEGE OF COMMERCE

- (E) Business Administration, B. S. in Business Administration, page 209.
- (E) Accounting, B. S. in Business Administration, page 212.

IN THE COLLEGE OF ENGINEERING

- (F) Agricultural Engineering, B. S. in Agricultural Engineering, page 222.
- (F) Chemical Engineering, B. S. in Chemical Engineering, page 223.
- (F) Civil Engineering, B. S. in Civil Engineering, page 224.
- (F) Electrical Engineering, B. S. in Electrical Engineering, page 225.
(In connection with second degree in Business Administration),
page 230.
- (F) Industrial Engineering, B. S. in Industrial Engineering, page 226.
- (F) Mechanical Engineering, B. S. in Mechanical Engineering, page 227.
(Aeronautical option), page 228.
(Environmental option), page 228.
(Design option), page 228.
(Petroleum Production option), page 228.
- (F) Nuclear Engineering, B. S. in Nuclear Engineering, page 229.
(Option I), page 230.
(Option II), page 230.

IN THE COLLEGE OF HOME ECONOMICS

- (C) Home Economics with options. B. S. in Home Economics, page 266.
(Art, Costume Design, Interior Decoration, Teaching Art,
Crafts), page 268.
(Clothing Retailing, Designing, Textiles Research), page 269.
(Family and Child Development with Community Services,
Nursery School Teaching), page 269.
(Family Economics, Homemaking, Family Economics and
Finance, Household Equipment, Housing, and Home Man-
agement), page 270.
(Foods and Nutrition in Business, Research), page 271.
(Home Economics Agent in Extension), page 267.
(Home Economics Secondary Education—Vocational), page 267.
(Home Economics Secondary Education—Non-vocational only),
page 267.
(Radio and Television in Home Economics), page 271.
- (C) Dietetics and Institutional Management, B. S. in Home Economics,
page 273.
- (C) Home Economics and Journalism, B. S. in Home Economics and
Journalism, page 275.
- (C) Home Economics with Liberal Arts, B. S. in Home Economics, page
272.
- (C) Home Economics and Nursing, B. S. in Home Economics, page 276.
- (C) Restaurant Management, B. S. in Restaurant Management, page 274.

IN THE COLLEGE OF VETERINARY MEDICINE

Veterinary Medicine, Doctor of Veterinary Medicine, page 290.

(For completion of six-year combination of pre-veterinary cur-
riculum and veterinary medicine curriculum)

(See College of Arts and Sciences for B. S. degree in connection
with College of Veterinary Medicine.)

Second degree—For a second bachelor's degree, an additional year of
not fewer than 30 semester hours is required. The work is in charge of
the dean who administers the curriculum chosen.

Admission

All correspondence about admission to Kansas State University should be addressed to the Dean of Admissions. Students may be enrolled at Kansas State for the fall semester in September, for the spring semester in February, and for the summer session in June.

The summer session is especially recommended to recent high school graduates and other students who wish to accelerate their progress toward a degree. New students are able to become acquainted with the campus, the faculty, college life, college requirements, and to establish good study habits during this period. Summer session courses are also planned for those students who wish to meet special educational needs such as prerequisite courses in mathematics for engineering and of those teachers and others who are unable to attend during the fall and spring semesters.

High School Graduates

A graduate of any Kansas high school or academy accredited by the State Board of Education will be admitted to Kansas State University. A graduate of an accredited high school or academy in another state will be considered for admission if his record is good and if his American College Test scores indicate that he is capable of doing successful college work.

The student should complete the application form, indicate the curriculum in which he plans to enroll and return it to the Dean of Admissions. Prospective graduate students write to the Dean of the Graduate School.

If the undergraduate applicant is a high school graduate when the application for admission is received, the Dean of Admissions will request a transcript from the high school principal. Upon receipt of the transcript, the Dean of Admissions will notify the student of his admission status and advise him of any deficiencies for the curriculum in which he wishes to enroll. He will also advise the student of the date, hour, and place that he should be present to begin the semester or summer session.

Students in high school are encouraged to apply for admission during their senior year. Upon receipt of an application for admission from a senior in high school, the Dean of Admissions will send the student a provisional acceptance. Near the close of the student's senior year, the Dean of Admissions will request a transcript from the high school principal. As soon as a satisfactory transcript is received the student will be sent registration instructions.

Kansas students who are high school graduates should complete the American College Testing Program Battery. Entrance examinations will be given to eligible students who are deficient in high school units. Applications for such examinations must be made in advance to the Dean of Admissions.

Any graduate of an accredited Kansas high school will be admitted to Kansas State University; however, he should have completed certain high school courses including three units of English and one unit of either general science, biological science, or physical science. Additionally, for a specific degree curriculum, he should have completed other courses as indicated by the various capital letters. These correspond to the previous section on Undergraduate Degrees, 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.

Although a high school graduate will be admitted to the University if he lacks some of these requirements, he must make up any prerequisites in his first year of enrollment. Students lacking required units

will not be advanced in classification until the deficiency is removed. College credit is not granted for subjects taken to make up mathematics deficiencies.

A student lacking one-half or one required unit of biological or physical science will be held for two or four hours of college science in addition to the science required in his curriculum. For these hours he may be given elective credit toward graduation, except in curriculums in the College of Engineering and the College of Architecture and Design.

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, 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.

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 18.)

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.

High School Non-graduates

Under certain circumstances, outstanding students may be admitted prior to high school graduation. To be considered for such admission the student must have the recommendation of his high school principal, the approval of his parents, and the recommendations of the dean of the college he wishes to enter and the Dean of Admissions. Additional testing and interviewing are required. For details non-graduates should write the Dean of Admissions.

Students with Advanced Credit

Most credits from other accredited colleges and universities are transferable to Kansas State University.

On a regular application form a student with advanced credit must not only state the curriculum he plans to follow, but must also list all other institutions in which he has been enrolled. He must ask these institutions to send an official and complete transcript of his records to the Dean of Admissions. A separate transcript must be furnished from each college previously attended. If fees are charged for such transcripts, the applicant must make necessary arrangements with his former institutions.

When the transcripts have been evaluated, a copy of the evaluation will be sent to the student. Students without an approved evaluation must satisfy the admissions committee before registering. If their records are not completely satisfactory, they may be enrolled provisionally at the option of the committee.

The committee cannot act on transcripts received later than one week before the date of registration.

Transcripts of record must be sent to the Dean of Admissions directly from the institutions issuing them. Others will not be accepted.

Transfer students are expected to have a 2.0 (C) average in their previous academic work in order to be considered for admission to the University.

Junior Colleges

Credit earned in an accredited junior college is accepted by Kansas State University and applied to satisfy up to one-half of the course requirements of the curriculum chosen. Students who plan their program carefully and continue successfully without a change of objective can proceed without loss of time or credit. Students contemplating transfer are urged to contact the University early for advisement and to work closely with their junior college adviser in program planning.

A list of Kansas junior colleges which are accredited by the State Department of Education may be secured from that office.

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.

Special Students

A special student is not one regularly enrolled in work for a degree. He may, however, on completing entrance requirements and with the consent of his dean, become a regular student.

Because experience and maturity often compensate for lack of scholastic attainment, the University admits as special students men and women over 21 years of age who cannot meet the regular entrance requirements. The age limit does not apply to special students in music.

Special students must give evidence of satisfactory preparation for the course they wish to take, and present transcripts of record of their preliminary education.

Special students are subject to regulations for regular students, payment of all fees, regular attendance at classes, maintenance of satisfactory standing, and as a rule assignment to physical education and military training.

The University will give special consideration to students who apply for admission as special students on the basis of experience gained in service in the Armed Forces. (See "Veterans of the Armed Forces," page 14.)

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.)

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.

Testing and Pre-enrollment

Each new undergraduate enrollee of the University is required to complete testing to measure aptitude and achievement traits of prospective students. It is expected that entering freshmen will have completed the American College Test Battery as seniors in high school. The tests do not affect a Kansas applicant's admission status but are used to obtain information that is helpful in advising matriculated students. These tests are given to freshmen enrolling in Kansas State University for the first time during the freshman orientation period. Opportunity is provided also for prospective students to take aptitude and other required freshman tests at the Manhattan campus by appointment during the summer prior to their beginning college in September. Students who take these tests are not required to repeat them during their enrollment period. Students who come to the University campus during the summer confer with University staff members concerning the results of the tests and the choice of a curriculum. All parts of the enrollment may be completed in advance so that only the fee remains to be paid when the student appears on the campus in the fall. This opportunity to pre-enroll does not mean that a student cannot take his tests and enroll at the regular scheduled time in the fall.

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.

Freshman Advising Program

Each freshman 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.

Required Physical Examinations

All new students are required to take a physical examination at the time of registration for physical education and ROTC participation. The Board of Regents and the University require a chest examination.

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.

Veterans of the Armed Forces

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.

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.

A veteran who was in the United States Armed Forces between the dates June 27, 1950, and January 31, 1955, may be entitled to educational benefits. All educational benefits for veterans cease 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, Room 212, Anderson 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.

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 29.

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.).

Fees for Regular Semesters

For students enrolled in more than six semester credit hours.

	<i>Residents of Kansas and Staff Members</i>	<i>Non-residents of Kansas</i>	
		<i>Under- graduate</i>	<i>Graduate</i>
Incidental Fee			
All except Veterinary Medicine students	\$ 85.00	\$250.00	\$145.00
Veterinary Medicine students	95.60	260.00	145.00
Student Health	13.00	13.00	13.00
Student Union Building	4.00	4.00	4.00
Student Union Annex	3.50	3.50	3.50
Student Activities (including Union operations)	16.50	16.50	16.50
Totals—All except Veterinary Medicine students	<u>\$122.00</u>	<u>\$287.00</u>	<u>\$182.00</u>
Totals—Veterinary Medicine students	<u>\$132.00</u>	<u>\$297.00</u>	<u>\$182.00</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>	
		<i>Under- graduate</i>	<i>Graduate</i>
Incidental Fee per semester credit hour:			
All except Veterinary Medicine students	\$ 6.00	\$ 19.00	\$ 10.00
Veterinary Medicine students	7.00	20.00	10.00
Student Health	Not Elig.	Not Elig.	Not Elig.
Student Union Building	2.65	2.65	2.65
Student Union Annex	2.35	2.35	2.35
Student Activities (including Union operations)	2.00	2.00	2.00

For staff members enrolled in Graduate School.

Incidental Fee per semester credit hour \$ 6.00

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	3.50
Student Activities (including Union operations)	16.50

B. If enrolled in six semester credit hours or less:

Student Health	Not Elig.
Student Union Building	2.65
Student Union Annex	2.35
Student Activities (including Union operations)	2.00

Fees for Summer Sessions

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>	
		<i>Under- graduate</i>	<i>Graduate</i>
Per semester credit hour:			
Incidental Fee	\$ 6.00	\$ 19.00	\$ 10.00
Campus Privilege Fees	3.00	3.00	3.00
Total per semester credit hour	<u>\$ 9.00</u>	<u>\$ 22.00</u>	<u>\$ 13.00</u>

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. The following persons are considered as staff members for the purpose of fee assessment: Fellows, Fellow-Post-Doctoral, Graduate Assistants, Graduate Research Assistants, Research Assistants, Research Associates, Assistant Instructors, Instructors, Assistant Professors, Associate Professors, Professors, wives and dependent children of such persons, but not their husbands, and all classified civil service employees. Also, the wives and dependent children, but not husbands, of those classified employees who receive a monthly salary of at least \$415.00 (a salary at which classified employees automatically achieve classification in the administrative bracket).

Foreign Students. Those foreign students who are in this country on : temporary (non-immigrant) visa.

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 \$37.00, 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:

	<i>Amount of Refund</i>	
	<i>Regular semester</i>	<i>8-week summer session</i>
During the first week	100%	100%
During the second week	90%	75%
During the third week	80%	50%
During the fourth week	70%	no refund
During the fifth week	60%	no refund
During the sixth week	50%	no refund
After sixth 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 school term; 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.*

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 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 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 Department of Continuing Education, Division of Extension, see page 311.

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:

Sophomore
25

Junior
58

Senior
90

Fifth year student
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 Library

The Kansas State University Library's book collections serve the needs of all students and faculty for study and research. The Library consists of 350,000 cataloged volumes, plus periodicals, newspapers, maps, and other printed materials. They are housed in the Farrell Library building and in four branch libraries: the Willard Library for chemistry, the Physics Library, the Architecture Library, and the Veterinary Library. The Library follows a policy of open stacks for all students, believing that all students should have direct access to its resources.

The reference reading room contains a selected collection of the most-used reference works and is the service center for government publications. As a depository, the Library receives documents and other publications of the United States Government and of Kansas, as well as many publications of international agencies. The serials reading room contains current issues and unbound files of 6,230 periodicals and other serial publications, as well as publications of foreign governments and of states other than Kansas, including bulletins of state agricultural and engineering experiment stations. Selected local, national, and foreign newspapers are also available. The class reserves reading room provides convenient access to books which are required or suggested reading for specific courses. A special collection is maintained in the Library stacks for honors students.

Publications

University publications include the following:

General Catalog	President's Report	Agricultural Experiment
Student Catalog	Financial Report	Station Bulletins
Summer Catalog	Extension Bulletins	Engineering Experiment
Home Study Catalog		Station Bulletins

Student publications include these:

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

The Royal Purple—yearbook published annually.

The Student Directory—published annually.

The Kansas Agricultural Student—published six times during academic year.

The Kansas State Engineer—published monthly during academic year.

Alumni Association 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 where official interdepartmental mail is sorted and distributed to each building. Federal postal regulations prevent the postal center from handling unstamped mail which is not official University mail.

The Postal Center also contains a federal contract post office 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 and 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 17.

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 freshmen and beginning transfer 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 freshman or a beginning transfer 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 freshmen and beginning transfer 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 when a student may have further time at the discretion of the instructor to complete the required work.

Report of Grades

As shown on the academic calendar, deficiency reports of unsatisfactory work are reported 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, no semester grade is re-

ported 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 21.)

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 he 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. After dismissal from K. S. U., 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

* Students who entered prior to June 1, 1964, are continued under the previous policy.

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.

OPTIONAL ATTENDANCE

Undergraduate students other than freshmen or first-year students in architecture who earn a grade in a minimum of 15 semester hours in a semester with an average of 3.25 or above have the privilege of optional attendance for the succeeding semester. Instructors are not required to allow students to make up class work missed as a result of the exercise of this privilege. Abuse of the optional attendance privilege may result in loss of the privilege upon the recommendation of the instructor and at the discretion of the student's dean.

ABSENCE THE DAY BEFORE OR AFTER A HOLIDAY OR STUDENT RECESS

Instructors will not grant excuses to students to be absent 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 this 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 3.25 (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>Agricultural Student</i> journalism	1	4
<i>Kansas State Engineer</i> journalism	1	4
<i>K-Book</i> journalism (if not paid)	2	2
<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.

Bible Study

The University will accept no courses in sectarian religion but will accept courses in non-sectarian religion from accredited institutions when appropriate for use as electives. The University offers some courses of its own in non-sectarian religion in appropriate general fields such as history, philosophy, and English.

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 retraining. 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.

Office of the Dean of Students

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, Student Counseling Center, Placement Center, Student Health, Foreign Student, Student Religious Activities, and Student Organizations.

Office of the Associate Dean of Students and Dean of Women

The Associate Dean of Students (Dean of Women) is responsible primarily for the welfare of the women students on campus. She and the Assistant Dean of Women supervise the residence hall program which is designed to contribute to the academic and social development of the students. This office also is responsible for assisting students who live in sororities and in off-campus housing. The staff members serve as advisers to such organizations as the Social Coordinating Council, Associated Women Students, Women's Inter-dormitory Council and Off-campus Women. They work closely with housemothers and are available to assist faculty and students of any group in problems of program and administration.

University Housing Policy Office of Director of Housing

Believing that comfortable, wholesome, pleasant living conditions have a marked influence on a student's scholarship, habits, attitudes and ideals, 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 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.

Housing for Women

All *freshman* women live in University-operated residences for the entire year unless excused by the University Administration. The basis for excuse is (a) to live at home with parents, (b) to live with close relatives in Manhattan, (c) to commute from nearby communities (it is understood that if the weather or other circumstances at any time during the freshman year make it necessary or desirable for a girl to live in Manhattan she will move into a Residence Hall, unless again given permission to live outside), (d) marriage, (e) financial need. If a student needs to be excused from living in a Residence Hall for any of these reasons, other than living at home, she should present a formal request in writing with a statement signed by her parents that it is necessary for her to do this. The Associate Dean of Students assigns rooms for on-campus women students.

Upperclass women and transfer students who have had two semesters in an accredited college may live in University residence halls, off-campus houses approved by the University, or sorority houses.

Kansas State University has five University-operated residence halls, two Jardine Terrace apartment buildings, and a cooperative living unit. These house over 1,200 women students. The program in the residence halls is designed to contribute to the academic, social, and personal growth of the students. Competent directors are in charge of the halls.

Residence Halls. Boyd, Putnam, and Bessie West Halls house over 50 women students and are reserved for freshmen. Waltheim Hall is reserved for upperclass women and houses 80 students. Van Zile Hall (160 students) is used for either upperclass or freshman women. All of these halls rent for \$350.00 per semester for board and room if paid in advance; \$360.00 per semester if paid in three installments of \$100.00,

\$130.00 and \$130.00. All rates are subject to change. Contracts for board and room are made for the entire nine-months school year. The contract, in addition to space in a room, includes 20 meals per week, clean bed linens weekly, and free laundry privileges. Applications and further information are available at the Office of the Director of Housing, Kansas State University, Manhattan, Kansas.

Jardine Terrace Apartments. As the need for apartments for upper-class women arises, the University makes apartments in Jardine Terrace available to them. Four to five women are assigned to each apartment.

Smurthwaite. Smurthwaite House accommodates 62 women and is a cooperative living unit where the girls are responsible for their own cooking and much of the house management. Board and room charges are about \$50.00 a month. For further information write to the Associate Dean of Students, Kansas State University, Manhattan, Kansas.

Clovia. 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.

Sororities. There are 11 National Panhellenic sororities at Kansas State University, housing over 500 upperclass women. Membership in a sorority is by invitation. House bills in the sororities range from \$90.00 to \$97.00 a month, including room, board and sorority dues. Further information about sororities is available from the Faculty Adviser to Sororities, Office of the Associate Dean of Students, Kansas State University, Manhattan, Kansas.

Off-campus. There are several off-campus rooming houses and apartments that have been approved by the University for upperclass women. Room rentals range from \$15.00 to \$30.00 a month. Apartments rent from \$50.00 to \$100.00 per month. The Housing Office in Room 212, Anderson Hall, keeps a card file of rooms and apartments that are available in private homes in Manhattan. It is necessary that students who wish to live off campus visit Manhattan and personally select their own housing. Listings change too rapidly to be of use by mail.

For further information, write to the Housing Office, Kansas State University.

Housing for Men

The University has three residence halls and two scholarship houses which house 1,440 men students. Hall residents have many opportunities for participation in student government, intramural sports, and social activities. A competent director is in charge of each hall.

Residence Halls. Goodnow Hall and the New Men's Residence Hall have accommodations for 600 students each while West Stadium has accommodations for 150 students. The rent in Goodnow and the New Men's Residence Hall is \$350.00 per semester for board and room if paid in advance; \$360.00 per semester if paid in three installments of \$100.00, \$130.00 and \$130.00. In West Stadium Hall the rent is \$300.00 per semester for board and room if paid in advance; \$310.00 per semester if paid in three installments of \$100.00, \$105.00 and \$105.00. All rates are subject to change. Contracts for board and room are made for the entire nine-months school year. The contract, in addition to space in a room, includes 20 meals per week, clean bed linens weekly, and free laundry privileges. Applications and further information are available at the Housing Office, Kansas State University, Manhattan, Kansas.

Scholarship Houses. Maitland E. Smith Memorial Scholarship House and Oscar N. Straube Memorial Scholarship House are available for outstanding men who are in need of financial assistance. The cost to the students is approximately \$48.00 per month plus one hour of work each day for board and room. The residents do their own cooking and much of the house management. Address your inquiries to the Director of Aids and Awards, Kansas State University, Manhattan, Kansas.

Fraternities. Kansas State fraternities house over 1,200 students. Any student who wishes may attend fraternity Rush Week. Membership in a fraternity is by invitation. House bills in the fraternities range from \$80.00 to \$90.00 a month, including room, board, and dues. For further information write to the Faculty Adviser to Fraternities, Office of Dean of Students, Kansas State University, Manhattan, Kansas.

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 \$20.00 to \$25.00 a month for one person to a room and \$15.00 to \$20.00 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 a semester. This includes 17 meals per week.

Housing for Families

Jardine Terrace. In Jardine Terrace there are 576 apartments available for married students. These are University-operated apartments costing \$65.00 for a one-bedroom apartment and \$70.00 for a two-bedroom apartment. This includes furnishings. Rates are subject to change. Applications and information are available at the Housing Office, Kansas State University, Manhattan, Kansas.

North Campus Courts. Fifty-two parking places for privately owned modern mobile homes are available for \$20.00 per month in North Campus Courts. No trailers more than 45 feet in length can be accommodated. The rental includes sewer, water, and utilities. Rates are subject to change at any time.

Off-campus. Off-campus apartment listings are available at the Housing Office, Room 212, Anderson Hall. Listings are not mailed, since they change too rapidly to be of use by mail. Apartments rent from \$50.00 to \$100.00 per month, depending upon the size of the family and the facilities required.

Information

For further information, write for the housing brochure "Living at Kansas State University." Address your inquiries to the Director of Housing, Anderson Hall, Kansas State University, Manhattan, Kansas.

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, twenty-five meeting areas, banquet and party rooms, recreation facilities (bowling, billiards, table tennis, etc.), a little theater, and the Student Activities Center. In addition, there are lounges, a browsing library, an information desk, and a supplies store. 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 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 Y-Orpheum. All students are invited to apply for membership on one of these committees.

Counseling Center

Most students find the services of the Counseling Center to be useful to them. A staff of counseling psychologists is 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 self-defeating attitudes of inferiority. 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. In most instances, students are able to resolve their concerns and to make changes in themselves through a process of self-analysis and understanding. Counselors contribute to the student's efforts in several ways—by providing a warm and accepting environment, a completely confidential setting, an outsider's view of the situation, or perhaps some relevant objective information. This information may include the results 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.

Emphasis is placed on the ultimate responsibility of the student for conducting his own life and making the most of it. Counselors do not make decisions for a student nor do they "solve" his problems for him in any other way. 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 from the counselor.

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 227 Anderson Hall.

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, re-

sorts, public agencies, agriculture, and industry are made available. Extensive 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.

Student Health Center

The University has a new Student Health Center completed November, 1959. It is supported by student health fees. Full-time physicians are on duty, with an adequate medical supporting staff to care for the students. The hospital has a capacity of 40 beds.

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 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. Such treatment includes 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.

The staff provides medical care for serious illness and emergencies through the emergency room which is available after the regular clinic hours. Home calls are not covered by the Student Health program.

The 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.

The hospital will be closed during the summer session, but the clinic is open at the regular hours, and a physician is "on call" at other times. Patients who need hospital care are hospitalized at one of the local hospitals under the care of the Student Health Center physician.

At the Student Health Center there is no fee for the physician's services but a charge is made for medication, laboratory procedures, X-rays, physical therapy, etc. The charge for hospitalization will be at a reduced rate up to 21 days. Beyond 21 days the charges will be reasonable and comparable to those of other Kansas hospitals.

Hospital insurance plans may be used at the Student Health Center. The use of such plans will be discussed with the patient, since the variation in coverage makes firm statements of cost difficult.

There is a special Blue Cross policy available to students only, at a special rate. The plan supplements the coverage now 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, since illness is unpredictable.

A complete medical examination is required of each new student. This is a ruling of the State Board of Regents. This examination should be done by the family medical doctor and the report on the physical examination form furnished should be sent to the Student Health Center before enrolling.

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 and Reserve Officer Training.

Physical examinations required by agencies outside of the University are given only on authorization of the Director, and an additional charge is made for such examinations.

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. His office helps to promote contacts between foreign students and American student groups, faculty and community. Contacts are maintained with national and governmental agencies having to do with the exchange of students between countries. He is also concerned with providing information to American students about opportunities for studying abroad.

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.

On the campus there are two memorial chapels—Danforth and All-Faith. These chapels 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 Department of Philosophy. Credit courses in religion are offered in the departments of English 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
Church of Christ (Alpha Iota Club)	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)	YWCA
Lutheran, National Lutheran Council (Lutheran Student Association)	

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 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.

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.

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
Vice-President	College Councils	Chancellor
Cabinet	Committees	Justices
Appointed Officers		

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	Deutscher Verein
Agricultural Economics Club	Entomology Club
Agricultural Education Club	Extension Club
Block and Bridle (Animal Husbandry)	Geography Club
Botany Club	Graduate Students Association
Chancery Club (Pre-Law)	Horticulture Club
Dairy Science Club	Kappa Iota Sigma (Sociology)

Departmental (Continued)

Klod and Kernel Klub (Agronomy)	Political Science Club
Mathematics Club	Poultry Science Club
Milling Association	Pre-Veterinary Medical Club
Phems (Women's Physical Education)	Student Education Association
Philosophy Club	Williston Geology Club
Plow and Pen Club	

Student Government

All-College Councils	International Coordinating Council
Associated Women Students	Junior Panhellenic Council
Board of Student Publications	Panhellenic Council
Interdorm Council	Student Governing Association
Interfraternity Council	Union Governing Board
Interfraternity Pledge Council	

Professional

American Chemical Society	American Veterinary Medical Association
American Guild of Organists	Clinic Club
American Home Economics Association	Institute of Aerospace Sciences
American Institute of Architects	Kappa Alpha Mu (Photo Journalism)
American Institute of Chemical Engineers	Music Educators National Conference (MENC)
American Institute of Electrical and Electronics Engineers	Phi Delta Kappa (Men's Education)
American Institute of Industrial Engineers	Phi Mu Alpha (Men's Music)
American Institute of Physics	Phi Upsilon Omicron (Home Economics)
American Nuclear Society	Sigma Delta Chi (Men's Journalism)
American Society of Agricultural Engineers	Society of American Military Engineers
American Society of Civil Engineers	Soil Conservation Society of America
American Society of Mechanical Engineers	Steel Ring (Engineering)
	Student Society of Landscape Architects

Honorary

Arnold Air Society	Kappa Delta Pi (Education)
Blue Key (Senior Men)	Mortar Board (Senior Women)
Chi Epsilon (Civil Engineering Honors Committee)	Mu Phi Epsilon (Women, Music)
Chimes (Junior Women)	Omicron Delta Epsilon (Economics)
Delta Phi Delta (Art)	Phi Delta Gamma (Graduate Women)
Delta Sigma Rho (Debate)	Pi Epsilon Delta (Dramatics)
Gamma Sigma Delta (Agriculture)	Scabbard and Blade (Cadet ROTC Officers)
	Sigma Alpha Eta (Speech Therapy)

Scholastic Honorary

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

Interest Groups (Membership Open)

Alpha Phi Omega (Scouting)	Intramurals, All Sports
Amateur Radio Club	Judo Club
Arab-American Club	K-State Players (Drama)
Astronomy Club	Masonic Club
Chaparajos Club	Off-Campus Women
Chinese Student Association	Peace Corps
Circle K	People to People
Collegiate 4-H	Sports Car Club
Dames Club	Women's Pep Club
Flying Club	Young Democrats
Forensic Union	Young Republicans
Independent Student Association	

Interest Groups (Membership Selected)

Agricultural Judging Teams	K-Steppers (Twirlers)
Angel Flight	Orchesis (Dance)
Cheerleaders	Pershing Rifles (Military)
Court of Chevaliers	Radio Workshop
Frog Club	Soccer Club
Future Farmers of America	Statesmen (Men's Pep)
India Association	Television Workshop
Iraqi Students Society	Touchstone (Student Magazine)
K-State Union Committees	Varsity Rifle Team

Home Economics Interest Groups

Art	Journalism
Clothing and Textiles	Nursing
Extension	Professional Foods
Family and Child Development	Teaching

Music Interest Groups

A Cappella Choir	Jazz Workshop Ensemble
Band	K-State Singers
All-Men's Marching	Madrigal Ensemble
Basketball Pep	Men's Glee
Concert	Apollo
Varsity	Varsity
Ensembles	Oratorio Choir
Brass, Percussion	Orchestra
String, Woodwind	Women's Glee

Religious

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 (Newman Club)	Mormon (Reorganized Latter Day Saints; Liahona Fellowship)
Chinese Christian Fellowship	Religious Council
Church of Christ (Alpha Iota)	United Campus Christian Fellowship
Episcopal (Canterbury Association)	Christian
Friends (Quaker)	Evangelical United Brethren
Islamic Association	Presbyterian
Jewish (B'nai B'rith Hillel Foundation)	United Church of Christ
Kansas State Christian Fellowship (Inter- Varsity Christian Fellowship)	YWCA
Lutheran, Missouri Synod (Gamma Delta)	
Lutheran, National Lutheran Council (Lutheran Student Association)	

Sororities and Fraternities

There are 25 Greek letter fraternities for men at Kansas State University and 11 national sororities for women. Sororities and fraternities offer excellent living accommodations and a social program to their members. Membership in all of these organizations is by invitation.

Booklets describing social sororities and fraternities and setting forth the provisions regulating selection of new members are provided to all prospective students by the Interfraternity Council and the Panhellenic Council. Additional information about sororities may be obtained from the Faculty Adviser to Sororities and about fraternities from the Faculty Adviser to Fraternities.

SORORITIES

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.

FRATERNITIES

Acacia, Alpha Epsilon Pi, 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 Kappa Tau, Phi Kappa Theta, Pi Kappa Alpha, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon, Theta Xi, Triangle.

Independent Student Association

The Independent Student Association is a social and service organization open to all students not actively affiliated with a social fraternity or sorority. The executive council of ISA is composed of the elective officers, standing committee chairmen, and representatives of the dormitories and independent organized houses.

Athletics

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 University of Colorado, Iowa State University, University of Kansas, University of Missouri, University of Nebraska, University of Oklahoma, and Oklahoma State University.

Kansas State participates in all intercollegiate sports on the Conference program. Varsity competition is open to all male students and supervised by a staff of coaches who are specialists.

Intercollegiate athletics is conducted at Kansas State University to provide:

- (1) A recreational and physical education program for approximately 400 students trying out for the various teams;
- (2) Laboratory work for those specializing in physical education;
- (3) Recreation for non-participating students, faculty, and alumni;
- (4) A stimulus to the intramural and other physical education programs;
- (5) An educational experience which, to both participants and non-participants, is not duplicated in other lines of collegiate endeavor. Included in this experience are: (a) Sacrificing personal pleasure to the general welfare, as participants undergo the strict self-discipline and training necessary to attain the physical fitness required for success in these competitive activities. (b) Developing a spirit of self-reliance from competition in such team sports as football, baseball, and basketball, and in participation in sports such as track (indoor and outdoor), cross-country, tennis, wrestling and golf, in which the player must rely principally upon himself. (c) Engendering his spirit of loyalty to coaches and fellow players that is exemplified in "teamwork." (d) Developing a devotion to the University as a whole, greater than that to any group within it. (e) Providing opportunities to both participants and non-participants, to develop a spirit of sportsmanship. (f) Promoting in players a sense of responsibility to the entire University which is judged by their conduct on or off the athletic court or field.

The Department of Physical Education sponsors a broad program of intramural athletics, supplementing intercollegiate athletics. Fraternities and independent clubs play full schedules to decide the championship in the various sports. Appropriate medals, plaques, and sweater awards are presented individual and team winners.

Under the auspices of the Women's Athletic Association, the women students of the University take part in a full intramural athletic program, with competent instruction by the faculty of the Department of Physical Education.

Aids and Awards

LOAN PROGRAM

Kansas State University has five loan funds. These are the Emergency Loan Fund, the University Student Loan Fund, the Alumni Association Loan Fund, the Endowment Loan Fund, and the National Defense Education Act Loan Fund. The University also participates in the United Student Aid Fund loan program.

All student loan funds are intended to assist needy and qualified students in attaining their educational goals.

Students interested in obtaining a student loan should write or visit the Aids and Awards Office, Room 119, Holtz Hall, Kansas State University, Manhattan, Kansas.

GENERAL ELIGIBILITY REQUIREMENTS

Only bona-fide full-time students enrolled in the University are eligible to use KSU loan funds. Full-time staff or full-time employees of the University who may be enrolled in college courses are not eligible.

The student must be in good academic standing.

Generally, the student must have completed one semester at Kansas State University. Major exceptions are:

- a. Graduating high school seniors who show excellent academic promise may apply for a National Defense Education Act Loan for their freshman year.

b. Freshman students may also apply for 30-day loans under the Emergency Loan Program.

The student must have an educational need for the loan. Applicants for long-term loans will furnish a budget for at least one complete session of schooling; if the loan is for a complete academic school year, the budget will show all known and estimated expenses and income for the year. Budgets must be realistic; all assistance from other sources, whether money or gifts, should be given a value and entered into the budget.

Scholarship Programs

Kansas State University has a fully developed scholarship program in which approximately 585 scholarships are awarded annually to both upperclassmen and incoming students.

Students desiring application blanks or information relative to scholarships should write to the Aids and Awards Office, Room 119, 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.

A complete listing of the scholarships available and pertinent information regarding them will be found in the Kansas State University Student Catalog.

Part-Time Jobs

Kansas State University employs more than 1,300 students each year. Many other part-time job opportunities are available in the Manhattan community. Any student who wants assistance in seeking a part-time job should visit the Aids and Awards Office, Room 119, Holtz Hall immediately after he arrives in Manhattan.

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 student 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

HAROLD HOWE, *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 designing, 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 degrees 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 College 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 seventeen 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 therefor 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 68 departments or fields, and the work leading to the degree Doctor of Philosophy in 25 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 exceeding \$4,000,000 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 has research projects in five colleges of the University. Students doing graduate work in any of the station's 18 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 departments in 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	Dairy Production	Landscape Architecture
Agricultural Economics	Education	Mathematics
Agricultural Education	Electrical Engineering	Mechanical Engineering
Agricultural Engineering	Entomology	Milling Industry
Agronomy (Crops and Soils)	Extension Education	Music
Anatomy	Family and Child Development	Nuclear Engineering
Animal Husbandry	Family Economics	Parasitology
Applied Mechanics	Farm Mechanics	Pathology
Architectural Engineering	Feed Technology	Physical Education
Bacteriology	Foods and Nutrition	Physical Science Teaching
Biochemistry	General Home Economics	Physics
Botany	Genetics	Physiology
Business Administration	Geography	Plant Pathology
Chemical Engineering	Geology	Poultry Science
Chemistry (Analytical, Inorganic, Organic, Physical)	Home Economics Education	Psychology
Civil Engineering	Horticulture	Statistics
Clothing and Textiles	Industrial Education	Surgery and Medicine
Dairy Manufacturing	Industrial Engineering	Technical Journalism
	Institutional Management	Zoology

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	
Geography	Philosophy	

Master of Architecture

Major work leading to the degree Master of Architecture is offered in architectural design, urban design and structural design.

Master of Regional Planning

Major work leading to the degree Master of Regional 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 fields of:

Agronomy	Economics	Milling Industry
Animal Breeding	Electronics (Electrical Engineering or Physics)	Nuclear Engineering
Animal Nutrition	English	Parasitology
Applied Mechanics	Entomology	Physics
Bacteriology	Foods and Nutrition	Plant Pathology
Biochemistry	Genetics	Psychology
Botany	Horticulture	Veterinary Medicine (Pathology ; Physiology)
Chemical Engineering	Mechanical Engineering	Zoology
Chemistry		

Minor work for this 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 office in planning the students' programs. Coordinating committees have been established for the Doctor of Philosophy in Animal Breeding, in Animal Nutrition, and in Genetics, for the Master of Science in Extension Education and in Physical Science Teaching and for the Master of Regional 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. 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 percent 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 Economics, Agricultural Engineering, Agronomy, Animal Husbandry, Applied Mechanics, Architecture, Art, Bacteriology, Biochemistry, Botany, Business Administration, Chemical Engineering, Chemistry, Civil Engineering, Clothing and Textiles, Dairy Science, Economics, Education, Electrical Engineering, English, Entomology, Family and Child Development, Family Economics, Flour and Feed Milling Industries, Foods and Nutrition, Genetics, Geography, Geology, History, Horticulture, Industrial Engineering, Institutional Management, Journalism, Landscape Architecture, Mathematics, Mechanical Engineering, Modern Languages, Music, Nuclear Engineering, Parasitology, Pathology and Physiology (Veterinary Medicine), Philosophy, Physical Education, Physics, Plant Pathology, Political Science, Poultry Science, Psychology, Regional 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. Admission to graduate study is granted on two bases: (1) Full standing and (2) provisional standing.

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; must have an undergraduate average of B or better in the junior and senior years; and must have had undergraduate training substantially equivalent to that given by this University in the specific subject-matter field in which the applicant expects to do graduate work. 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, who 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 by the registrars of these institutions directly to the appropriate department head. The application and transcripts should be filed with the department at least two 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, but only *one* copy of the transcript from each of the other institutions of higher learning attended is required. This transcript must be sent by the Registrar of the institution directly to the Dean of the Graduate School. 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.

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 the first registration, and at subsequent registration periods, it is necessary that the student present a proof ticket, signed previous to registration by the department head or major professor, on which are recorded a list of courses, line numbers and credit hours for the semester or summer session.

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 16.

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, with the consent of his dean and the Dean of the Graduate School, 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 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 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. Those who make grades of B or better in at least two-thirds of all graduate work for which a letter grade has been assigned will be in good standing. Those failing to meet the above requirement will be placed on probation. After being placed on probation, a graduate student who, at the end of any subsequent term, fails to achieve and maintain good standing will be automatically dismissed by the Dean of the Graduate School.

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. Approximately two-thirds of the student's time is devoted to his major subject and one-third to one or more minor subjects. The word "subject" is used to designate a recognized field

of study and is not defined by the limits of a department. For master's candidates, the nature and distribution of majors and minors within the program of study are approved by the Dean of the Graduate School, upon recommendation of the major instructor, the head of the major department and a representative from outside the area of major specialization. The number of credit hours to be devoted to the minor or minors is fixed between the limits of 6 and 12. For doctor's candidates, the approval 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 Planning degree must satisfactorily complete at least 60 hours of graduate work, including a master's thesis of approximately 12 semester hours.

A program of study must be filed with the Graduate School as soon as the advisory committee is satisfied that a suitable program can be formulated. Ordinarily this will be during the first semester in residence. 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 addition of courses to 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. Detailed specifications for thesis preparation may be obtained from 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 candidate for the master's degree is subject to an *oral examination* covering the thesis or report and his competence in his field by a committee selected from the instructors with whom major and minor work was taken, the head of the major department, the major instructor, and a representative of the Graduate Council who serves as committee chairman.

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 also demonstrate to an authorized representative of the Department of Modern Languages *a reading proficiency in two foreign languages in the literature of his special field*. The choice of these two languages must be approved by the candidate's supervisory committee and by the Graduate Council, and the language requirements 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 chosen by the Dean of the Graduate School consisting of not fewer than six members, representing the major and minor fields. This committee aids the student in the preparation of his program of study (which must be approved by the Dean of 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 preliminary examinations* in both his major and minor fields. An oral preliminary examination may be required by a department in addition to the written preliminary 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, at least one month before Commencement, the candidate is given the *final examination*.

Early in the graduate work a *dissertation* subject is chosen in the major field and approved by the supervisory committee. The finished thesis 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. Three complete typewritten copies of the dissertation approved by the supervisory committee shall be submitted to the Dean of the Graduate School at least one month before commencement. On completion of all requirements for the degree, two copies shall be placed in the University Library and the third copy filed with the head of the department in which major work is taken. Three copies of the dissertation shall be submitted to the Dean of the Graduate School at least one month before Commencement. 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

All students enrolled in the Graduate School are members of the Graduate Students Association. The objectives of the association are to promote acquaintance and fellowship among those enrolled in graduate work and to have representatives elected and authorized to speak and to act for the graduate students.

Phi Delta Gamma, national fraternity for graduate women, has a chapter on the campus. It is the only Greek letter organization whose membership is open to women of all professional interests. The purpose of Phi Delta Gamma is twofold: to promote the highest professional ideals among women of graduate schools, and to advance the social welfare and activities of women in graduate schools.

There are on the campus a large number of active *professional organizations* in which graduate students may participate. Under the heading are such organizations as the American Chemical Society and student branches of American engineering societies and institutes. There are also a large number of student *religious organizations* on the campus, into which gradu-

ate students are welcomed. Most of the churches of Manhattan have student clubs with programs specifically designed for university students.

In view of the many foreign students enrolled each year in the Graduate School, special mention should be made of the University's chapter of the Association of Cosmopolitan clubs in universities and colleges of America. Active membership in the Cosmopolitan Club consists of students of the United States as well as foreign students, both men and women. Objective of the club is to promote international understanding through friendship among students of various nationalities.

Residences and Living Costs

Some choice of accommodations is available to graduate students attending Kansas State University. Residence halls for single women are available to graduate students for the summer session only. The University operates new residence halls for men accommodating 1200 for board and room. Graduate students who desire to live with undergraduate students will be permitted residence in the halls; however, the contract is for the full nine-month period and may not be broken. The rate is \$350.00 per semester for board and room.

Many rooms and some apartments in private homes in Manhattan are listed with the University for single graduate students, both men and women.

The University operates 576 permanent dormitory apartments for married students. Only those who are married may apply for admission. The rent is \$65.00 for a one-bedroom apartment and \$70.00 for a two-bedroom apartment. This includes furniture and utilities with a 140-KWH minimum per month on electricity. A card file of apartments available off-campus in the city of Manhattan is kept in the Housing Office. For additional information, a prospective student should write to the Director of Housing. Women should write to the Associate Dean of Students.

Estimates of living costs for married students are difficult to make because of the wide variation in apartment rents and the requirements of a family.

Living costs for a single student have been estimated for one semester as follows:

Room	\$140.00
Board	325.00
Laundry and cleaning	35.00
Miscellaneous	<u>150.00</u>
Total per semester	\$650.00

Graduate Loans

Kansas State University has two major loan programs to assist graduate students in pursuing their degrees. The National Defense Education Act Loan program provides up to a maximum of \$5,000 at a rate of \$1,000 per year to full-time students. Prime consideration is given to those majoring in elementary and secondary education, the sciences, engineering, modern foreign languages and mathematics.

Each student must establish need. These loans bear no interest until one year after graduation or termination of formal education and then three per cent. From this date the repayment is scheduled in ten annual installments. Students entering the University with a satisfactory record may be considered for these loans.

The University has an Alumni loan fund which supplies needy students up to \$1,000 at three per cent interest payable from time loan is granted. Normally, these loans are not available to a graduate student until a graduate academic record has been established. A qualified co-signer is required and the maximum time allowed for repayment is three years from the date the loan is made.

Emergency loan funds are available on a short-term basis of thirty days repayment period, no interest, to meet emergency expenses. The maximum is \$100.00 except for University fees or interview trips. If interested in the loan programs, write the Director of Aids and Awards, Holtz Hall, Room 119.

K-State Union

The K-State Union is the headquarters for all students for meetings and out-of-class activities. A large Cafeteria and Snack Bar, a Games Area including bowling, billiards, and table tennis, numerous meeting rooms, a large ballroom, and a Student Activities Center are included in the facilities which will provide graduate students with a wide variety of activities. A master calendar, listing all events of interest to students, is located in the Activities Center and may be used by all students. Located just inside the main entrance is an Information Desk at which point students and visitors to the campus may get answers to their questions regarding the University and the Union.

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, Dairy Science 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: James V. Craig, H. T. Gier, G. B. Marion, Walter H. Smith, John D. Wheat, Stanley Wear-den, Keith Huston, Lewis T. Smith and Harold G. Spies, Chairman.

Animal Nutrition

Major work leading to the degree Doctor of Philosophy in Animal Nutrition is offered in the departments of Animal Husbandry, Dairy Science, 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 Richard-

son, Animal Husbandry, Chairman; E. E. Bartley, Dairy Science; D. B. Parrish, Biochemistry; Paul E. Sanford, Poultry Science; and G. K. L. Underbjerg, Physiology.

Extension Education

The School 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 Education 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 student 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.

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 Science, 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 H. Pittenger, Agronomy, Chairman; James V. Craig, Poultry Science; John Wheat, Animal Husbandry; Abraham Eisenstark, Bacteriology; Elizabeth McCracken, Botany; Keith Huston, Dairy Science; Stanley Wearden, Statistics; and Charles Hall, Horticulture.

Physical Science Teaching

The departments of Chemistry, Geology, Mathematics, Physics and 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 and Geography, Chairman; William G. Schrenk, Chemistry; John M. Marr, Mathematics; Basil Curnutte, Jr., Physics; and Russel G. Drumright, Education.

Regional Planning

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

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 coordinating committee for the program in Regional Planning: Emil C. Fischer, Architecture, Chairman; Donald D. White, City and Regional Planning; Louis H. Douglas, Political Science and Administration; Ralph E. Dakin, Economics and Sociology; Joseph R. Chelikowsky, Geology and Geography; Jack B. Blackburn, Civil Engineering; and Robert P. Ealy, Landscape Architecture.

Agriculture

GLENN H. BECK, *Dean*

As at other land-grant universities, agriculture at Kansas State University includes instruction, research, and extension, with county agents, branch experimental stations and experimental fields located at strategic locations in the state. Under the Dean of Agriculture are three administrators in charge of those three phases of work: the director of resident instruction, the director of the experiment station, and the director of extension.

The College of Agriculture

DUANE C. ACKER, *Director of Resident Instruction and Associate Dean*

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

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 being constructed.

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 advantages 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 (Director of Resident Instruction), becomes the student's degree requirement. All curriculums and majors require a minimum of 136 credits.

Curriculums and Majors in Agriculture

<i>Major or Curriculum</i>	<i>Options or Areas of Study</i>	<i>Major or Curriculum</i>	<i>Options or Areas of Study</i>
General		Agricultural Education	
Agricultural Economics	Bus. and Industries Science Production	Bakery Management	Administration Science Operations
Agricultural Journalism		Biochemistry	
Agricultural Mechanization	Bus. and Industries Science Production	Dairy Manufacturing	Administration Science Food Processing
Agronomy (crops and soils)	Bus. and Industries Science Production	Feed (Manufacturing) Technology	Administration Chemistry Operations
Animal Husbandry	Bus. and Industries Science Production	(Flour) Milling Technology	Administration Chemistry Operations
Dairy Production	Bus. and Industries Science Production		
Entomology	Bus. and Industries Science		
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, advisable if he feels he wants to enter some part of professional agriculture but is not yet ready to identify a particular branch. 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. A joint program may also be developed with the College of Commerce.

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, etc.

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	Plant Science	4
General Botany	4	Chemistry I	5
College Algebra	3	Plane Trigonometry	3
Economics I	3	Air or Military Science	1
Air or Military Science	1	Physical Education	0
Physical Education	0		
Total	16	Total	16

Example II:

FALL SEMESTER		SPRING SEMESTER	
English Composition I	3	English Composition II	3
Agriculture in Our Society	2	Plant Science	4
Chemistry I & II ¹	8	Elements of Organic Chemistry	3
College Algebra	3	Plane Trigonometry	3
General Botany	4	Soils	4
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	21	Total	18

Example III:

FALL SEMESTER		SPRING SEMESTER	
Agriculture in Our Society	2	Plant Science	4
Animal Sciences	4	English Composition I	3
General Botany	4	General Geology	3
College Algebra	3	Dairy Science	2
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	14	Total	13

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

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

FRESHMAN YEAR COURSES

English Composition I	3
English Composition II	3
Oral Communication	2
Agriculture in Our Society	2
College Algebra	3
Economics I	3
Chemistry I	5
Physical Education I	0
Physical Education II	0
Air or Military Science	1
Air or Military Science	1

ADDITIONAL REQUIREMENTS

Air or Military Science	1
Air or Military Science	1
Humanities (See list, p. 231)	6
Communications	2 or 3

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 55.

Agricultural Economics

MAJOR COURSES

Principles of Agricultural Economics	4
Agricultural Economics Summary	2
Selected others, see p. 55	

NON-MAJOR COURSES

Economics II	3
Principles of Accounting	3
Money and Banking	3

Agricultural Journalism

TECHNICAL JOURNALISM COURSES

Graphic Arts Survey	2
Typography Lab	1
Reporting II	3
Editing	2
News Photography	2
Principles of Advertising	3
Magazine Article Writing	2
Public Information Methods	2
Radio & TV News	2
Ag Student Journalism	4

PROFESSIONAL AGRICULTURE COURSES

A minimum of 12 hours must be taken in one of the following fields:
1. Agricultural Economics
2. Agronomy
3. Animal Husbandry
4. Dairy Science
5. Entomology
6. Flour & Feed Milling Industries
7. Horticulture
8. Poultry Science

Agricultural Mechanization

MAJOR COURSES

Farm Power	3
Agricultural Machinery	3
Farm Buildings Construction	3
Electricity in Agriculture	3
Drainage & Erosion Control	3
Irrigation Practices	3

PROFESSIONAL AGRICULTURE COURSES

A minimum of 12 hours must be taken in one of the following fields:
1. Agricultural Economics
2. Agronomy
3. Animal Husbandry
4. Dairy Science
5. Entomology
6. Horticulture
7. Poultry Science

Agronomy

MAJOR COURSES

Plant Science	4
Soils	4
Other courses listed on page 55	12 or more

NON-MAJOR COURSES

Chemistry II and Lab.	5
General Organic Chemistry	3
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	3
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		
Nutrition & Management of Farm Animals	4		
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 55		General Botany	4
		Other Botany or Plant Pathology	2 or 3
		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
		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
		Rural Sociology	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	General Zoology	4
Plant Science	4	Soils	4
Landscape Horticulture	3	Chemistry II	3
Principles of Fruit and Nut Growing I	3		
Vegetable Crops I	3		
Principles of Floriculture	3		

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

Plant Pathology

MAJOR COURSES

NON-MAJOR COURSES

General Botany	4
Plant Science	4
Plant Pathology	2
Morphology of the Fungi	3
Botanical Science	3

Soils	4
General Zoology	4
Genetics	3
Chemistry II and Lab.	5
General Organic Chemistry	5
General 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 Sciences	2
Poultry Science	2
Nutrition of the Fowl	3
Poultry and Dairy Cattle Genetics	4
Avian Metabolism	3
Poultry Products Technology	3
Poultry Judging	3
Poultry Management	3

To be developed in consultation with adviser.

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 Preceding Majors

	<i>Science</i>	<i>Business and Industries</i>	<i>Production</i>
AGRICULTURE			
Soils	4		
Plant Science	4		
Nutr. and Mngt. Farm Ani. or Animal Sciences Lab.	4	Two of the courses listed (Ent. and Pl. Path. majors exempt)	Two of the courses listed plus 6 credits in animal sciences (except for Hort. majors) and 6 credits in plant sciences
Prin. of Agr. Econ.	4		
Engg. in Agr.	4		
BIOLOGICAL SCIENCES			
General Botany	4		
General Zoology	4		
Genetics	3		
General Microbiology	4	Four of the courses listed (only 2 for Ag. Econ. majors)	Four of the courses listed
Economic Entomology	3	6 credits	
Plant Pathology	2		
Ani. Anat., Physiol., or Path.	3		
MATHEMATICS AND STATISTICS			
Elements of Statistics	3	3 credits	} 6 credits
Plane Trigonometry	3	(courses not specified)	
El. Digital Computing Tech.	2		
PHYSICAL SCIENCES			
Organic Chemistry	3 or 5	6 credits (Agr. Econ. may sub. human behavioral sciences)	} 6 credits
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	12 credits	12 credits
Accounting and Bus. Admin.		12 credits	

Curriculum in Agricultural Education

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			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Gn. Ag.	100	Agr. in Our Society	2	Engl.	120	Engl. Comp. II	3
Engl.	100	Engl. Comp. I	3	Psych.	110	Gen. Psychology	3
Math.	100	College Algebra	3	Chem.	210	Chemistry I	5
Bot.	200	Gen. Botany	4	Agron.			
		Elective Agr. Sci.	4	Hort.	200	Plant Science	4
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Physical Education	0
		Air or Military Science ..	1			Air or Military Science ..	1
Total		.....	17	Total		.....	16

SOPHOMORE

Chem.	190	Organic Chem.	3	Agron.	270	Soils	4
Zool.	200	Gen. Zool.	4	Ag. Ec.	200	Prin. Agr. Econ.	4
Ag. E.	210	Farm Mechanics	2	Spch.	105	Oral Comm. I	2
Educ.	202	Educ. Psych. I	3			Elective Agr. Science	3
Ec. So.	110	Economics I	3	Ag. E.	220	Farm Power	3
		Air or Military Science ..	1			Air or Military Science ..	1
		Elective	1				
Total		.....	17	Total		.....	17

JUNIOR

Educ.	400	Educ. Psych. II	3	Educ.	702	Voc. Educ.	3
Ag. E.	415	Agr. Engg. Applie.	2			Literature or Language .	3
Engl.	090	English Proficiency	0			Elec. Social Science	3
		Literature or Language .	3	Journ.	350	Agr. Journalism	3
		Elective Agr. Science	6			Elective Agr. Science	6
		Elective Social Science .	2				
		Elective	1				
Total		.....	17	Total		.....	18

SENIOR

Educ.	201	Prin. Sec. Educ.	3	Ag. E.	215	Farm Mach. Repair	3
Educ.	500	Meth. Tchg. Agr.	3			Elective—Basic Science	4
Educ.	477	Tchg. Partic. Sec. School	3			Elective—Social Science	2
Ag. E.	405	Farm Mech. Meth.	3			Elective—Agr. Science .	8
Ag. E.	410	Farm Bldgs. Constr.	3				
Total		.....	17	Total		.....	17

Five 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.

Bakery Management, Feed Technology and Milling Technology

These curriculums have options in (a) Administration, (b) Chemistry or Science 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 business; the Chemistry or Science 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.

Students transferring from other institutions to any one of the three curriculums must designate their options.

Curriculum in Bakery Management*B. S. in Bakery Management***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Millg.	010	Seminar	0	Millg.	010	Seminar	0
Millg.	011	Freshman Assembly	0	Millg.	011	Freshman Assembly	0
Gn. Ag.	100	Agr. in Our Society	2	Millg.	100	Prin. of Milling	3
Engl.	100	Engl. Comp. I	3	Spch.	105	Oral Comm. I	2
Math.	100	College Algebra	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Math.	150	Plane Trig.	3
M. E.	213	Engineering I	3	Chem.	230	Chemistry II	3
		Air or Military Science .	1	Chem.	250	Chemistry II Lab.	2
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Air or Military Science .	1
						Physical Education	0
Total			17	Total			17

SOPHOMORE

Millg.	010	Seminar	0	Millg.	010	Seminar	0
Ec. So.	110	Economics I	3	Bact.	220	General Microbiology	4
Bot.	121	Biology I	4			Air or Military Science .	1
		Air or Military Science .	1			Option A, B, or C	12
		Option A, B, or C	9	Total			17
Total			17	Total			17

JUNIOR

Millg.	010	Seminar	0	Millg.	010	Seminar	0
Engl.	090	English Proficiency	0	Millg.	631	Exp. Baking II	4
Millg.	630	Exp. Baking I	4	Millg.	650	Qualities Wheat and	
Bact.	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.	010	Seminar	0	Millg.	010	Seminar	0
Hist.	111	West. Civilization I	3	Hist.	112	West. Civilization II	3
Ec. So.	620	Labor Economics	3	Entom.	100	Milling Entomology	4
		Option A, B, or C	11			Options A, B, or C	10
Total			17	Total			17

OPTION A (Administration)

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

OPTION B (Science)

Phys.	211	Gen. Physics I	4	Chem.	585	Physical Chemistry	5
Math.	220	Anal. Geom. & Calc. I ..	4	Millg.	610	Flour and Feed Anal.	4
Math.	221	Anal. Geom. & Calc. II .	4	Millg.	620	Adv. Wht. & Flr. Testg. .	3
Math.	222	Anal. Geom. & Calc. III .	4	Stat.	620	Stat. Methods I	3
Chem.	300	Gen. Quant. Analysis	4	Millg.	632	Bakery Design & Flow ..	2
Chem.	511	Organic Chem. I	3	Biochem.	660	Biochemistry	3
Chem.	512	Organic Chem. I Lab.	2	Biochem.	661	Biochemistry Lab.	2
Chem.	516	Organic Chem. II	3			Electives	8
Chem.	517	Organic Chem. II Lab. .	2				

OPTION C (Operations)

M. E.		Engg. Comm. II	2	Chem.	351	Gen. Org. Chem. Lab.	2
Math.	220	Anal. Geom. & Calc. I ..	4	Ap. M.	415	Mech. of Materials	3
Math.	221	Anal. Geom. & Calc. II .	4	I. E.	436	Industrial Management ..	3
Math.	222	Anal. Geom. & Calc. III .	4	Millg.	632	Bakery Design & Flow ..	2
Ap. M.	305	Staties	3	Millg.	633	Bakery Technology	3
Phys.	310	Engg. Physics I	5			Electives	14
Phys.	311	Engg. Physics II	5	E. E.	400	Elect. Engg. C	2
Chem.	350	Gen. Organic Chem.	3	E. E.	402	Elect. Engg. C Lab.	1

Curriculum in Feed Technology
B. S. in Feed Technology

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Millg.	010	Seminar	0	Millg.	010	Seminar	0
Millg.	011	Freshman Assembly	0	Millg.	011	Freshman Assembly	0
Gn. Ag.	100	Agr. in Our Society	2	Millg.	100	Prin. of Milling	3
Engl.	100	Engl. Comp. I	3	Spch.	105	Oral Comm. I	2
Math.	100	College Algebra	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Math.	150	Plane Trig.	3
M. E.	213	Engineering I	3	Chem.	230	Chemistry II	3
		Air or Military Science .	1	Chem.	250	Chemistry II Lab.	2
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Air or Military Science .	1
						Physical Education	0
Total			17	Total			17

SOPHOMORE

Millg.	010	Seminar	0	Millg.	010	Seminar	0
Ec. So.	110	Economics I	3	Bot.	122	Biology II	4
Bot.	121	Biology I	4	Millg.	410	Feed Tech. I	4
Millg.	210	Flow Sheets	2			Air or Military Science .	1
		Air or Military Science .	1			Option A, B, or C	8
		Option A, B, or C	7	Total			17
Total			17	Total			17

JUNIOR

Millg.	010	Seminar	0	Millg.	010	Seminar	0
Engl.	090	English Proficiency	0	Millg.	660	Qual. of Feed Ingred.	3
Dy. Sc.	200	Nutr. & Mngt. Fm. An. .	4			Option A, B, or C	14
Ec. So.	620	Labor Economics	3	Total			17
		Option A, B, or C	10	Total			17
Total			17	Total			17

SENIOR

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

OPTION A (Administration)

Ag. Ec.	130	Grain Marketing	3	Chem.	351	Gen. Org. Chem. Lab.	2
Phys.	211	Gen. Physics I	4	B. A.	410	Business Finance	3
Phys.	212	Gen. Physics II	4	Ec. So.	430	Money & Banking	3
B. A.	273	Prin. of Accounting	3	Stat.	510	Stat. Qual. Control	3
Chem.	300	Gen. Quant. Analysis	4	B. A.	542	Sales Management	3
Stat.	320	Elements of Statistics ..	3	Millg.	610	Flour & Feed Analysis ..	4
B. A.	325	Business Law I	3	Millg.	680	Feed Tech. II	4
Chem.	350	Gen. Organic Chem.	3			Electives	8
		Managerial Acetg.	3				
		Economics II	3				

OPTION B (Chemistry)

Phys.	211	Gen. Physics I	4	Chem.	512	Organic Chem. I Lab.	2
Phys.	212	Gen. Physics II	4	Chem.	516	Organic Chem. II	3
Math.	220	Anal. Geom. & Calc. I ..	4	Chem.	517	Organic Chem. II Lab. .	2
Math.	221	Anal. Geom. & Calc. II ..	4	Chem.	585	Physical Chemistry I	5
Math.	222	Anal. Geom. & Calc. III .	4	Biochem.	660	Biochemistry	3
Chem.	300	Gen. Quant. Analysis	4	Biochem.	661	Biochemistry Lab.	2
Millg.	450	Flour & Feed Analysis ..	4			Electives	15
Chem.	511	Organic Chem. I	3				

OPTION C (Operations)

M. E.		Engg. II	2	Chem.	350	Gen. Organic Chem.	3
Math.	220	Anal. Geom. & Calc. I ..	4	Chem.	351	Gen. Organic Chem. Lab. .	2
Math.	221	Anal. Geom. & Calc. II ..	4	E. E.	400	Elect. Engg. C	2
Math.	222	Anal. Geom. & Calc. III .	4	E. E.	402	Elect. Engg. C Lab.	1
Math.	240	Series & Diff. Equa.	4	Ap. M.	415	Mech. of Materials	3
Ap. M.	305	Statics	3	Millg.	600	Adv. Flour & Feed Tech. .	3
Phys.	310	Engg. Phys. I	5	Millg.	610	Fl. & Fd. Mill Constr. ..	3
Phys.	311	Engg. Phys. II	5	Millg.	680	Feed Tech. II	4
						Electives	11

Curriculum in Milling Technology*B. S. in Milling Technology***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Millg.	010	Seminar	0	Millg.	010	Seminar	0
Millg.	011	Freshman Assembly	0	Millg.	011	Freshman Assembly	0
Gn. Ag.	100	Agr. in Our Society	2	Millg.	100	Prin. of Milling	3
Engl.	100	Engl. Comp. I	3	Spch.	105	Oral Comm. I	2
Math.	100	College Algebra	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Math.	150	Plane Trig.	3
M. E.		Engineering I	3	Chem.	230	Chemistry II	3
		Air or Military Science ..	1	Chem.	250	Chemistry II Lab.	2
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Air or Military Science ..	1
						Physical Education	0
Total			17	Total			17

SOPHOMORE

Millg.	010	Seminar	0	Millg.	010	Seminar	0
Ec. So.	110	Economics I	3	Bact.	220	Gen. Microbiology	4
Bot.	121	Biology I	4	Millg.	400	Milling Tech. I	4
Millg.	210	Flow Sheets	2			Air or Military Science ..	1
		Air or Military Science ..	1			Option A, B, or C	8
		Option A, B, or C	7	Total			17
Total			17	Total			17

JUNIOR

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

SENIOR

Millg.	010	Seminar	0	Millg.	010	Seminar	0
Millg.	630	Exp. Baking I	4	Hist.	112	West. Civilization II	3
Hist.	111	West. Civilization I	3	Entom.	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.	130	Grain Marketing	3	Chem.	351	Gen. Org. Chem. Lab.	2
Phys.	211	Gen. Physics I	4	B. A.	410	Business Finance	3
Phys.	212	Gen. Physics II	4	Ec. So.	430	Money & Banking	3
B. A.	273	Prin. of Accounting	3	Stat.	510	Stat. Qual. Control	3
Chem.	300	Gen. Quant. Analysis	4	B. A.	542	Sales Management	3
Stat.	320	Elements of Statistics ..	3	Millg.	610	Flour & Feed Anal.	4
B. A.	325	Business Law I	3	Millg.	680	Feed Tech. II	4
Chem.	350	Gen. Organic Chem.	3			Electives	8
		Managerial Acctg.	3				
		Economics II	3				

OPTION B (Chemistry)

Phys.	211	Gen. Physics I	4	Chem.	512	Organic Chem. I Lab.	2
Phys.	212	Gen. Physics II	4	Chem.	516	Organic Chem. II	3
Math.	220	Anal. Geom. & Calc. I	4	Chem.	517	Organic Chem. II Lab. ..	2
Math.	221	Anal. Geom. & Calc. II ..	4	Chem.	585	Physical Chemistry I	5
Math.	222	Anal. Geom. & Calc. III .	4	Biochem.	660	Biochemistry	3
Chem.	300	Gen. Quant. Anal.	4	Biochem.	661	Biochemistry Lab.	2
Millg.	450	Flour & Feed Analysis ..	4			Electives	15
Chem.	511	Organic Chem. I	3				

OPTION C (Operations)

M. E.		Engg. II	2	Chem.	350	Gen. Organic Chem.	3
Math.	220	Anal. Geom. & Calc. I	4	Chem.	351	Gen. Organic Chem. Lab. .	2
Math.	221	Anal. Geom. & Calc. II ..	4	E. E.	400	Elect. Engg. C	2
Math.	222	Anal. Geom. & Calc. III .	4	E. E.	402	Elect. Engg. C Lab.	1
Math.	240	Series & Diff. Equations	4	Ap. M.	415	Mech. of Materials	3
Ap. M.	305	Statics	3	Millg.	600	Adv. Flour & Feed Tech. .	3
Phys.	310	Engg. Phys. I	5	Millg.	610	Fl. & Feed Mill Constr. .	3
Phys.	311	Engg. Phys. II	5	Millg.	680	Feed Tech. II	4
						Electives	11

Curriculum in Biochemistry

B. S. in Biochemistry

FRESHMAN

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

SOPHOMORE

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

JUNIOR

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

SENIOR

Chem.	585	Physical Chem. I Lec. ..	3	Chem.	595	Phys. Chem. II Lec.	3
Chem.	586	Phys. Chem. I Lab.	2	Chem.	598	Phys. Chem. II Lab.	2
Biochem.	660	Biochemistry Lec.	3			Biochem. (600, higher) .	5
Biochem.	661	Biochemistry Lab.	2	Mod. L.	111	Technical German	3
Mod. L.	105	Technical German	3	Chem.	666	Instrumental Analysis ..	4
		Elective	4				
			17				17
Total				Total			

1. See list, page 231.

Curriculum in Dairy Manufacturing

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Gn. Ag.	100	Agri. in Our Society	2	Chem.	230	Chemistry II Rec.	3
Chem.	210	Chemistry I	5	Chem.	250	Chemistry II Lab.	2
Engl.	100	Engl. Comp. I	3	Ec. So.	110	Economics I	3
Math.	100	College Algebra	3	Engl.	120	Engl. Comp. II	3
Dy. Se.	180	Elements Dairy. Rec.	2	Math.	150	Plane Trigonometry	3
Dy. Se.	190	Elements Dairy. Lab.	1	Spch.	105	Oral Communication I ..	2
		Air or Military Science ..	1			Air or Military Science ..	1
Ph. Ed.	011	Physical Education	2	Ph. Ed.	011	Physical Education	2
Total			17	Total			17

SOPHOMORE

Bact.	220	General Microbiology	4	Dy. Se.	400	Mkt. Milk & Dy. Insp. ..	4
Zool.	200	General Zoology	4	Bact.	615	Dairy Bacteriology	4
Chem.	350	Gen. Organic Chem.	3	Bot.	200	General Botany	4
Chem.	351	Gen. Org. Chem. Lab.	2			Political Science	3
		Option	3			Air or Military Science ..	1
		Air or Military Science ..	1	Total			16
Total			17	Total			16

JUNIOR

Dy. Se.	210	Dairy Technology	3	Dy. Se.	220	Dairy Products Eval. I ..	1
Ag. E.	455	Dairy Mechanics	3	Dy. Se.	680	Dairy Foods Proc. I	5
Phys.	211	General Physics I	4			Humanities	3 ¹
Engl.	090	English Proficiency	0			Option	8
		Humanities ¹	3	Total			17
		Option	5	Total			17
Total			18	Total			17

SENIOR

Dy. Se.	460	Dairy Prod. Eval. II	1	Ag. Ec.	241	Prin. of Agr. Mkts. Lec. .	2
Dy. Se.	690	Dairy Foods Proc. II	5	Dy. Se.	244	Dairy Marketing	1
Stat.	320	Elements of Statistics ..	3	Dy. Se.	500	Dairy Seminar	1
		Option	8	Dy. Se.	660	Dairy Plant Mgt.	2
				Dy. Se.	670	Quality Control of Dairy	
						Products	3
						Option	8
Total			17	Total			17

1. See List of Humanities Electives, page 231.

ADDITIONAL COURSES TO BE SELECTED FROM THOSE LISTED BELOW.

SCIENCE OPTION

Quantitative Analysis	4	Analytical Geometry & Calculus II	4
Organic Chemistry	5	Microbiology of Foods	5
Biochemistry	3	Sanitary Bacteriology Lab.	2
General Physics II	4	Physiology of Microorganisms	3
Analytical Geometry & Calculus I	4	Principles of Nutrition	4

ADMINISTRATION OPTION

Economics II	3	Marketing	3
Introductory Accounting	5	Personnel Administration	3
Business Law I	3	Business Finance	3
Managerial Accounting	3	Business Policy	3
Sales Management	3	Fundamentals of Business for	
		Professional People	2

FOOD PROCESSING OPTION

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

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, 1966, and the College of Agriculture at Kansas State before September 1, 1968.

<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 Management, Feed Manufacturing Technology, or Flour Milling, 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 Manufacturing 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.

Students who have completed 59 semester hours or more prior to coming to K-State will be excused from military training here. Those who have completed between 25 and 59 semester hours will be excused from the second year.

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.

Because agricultural businesses have expanded in size and number in Kansas, represent such a large part of the Kansas economy, and Kansas youth want to exploit their agricultural backgrounds and interests in their academic training and future employment, 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 213 (College of Commerce) and page 51 (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. 50), followed by a Master's degree in Business Administration (see p. 39). 5½ academic years.
2. A B. S. degree in some discipline within the College of Agriculture, followed by a B. S. degree in Business Administration (see p. 213). 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 Ad-

ministration (see options and areas of study on page 213). 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	100	Elementary Design	2	B. A.	273	Prin. of Acetg.	3
Engl.	100	Engl. Comp. I	3	Art	240	Interior Decoration	2
Hort.	130	Floral Arrangement	2	L. A.	100	Landscape Design	3
Bot.	200	General Botany	4				8
Hort.	150	Home Hort.	2				
B. A.	341	Salesmanship	2				
			15				
				Summary :			
					Horticulture & L. A.	13	credits
					Business Adm.	12	credits
					Home Economics Art	7	credits
					Botany	4	credits
					English	3	credits
					Speech	2	credits
						41	
SPRING							
Hort.	130	Floral Arrangement	2				
Art	395	Window Display	3				
Hort.	200	Plant Science	4				
Spch.	105	Oral Comm. I	2				
B. A.	210	Personal Finance	2				
B. A.	342	Credits & Collections	2				
B. A.	350	Small Business Operation	3				
			18				

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.	210	General Botany	4	Hort.	200	Plant Science	4
Hort.	260	Plant Materials I	3	Hort.	270	Plant Materials II	3
Hort.	150	Home Horticulture	2	Hort.	600	Landscape Hort.	3
Engl.	100	Engl. Comp. I	3	Hort.	620	Arboriculture	3
Hort.	220	Plant Propagation	3	Spch.	105	Oral Comm. I	2
			15	B. A.	101	Fund. of Business	2
							17

		SUMMER				FALL	
Chem.	210	Chemistry I	5	L. A.	441	Planting Design	2
L. A.	100	Landscape Design	3	Agron.	270	Soils	4
			8	Entom.	200	Econ. Entomology	3
				Pl. Path.	400	Plant Pathology	2
				B. A.	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, Hodges,* Hoover,* Kelley,* Manucl,* McCoy,* Montgomery,* Nordin,* Pine,* Schruben* and Whitehair; Associate Professors Bevins,* Gieseman,* Knight,* Koudede,* Orazem,* Otto,* Sjo,* Sorenson, Trieb and Wilkowske; Assistant Professors Banks,* Jackson, McDonald, McKinney,* Ross, Thomas and Walker; Instructors Cram, Jacobs, Knox and Reed; Emeritus: Dean Call,* President Farrell* 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 Master 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

- 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.: Ec. So. 110.
- 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.: Ec. So. 110.
- 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.: Ec. So. 110, Math. 100.
- 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.
- 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.
- 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.
- 241. Principles of Agricultural Marketing Lec.** (2) I. Marketing functions, costs, efficiency; market organization and institutions; consumer behavior; food processing industries; role of government; agricultural price determination. Two hours rec. a week. Pr.: Ag. Ec. 200 or consent of instructor. Conc. enrollment in Ag. Ec. 242 or 243 or 244 required.
- 242. Principles of Agricultural Marketing Rec.** (1) I. Applications of basic principles in agricultural marketing. Special problems and a field trip. One hour rec. a week. Pr.: Conc. enrollment in Ag. Ec. 241.
- 243. Egg and Poultry Marketing Rec.** (1) I. Offered on demand. Specific attention to certain aspects of egg and poultry marketing. One hour rec. a week. Pr.: Conc. enrollment in Ag. Ec. 241.
- 244. Dairy Marketing Rec.** (1) I. Offered on demand. Specific attention to certain aspects of dairy marketing. One hour rec. a week. Pr.: Conc. enrollment in Ag. Ec. 241.
- 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

- 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.: Ec. So. 110.

- 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. 241.
- 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. 241.
- 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.: Ec. So. 110.
- 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.
- 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.
- 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.
- 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 cooperative activity; limitations and possibilities for cooperatives in the agricultural economy. Three hours rec. a week. Pr.: Ec. So. 110.
- 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.: Ec. So. 110.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 610. 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.: Ec. So. 110.
- 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.
- 630. 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. Two hours rec. a week. Pr.: Ag. Ec. 450 or consent of instructor.

Land Law. (See B. A. 320.)

- 650. Agricultural Economics Problems.** Credit arranged. I, II, S. Pr.: Consult instructor.
- 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.: Ec. So. 110, junior standing.

FOR GRADUATE CREDIT

- 800. Economics of Agriculture I.** (3) Offered on sufficient demand. A comprehensive study of the economics of agriculture, with special attention to the integration of agricultural problems into the general body of economic theory. Includes: agriculture in the general economy, agricultural maladjustments, production and marketing organization, farm prices. Pr.: Consent of instructor.
- 810. Economics of Agriculture II.** (3) II. Offered on sufficient demand. A comprehensive study of the economics of agriculture, with special attention to the integration of agricultural problems into the general body of economic theory. Includes: value, distribution, and income; agricultural land utilization and tenure; agricultural credit and insurance; international agricultural relations; public activities relating to agriculture. Pr.: Consent of instructor.
- 820. Price Analysis.** (3) Offered on sufficient demand. Theory and analysis of prices, including techniques for empirical investigation of price problems. Pr.: Ag. Ec. 421 or consent of instructor.
- 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.
- 840. Seminar in Agricultural Economics.** (3) Offered on sufficient demand. Problems and current developments in agricultural economics. Pr.: Consent of instructor.
- 851. Research in Agricultural Economics.** Credit arranged. I, II, S. Research for thesis or master's report.
- 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

FLOYD W. SMITH,* *Acting Head of Department*

Professors K. L. Anderson, Bidwell,* Bieberly, Cleavinger, Davidson, Ellis,* Heyne,* Hobbs,* Lind, Olson,* Pittenger* and F. W. Smith;* Associate Professors L. E. Anderson,* Atkinson, Baird,* Barnett,* Jacobs,* Mader,* Pauli,* Stickler* and Wassom;* Assistant Professors Braum, Casady,* Edelblute, Harper, Moore, Overley, Peterson, Skidmore, Sloan, R. M. Smith, Sorensen,* Swallow, Walter, Woodruff and Wright; Instructors Axelton, Congrove, Lundquist, Raney, Wilkins and Withee; Emeritus: Professors Clapp, Davis,* Laude* 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

- 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.
- 210. Farm Crops Laboratory.** (1) Credit arranged. For students who have credit in course CA3, Farm Crops A, in Home Study Department; study of species and types of principal field crops. Three hours lab. a week. Pr.: Bot. 210 or 122.
- 220. Farm Crops.** (4) Credit arranged. Distribution, importance, characteristics, and production of the common field crops; study of species and types of principal field crops. Three hours rec. and three hours lab. a week. Pr.: Bot. 210 or 122.
- 221. Grain and Industrial Crops.** (3) II. Offered in 1965-66 and alt. years. Study of the fundamental principles of production of wheat, corn, sorghums, soybeans, and other important grain and industrial crops; growth habits, classification, identification, utilization, and grading according to Federal standards. Two hours rec. and three hours lab. a week. Pr.: Agron. 200 or equiv.
- 230. Grain Grading and Judging.** (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.
- 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.
- 250. Advanced Grain Judging.** (2) I. Commercial grading and judging of field crops and identification of principal types and varieties. Six hours lab. a week. Pr.: Agron. 230.
- 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.
- 270. Soils.** (4) I, II. Fundamental principles underlying the formation, fertility, and management of soils. Three hours rec. and three hours lab. a week. Pr.: Chem. 210.
- 300. Soil Management and Moisture Conservation.** (3) I, II. Principles and practices of soil and water management suited to dryland and humid areas. Three hours rec. a week. Pr.: Agron. 270.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 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.
- 410. Range Management I.** (3) II. Establishment, management, and utilization of tame and native pastures. Three hours rec. a week. Pr.: Agron. 200.

420. Weed Control. (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

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.

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.

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.

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.

650. Soil Fertility. (3) I, II. Fundamentals of soil fertility. Three hours rec. a week. Pr.: Agron. 270, Bot. 300.

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.

670. Soil Analysis Applications. (3) I. Offered in 1965-66 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 340.

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 Oklahoma State University. Pr.: Agron. 410, Bot. 670 and 690 or 730. Suitable field experience may be substituted for these prerequisites with consent of instructor.

690. Plant Genetics. (3) I. An advanced course dealing with genetic principles. Three hours rec. a week. Pr.: A. H. 400.

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.

710. Identification of Range and Pasture Plants. (1) II. Offered in 1965-66 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.: Consult instructor.

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.

730. Chemical Fertilizers. (3) I. Offered in 1964-65 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.: Agron. 270.

740. Range Management II. (3) II. Offered in 1965-66 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.

- 750. Soil Erosion and Its Control.** (3) I. Offered in 1964-65 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.
- 751. Soil Erosion Laboratory.** (1) I. Offered in 1964-65 and alt. years thereafter. Three hours lab. a week. One field trip. Pr.: Agron. 270, 750, or conc. enrollment.

FOR GRADUATE CREDIT

- 800. Methods of Plant Breeding.** (3) II. Offered in 1965-66 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, Bot. 605.
- 810. Agronomy Seminar.** (1) I, II. A discussion of agronomic developments. Pr.: Graduate standing.
- 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.
- 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.
- 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.
- 840. Advanced Crop Ecology.** (3) I. Offered in 1964-65 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.
- 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.
- 860. Advanced Forage Crops.** (3) I. Offered in 1965-66 and alt. years thereafter. Important forage crops species are studied throughout current literature with regard to growth characteristics, utilization, and breeding procedures. Three hours rec. a week. Pr.: Agron. 240.
- 870. Crop Hardiness.** (3) II. Offered in 1965-66 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.
- 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.
- 890. Soil Physical Chemistry.** (3) I. Offered in 1964-65 and alt. years thereafter. Application of physical chemistry to soils; cation and anion equilibria, cation activities, electrokinetics, sorption and other physico-chemical reactions in soils. Two hours rec. and three hours lab. a week. Pr.: Agron. 640, 660, Chem. 596.
- 900. Advanced Soil Physics.** (3) I. Offered in 1965-66 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.

920. Soil Genesis. (2) II. Offered in 1964-65 and alt. years thereafter. Theories of soil formation processes. Two hours rec. a week. Pr.: Agron. 400.

930. Developmental Genetics. (3) II. Offered in 1964-65 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

RUFUS F. COX,* *Head of Department*

Professors Cox, Good,* Koch,* Mackintosh,* Moyer, Richardson* and E. F. Smith;* Associate Professors Harbers, Kropf, Spies* and Wheat;* Assistant Professors Boren,* McAdams, Menzies, W. H. Smith* and Zoellner; Instructors Fletcher, McKee, Weiner and Westmeyer; Assistant Professor—Temporary, McCormick; Instructor—Temporary, Theurer; Emeritus: Professors Aicher and Aubel**

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 2,510 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

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.

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.

200. Nutrition and Management of Farm Animals. (4) I, II. Basic and applied nutrition and management of beef cattle, dairy cattle, horses, poultry, sheep, and swine. Three hours lec. and three hours lab. a week. Pr.: Zool. 200 and Chem. 190 or 350. Taught in cooperation with the Departments of Dairy Science and Poultry Science.

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.)

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.

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 six hours lab. a week. Pr.: A. H. 101 and 111, or 200 and junior standing.

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.

- 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.
- 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.
- 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.
- 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.
- 260. Meat Processing.** (1) I, II. Killing, dressing, cutting, packaging, 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.
- 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.
- 280. Meat Selection and Utilization, H. E.** (2) I, II. 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.
- 290. Beef Cattle Production.** (3) II. Three hours rec. a week. Pr.: A. H. 230.
- 300. Swine Production.** (3) II. Three hours rec. a week. Pr.: A. H. 230.
- 310. Sheep Production.** (3) I. Three hours rec. a week. Pr.: A. H. 230.
- 320. Horse Production.** (2) I. Two hours rec. a week. Pr.: A. H. 230.
- 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.
- 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
- 400. Genetics.** (3) I, II, S. Variation, Mendelian inheritance, and related subjects. Three hours lec. a week. Pr.: Zool. 200 or Bot. 200.
- 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.
- 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.
- 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.

- 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.
- 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

- 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.
- 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.
- 620. Population Genetics Laboratory.** (1) II. Compilation and analyzing of genetic data. Three hours lab. a week. Pr.: A. H. 610 or conc. assignment.
- 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.
- 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.
- 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.
- 670. Institutional Meats.** (2) Spring semester, 1964-65, 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.
- 675. Meat Practicums.** (2) II. Includes studies of the correlation of type, degree of finish, and other factors in the live animal, with carcass factors, particularly with reference to muscular development, skeleton, grading, and cutting and boning yields. Six hours lab. a week. Pr.: A. H. 250, 260.
- 680. Technological Principles of Meat Processing.** (2) II. Offered on sufficient demand. Application of biochemical, histological, and microbiological principles of fresh, frozen, cured, smoked, and processed meats, with reference to nutritive value and palatability factors. Two hours rec. a week. Pr.: A. H. 250, 260, and senior or graduate standing.
- 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

- 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.
- 805. Animal Breeding Seminar.** (1) II. Evaluation of animal experimentation as related to reproduction and breeding.
- 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.

- 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.
- 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.
- 870. Principles of Animal Husbandry Experimentation.** (2) II. Conducting and interpreting experiments involving the use of animals. Two hours rec. a week. Pr.: A. H. 230, 400.
- 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.
- 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 Clegg, Mitchell, Parrish and Perkins; Associate Professors Burkhard, Nordin and Ruliffson; Assistant Professor Cunningham; Emeritus: Professors Hughes and Whitnah; Associate Professor Hall; Assistant Professor Smits*

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 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 an interdepartmental program in animal nutrition leading to the Doctor of Philosophy degree (See Animal Nutrition, page 75).

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 preparation 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

inorganic, 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

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 digestion 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

410. General Plant Biochemistry. (4) I. Occurrence, properties, functions, and metabolism of the organic compounds of plants. Pr.: Chem. 190 or 350.

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. Pr.: Chem. 191 or 351.

FOR UNDERGRADUATE AND GRADUATE CREDIT

660. Biochemistry. (3) I; II on sufficient demand. Basic course for graduate students in biochemistry, and suggested for biochemistry minors. Biochemistry of carbohydrates, lipids, proteins, nucleic acids, enzymes, blood and respiration. An introduction of metabolism, the role of vitamins, minerals, hormones and nutrition. Pr.:*

661. Biochemistry Laboratory. (2) I; II on sufficient demand. Basic laboratory for graduate students in biochemistry, to accompany Biochem. 660. Selected experiments to illustrate biochemical principles including separation, identification and quantitative determination of typical biochemical substances; chemical properties of carbohydrates, lipids, proteins; techniques of enzymology. Pr.:*

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. 660.

680. Biochemistry of Toxic Materials. (2) I. Offered 1965-66 and in 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. 660.

690. Lipids. (3) II. Offered 1965-66 and in alt. years. Chemistry of plant and animal lipids, their occurrence, metabolism and industrial uses. Pr.:* Biochem. 660.

705. Vitamins. (2) II. Offered in 1965-66 and alt. years or on demand. A survey of the avitaminoses, chemical properties, biochemical roles, metabolic pathways and methods of assay of the vitamins. Pr.:* Biochem. 660.

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. 660 or 670, or conc. enrollment.

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. 660.

* Certain courses in the department numbered 600 and above require a number of prerequisites for major students. Whenever an asterisk (*) is used, the prerequisites are Chem. 230, 250, 444, 450, 451, 595, 598. Other students may enroll with the consent of the instructor.

- 725. Advanced Biochemistry Laboratory.** (2) II. Specialized laboratory techniques for advanced biochemical investigations. Pr.:* Biochem. 661.
- 745. Hormones.** (2) I. Offered in 1964-65 and alt. years or on demand. A study of the structure, biosynthesis, biochemical role, metabolism and interrelations of internal secretions. Pr.: Biochem. 660.
- 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

- 806. Biochemistry Seminar.** (0) I, II. Seminar for graduate students in biochemistry.
- 810. Survey of Agricultural and Biological Chemistry.** (1) Offered on demand. Independent study and reading followed by a comprehensive written examination. Pr.:*
- 812. Proteins.** (2) I. Offered in 1965-66 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. 660.
- 815. Plant Biochemistry.** (3) I. A more advanced treatment of the material of Biochem. 410, with greater emphasis on the chemistry involved. Pr.:* Biochem. 660.
- 816. Chemistry of Carbohydrates.** (2) I. Offered in 1964-65 and alt. years. Lectures and readings on structural chemistry or carbohydrates, their general properties, biological and chemical reactions and the methods of characterization. Pr.:* Biochem. 660.
- 818. Enzyme Chemistry.** (2) II. Lectures and readings on the chemical nature of enzymes, their reactions and assay. Pr.:* Biochem. 710.
- 819. Enzyme Laboratory.** (2) II. A laboratory course to accompany Biochem. 818. Pr.:* Biochem. 818 or conc. enrollment.
- 825. Advanced Animal Nutrition.** (3) I. Offered in 1964-65 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. 660 and a course in nutrition.
- 890. Theoretical Biochemistry.** (2) II. Offered in 1964-65 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. 660.
- 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.

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, Pady* and Sill;* Associate Professor King; Assistant Professors Dickerson,* Edmunds* and Kainski;* Instructors Browder and Willis; Emeritus: Professors Elmer,* Johnston* 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. 51). Courses in botany are offered in the Botany Section in the College of Arts and Sciences (See p. 124).

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 51 and 55.

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

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

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.

610. Fungous Diseases of Plants. (3) II in even years. Major fungous 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.

620. General Nematology. (3) I. The morphology, taxonomy, biology of and technics used in the study of plant parasitic and soil and freshwater free-living nematodes. Six hours of combined rec. and lab. a week. Pr.: Pl. Path. 400 or consent of instructor.

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.

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.)

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.

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

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.

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

DAIRY SCIENCE

C. L. NORTON,* *Head of Department*

Professors Bartley, Huston,* Larson,* Marion* and Norton;* Associate Professors Bassette,* Bonewitz, Claydon,* Farmer* and Ward;* Assistant Professors Mickelsen* and Morrill;* Instructors Call and Roberts; Emeritus: Professor Martin**

The Department of Dairy Science is well equipped to train men for key positions in the dairy industry.

A wider application of science to the problem of milk production and manufacturing of dairy products requires technically trained men. Courses in bacteriology, chemistry, mathematics, accounting, engineering, and commercial subjects provide excellent background for the dairy industry.

Instruction in dairy production includes dairy cattle feeding, management, breeding, milk production, and judging. A purebred herd of Holstein, Guernsey, Jersey, and Ayrshire cattle owned by the University provides animals for class work and for experimental research projects.

The four-year Curriculum in Dairy Manufacturing is designed to prepare students for positions as dairy plant managers, superintendents, sales managers, equipment and supply technicians, dairy products graders, inspectors and sanitarians, executives, research and technical workers, and teachers.

Major work leading to the degree Master of Science is offered in the fields of dairy cattle management, dairy cattle physiology, dairy cattle nutrition, and dairy cattle breeding.

Major work leading to the degree Master of Science is offered in dairy manufacturing that emphasizes the chemical and bacteriological aspects of dairy products processing, development, and control.

Work leading to the degree Doctor of Philosophy is offered in the fields of animal nutrition, animal breeding, and genetics.

Prerequisite to major work in this department is the completion of an undergraduate curriculum in dairy science substantially equivalent to that required of undergraduate students at this University.

FOR UNDERGRADUATE CREDIT

- 180. Elements of Dairying.** (2) I, II. Problems of the milk producer and manufacturer; feeding, handling, breeding, and selecting of dairy cattle; composition and properties of milk; manufacture of dairy products. Two hours rec. a week.
- 190. Elements of Dairying Laboratory.** (1) I, II. Three hours lab. a week.
- 200. Nutrition and Management of Farm Animals.** (4) I, II. Basic and applied nutrition and management of beef cattle, dairy cattle, horses, poultry, sheep, and swine. Three hours lec. and three hours lab. a week. Pr.: Zool. 200 and Chem. 190 or 350. Taught in cooperation with the Departments of Animal Husbandry and Poultry Science.
- 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 Animal Husbandry and Poultry Science. (A. H. 202, Dy. Sc. 202, and Pl. Sc. 202 are companion courses in the respective departments.)

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

- 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.
- 420. Advanced Dairy Cattle Judging.** (1) I. Visits to some of the best farms in the state. Three hours lab. a week. Pr.: Dy. Sc. 196.
- 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, Dairy Products Evaluation I, or consent of instructor.
- 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.
- 510. Dairy Technology.** (3) I. Offered in 1964-65 and alt. years. 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

- 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 or senior standing or consent of instructor.
- 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.
- 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. Sc. 180 and 190, or 200, or 201 and 202.
- 621. Dairy Cattle Management.** (3) II. Offered in 1965-66 and alt. 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. Sc. 180 and 190, or 200, or 201 and 202.
- 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.
- 640. Dairy Production Problems.** Credit arranged. I, II, S. Pr.: Junior standing.
- 650. Dairy Manufacturing Problems.** Credit arranged. I, II, S. Pr.: Junior standing in dairy manufacturing.
- 660. Dairy Plant Management.** (2) II. Offered in 1964-65 and alt. years. 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.: Senior standing or consent of instructor.

- 670. Quality Control of Dairy Products.** (3) II. Offered in 1965-66 and alt. years. 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 615.
- 680. Dairy Foods Processing I.** (5) II. Offered in 1964-65 and alt. years. 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.
- 690. Dairy Foods Processing II.** (5) I. Offered in 1964-65 and alt. years. 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 615. (Previously 680—Butter and Cheese.)
- 710. Dairy Fermentations.** (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.
- 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.: Dairy and Poultry Genetics I.

FOR GRADUATE CREDIT

- 800. 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.
- 805. Animal Breeding Seminar.** (1) II. Evaluation of animal experimentation as related to reproduction and breeding.
- 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. Pr.: Graduate standing.
- 820. Rumen Metabolism.** (2) 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. Sc. 200, Chem. 420, Physi. 635, or consent of instructor.
- 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.

ENTOMOLOGY
HERBERT KNUTSON,* *Head of Department*

Professors Knutson, Painter,* Roan and Wilbur;* Associate Professors Gates, Harvey, Hopkins* and Thompson;* Assistant Professors Burkhardt, DePew, Downe,* Elzinga,* Eshbaugh and Rettenmeyer;* Instructors Kauffeld and Pitts; 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, 420, 600, 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, other agencies of the states and the federal government, industry, and private practice.

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 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 as well as for apiculture.

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 regional 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 Northeast Experimental Fields at Wathena; 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. At present, fruit and vegetable insects are major subjects of investigation at Wathena; livestock, alfalfa, wheat and sorghum insects at Hays; and insects attacking field crops and specialty crops, and horticultural crops related to irrigation, at Garden City.

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 and 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

- 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.
- 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 two hours lab. a week.
- 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 two hours lab. a week.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 420. General Bee Culture.** (2) II. Offered in 1964-65 and alt. years. Structure, life history, general behavior, activity, and products of the honeybee; bee diseases and their eradication and control; relation of bees to agriculture and horticulture. Two hours rec. a week. Pr.: Entom. 200 or 211 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 620. Medical Entomology.** (3) I. Offered in 1964-65 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.
- 630. Insect Ecology.** (3) I. Offered in 1964-65 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.
- 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.
- 650. Insect Control by Host Plant Resistance.** (2) II. Offered in 1964-65 and alt. years. 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.
- 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.
- 670. Internal Insect Morphology.** (3) II. Offered in 1964-65 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.
- 675. Insect Physiology.** (3) I. Offered in 1965-66 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.

- 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.
- 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.
- 711. Taxonomy of Immature Insects.** (3) II. Offered in 1965-66 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.
- 740. Insect Toxicology.** (3) II. Offered in 1964-65 and alt. years. Chemical, physical, and biological properties of pesticidal chemicals and various components of formulations; advantages and limitations in the use of chemical control practices. Review of literature and report preparations are required. Pr.: Entom. 200 or 211, and a course in organic chemistry.
- 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.
- 770. Advanced Applied Entomology I.** (3) I. Offered in 1965-66 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.
- 780. Advanced Applied Entomology II.** (3) II. Offered in 1965-66 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.
- 795. Zoology and Entomology Seminar.** (1) I, II. Pr.: Consult seminar committee.
- 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

- 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.
- 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.
- 820. Advanced Physiology of Insects.** (4) II. Offered in 1965-66 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.
- 830. Insect Toxicology Laboratory.** (2) Offered on demand. Design of laboratory experiments and evaluation of pesticidal, mammalian, and plant toxicity; effects of formulations on efficiency; analytical methods for determining residues. Local field trips. Pr.: Entom. 740, equiv. or conc. registration; consent of instructor.

- 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.
- 860. Insect Behavior.** (3) II. Offered in 1965-66 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.
- 999. Research in Entomology.** Credit arranged. Thesis or dissertation credit. I, II, S. Work is offered in apiculture, applied entomology, host plant resistance, insect physiology, toxicology, medical entomology, pest control technology, taxonomy, and morphology. Pr.: At least nine hours of entomology and basic work in zoology, botany, bacteriology, chemistry, mathematics, and consent of department.

FLOUR AND FEED MILLING INDUSTRIES

JOHN A. SHELLENBERGER,* *Head of Department*

Professors Finney, Johnson, MacMasters,* Pfof,* Pomeranz, Schoeff and Shellenberger;* Associate Professors Deyoe, Farrell* and Ward; Assistant Professor G. D. Miller;* Instructors D. Miller and Stevens*

The Department of Flour and Feed Milling Industries offers three curricula leading to Bachelor of Science degrees in Bakery Management, Feed Technology or Milling Technology. In each curriculum an option is selected in Administration, Science, 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

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

- 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.
- 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, premixes,

and rations using a digital computer. Three hours lec. and three hours lab. a week. Pr.: Dy. Sc. 200 and Millg. 210.

- 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

- 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.
- 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.
- 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.
- 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.
- 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.
- 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. Pr.: Millg. 632 and Phys. 211.
- 640. Advanced Flow Sheets.** (2) II. The design of flows for various cereal processing methods. Six hours lab. a week. Pr.: Millg. 210.
- 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.
- 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.
- 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.
- 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.
- 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 microorganisms, respiration and heating, influence of insects on storage. Pr.: Millg. 650 or 660 or consent of instructor.
- 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.

- 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.
- 790. Milling Industry Problems.** Credit arranged. I, II, S. Pr.: Consent of staff.

FOR GRADUATE CREDIT

- 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.
- 801. Fundamental Study of Enzymes.** (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.
- 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
DUANE C. ACKER,* *Director of Resident Instruction*FRANK R. CARPENTER, *Assistant Director*

- 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.
- 109. Agricultural Student Journalism.** (1) I, II. Maximum of four credits may be used toward a degree.
- 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
ROBERT P. EALY,* *Head of Department*

Professors Campbell, Ealy,* Filinger,* Keen* and Pickett; Associate Professors Carpenter,* Gallaher,* Greig,* Hall* and Roberts; Assistant Professors Abmeyer, Hadle, Kepler, Parks and Winzer; Instructors Biswell, Derting, Gould, Grey, Roth, Shreve, Slusher and Strickler; Emeritus: 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.

A graduate program leading to the Master of Science and/or Doctor of Philosophy degrees 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

- 130. Floral Arrangement.** (2) I, II. Floral arrangement and design for the home and commercial flower shop; care and use of cut flowers and potted plants; sources of supplies and floral merchandising. One hour rec. and three hours lab. a week. Pr.: Consent of instructor.
- 150. Home Horticulture.** (2) I, II. An introductory general course covering the various phases of horticultural activity as they relate to modern living.
- 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. Meets first and second Thursdays of each month.
- 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.
- 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.
- 230. Greenhouse Construction and Management.** (3) II. Offered in the spring of 1965 and alt. years thereafter. Greenhouse construction, heating, air conditioning and crop planning. Two hours rec. and three hours lab. a week.
- 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 the Division of Landscape Architecture. Pr.: Bot. 210.
- 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 the Division of Landscape Architecture. Pr.: Bot. 210.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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 the Division of Landscape Architecture. Pr.: Bot. 210.
- 610. Turf Management.** (2) I. Offered in the fall of 1964 and alt. years thereafter. Methods and principles of establishing and maintaining special purpose turf. Pr.: Agron. 270, Bot. 400.
- 620. Arboriculture.** (3) II. Offered in 1964-65 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.
- 630. Forestry Practices.** (3) II. Offered in the spring of 1966 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.

- 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.
- 650. Principles of Fruit and Nut Growing I.** (3) I. Offered in the fall of 1965 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.
- 660. Principles of Fruit and Nut Growing II.** (3) II. Offered in the spring of 1966 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.
- 670. Systematic Olericulture and Pomology.** (3) I. Offered in the fall of 1965 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.
- 675. Storage of Horticultural Products.** (3) I. Offered in the fall of 1964 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.
- 680. Spraying.** (3) II. Offered in the spring of 1965 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.
- 690. Vegetable Crops I.** (3) I. Offered in the fall of 1964 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.
- 700. Vegetable Crops II.** (3) II. Offered in the spring of 1965 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.
- 710. Principles of Floriculture.** (3) I. Offered in the fall of 1964 and alt. years thereafter. Study of the culture of greenhouse crops. Two hours rec. and three hours lab. a week. Pr.: Hort. 200.
- 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

- 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.
- 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.
- 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.
- 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.

- 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.
- 850. Horticulture Graduate Seminar.** (1) I, II. A discussion of investigational works in the various branches of horticulture. Pr.: Hort. 790 and graduate standing.
- 860. Advanced Ornamental Horticulture.** (1-3) I, II, S. Intensive study of a special phase of ornamental horticulture. Pr.: Hort. 600, 610 or 620.

POULTRY SCIENCE

THOMAS B. AVERY,* *Head of Department*

Professors Avery, Craig* and Sanford;* Assistant Professors Adams, Fry* and Smith;* Instructor Kahrs; Emeritus: Professor Payne**

The poultry plant, which is devoted to breeding, rearing, and management of stock used for class and experimental work, occupies 24 acres, and is situated at the northeast corner of the campus. An additional 80 acres located northwest of the campus is used primarily as a turkey farm and rearing range for young chickens.

Major work leading to the degree Master of Science is offered in the fields of poultry management, poultry products technology, poultry breeding, poultry bacteriology, and poultry nutrition, with the collaboration of a representative of the special field chosen for the major work.

Major work leading to the degree Doctor of Philosophy is offered in poultry genetics, animal breeding and animal nutrition.

Prerequisite to major graduate work in these fields is the completion of a four-year curriculum substantially equivalent to that required of undergraduate students in general agriculture and including elementary work in the physical and biological sciences sufficient to prepare the student for advanced work in the field chosen.

Facilities for carrying on advanced work in poultry science include an excellent poultry library and 35,000 references to technical research work, and a poultry plant of numerous special poultry houses. The facilities include well-equipped laboratories of the Agricultural Experiment Station.

FOR UNDERGRADUATE CREDIT

- 100. Farm Poultry Production Lecture.** (2) I, II, S. An introductory course presenting numerous phases of poultry production, processing, management, marketing. Two hours rec. a week.
- 101. Farm Poultry Production Laboratory.** (1) I, II, S. Practical work, identifying breeds and varieties, judging and selecting laying stock and breeding stock; study of poultry houses and equipment; market dressing. Three hours lab. a week.
- 111. Poultry Practicums.** (2) II. Offered on demand. 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.: Pl. Sc. 100, 101, or 200.
- 200. Nutrition and Management of Farm Animals.** (4) I, II. Basic and applied nutrition and management of beef cattle, dairy cattle, horses, poultry, sheep, and swine. Three hours lec. and three hours lab. a week. Pr.: Zool. 200 and Chem. 190 or 350. Taught in cooperation with the Departments of Dairy Science and Animal Husbandry.
- 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 Animal Husbandry and Dairy Science.

- 202. Poultry Science.** (2) II and on demand. Application of basic principles of animal agriculture to the poultry industry. Four hours lab. a week. Pr.: Pl. Sc. 201 or conc. enrollment.
- 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.: Pl. Sc. 100, 101, or 200.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. Poultry Products Technology.** (3) I. Offered in 1965-66 and alt. years. Emphasis on the technological problems that exist between producer and consumer in the production and distribution of poultry and eggs; poultry processing, tenderness, shelf-life and packaging; egg grading, preservation, chemical changes, bacterial problems, and egg products. Two hours rec. and three hours lab. a week. Pr.: Pl. Sc. 100, 101, or 200; Chem. 190, 191; or 350, 351; Bact. 220.
- 610. 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.: Pl. Sc. 100, 101, or 200.
- 620. Avian Metabolism.** (3) I. Offered in 1964-65 and alt. years. Special emphasis on the physiological processes in reproduction, digestion, absorption, circulation, respiration, excretion and internal secretions. Three hours rec. a week. Pr.: Pl. Sc. 100, 101, or 200, Zool. 200.
- 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.: Pl. Sc. 100, 101, or 200; consult instructors.
- 635. Genetics of Poultry and Dairy Cattle I.** (4) I. (See Dairy Science 635.) Introduction to the genetics of qualitative and quantitative traits in poultry and dairy cattle. 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.
- 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.: Pl. Sc. 100, 101, or 200; senior or graduate standing.
- 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.: Pl. Sc. 100, 101, or 200.
- 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.: Pl. Sc. 100, 101, or 200.
- 735. Genetics of Poultry and Dairy Cattle II.** (4) II. (See Dairy Science 735.) Advanced genetics of qualitative and quantitative traits in poultry and dairy cattle. 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.: Poultry and Dairy Genetics I.

FOR GRADUATE CREDIT

- 800. Research in Poultry Science.** Credit arranged. I, II, S. Investigations which may form the basis of a master's or doctor's thesis. Con-

ferences by appointment. Pr.: Pl. Sc. 100, 101, or 200; consult instructors.

Advanced (Poultry) Farm Organization. (See Ag. Ec. 410.)

Poultry Sanitation. (See Bact. 620.)

Avian Anatomy. (See Anat. 801.)

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

805. Animal Breeding Seminar. (1) II. Evaluation of animal experimentation as related to reproduction and breeding.

The Kansas Agricultural Experiment Station

GLENN H. BECK, *Dean*

C. PEAIRS WILSON, *Director*

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, Biochemistry, Dairy Science, Economics and Sociology, Entomology, Flour and Feed Milling Industries, Home Economics, Horticulture, Poultry Science, Bacteriology, Botany and Plant Pathology, Chemical Engineering, Chemistry, Physics, Psychology, Statistics, Veterinary Medicine, and Zoology.

An annual budget of more than \$4 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 all schools 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.

MOUND VALLEY BRANCH STATION

The Mound Valley Branch Station was established by the 1949 legislature. It consists of 282 acres. The station is devoted to the study of soil, crops, and dairy nutrition. A major objective of the station is to study the relationship of soil and soil treatments to the quality of the feed produced as measured by the performances of dairy cows. To facilitate this study, a herd of identical twin dairy cows and heifers has been assembled. It is one of the largest herds of identical twin dairy animals in the United States.

Soil fertility, forage crop improvement, and crop production studies are major enterprises on the station.

EXPERIMENT FIELDS AND IRRIGATION DEVELOPMENT FARMS

The Kansas Agricultural Experiment Station also includes experiment fields in Southwestern Kansas (Minneola), East-central Kansas (Ottawa), St. John, South-central Kansas (Hutchinson), North-central Kansas (Belleville), Columbus, Chetopa, Scandia, Newton, Powhattan, and Wathena.

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, Landscape Architecture, Urban and Regional Planning, Architectural Engineering and the Arts associated with these professions. Specific course sequences combine instruction in the laws of science as well as art. The undergraduate and graduate programs are carefully designed to develop understanding and sensitivity for the needs of our physical environment.

Men associated with these professions will be 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 curriculums:

Architecture—curriculum on page 95

Architectural Engineering—curriculum on page 96

Landscape Architecture—curriculum on page 97

A general description of each of these curriculums, course offerings and graduate programs is presented on pages 98 through 103.

The College of Architecture and Design offers work at the graduate level leading to the degrees Master of Architecture, Master of Science in Architectural Engineering, Master of Science in Landscape Architecture, Master of Regional Planning and Master of Arts. Additional information on the graduate programs is included under Graduate School, page 39.

The approved Social Science and Humanities electives for students enrolled in the College of Architecture and Design are listed on page 231.

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 percent 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 listed in the curriculums of the College of Architecture and Design may be taken during the summer session. This is especially advantageous for those who wish to remove deficiencies in mathematics, physics, applied mechanics, drawing and painting.

Summer work is offered in freehand drawing, water color, oil painting, and art history for art majors and secondary school teachers. Courses in Architectural Design, Landscape Architecture, Theory of Structures and Regional Planning are also available.

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			
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Arch.	270	Hist. Arch. I	2	Arch.	274	Hist. Arch. II	2
Arch.	202	Basic Drawing	2	Arch.	202	Basic Drawing	2
Arch.	207	Arch. Graph. I	2	Arch.	208	Arch. Graph. II	2
Math.	220	Anal. Geom. & Calc. I ..	4	Arch.	222	Water Color Painting	2
Spch.	105	Oral Comm. I	2	Econ.	110	Economics I	3
		Air or Mil. Sci. 1a	1	Arch.	216	Intro. to Arch.	1
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. 1b	1
Arch.	110	Arch. Lectures	0	Ph. Ed.	010	Physical Education	0
				Arch.	118	Arch. Assembly	0
Total				Total			
16				16			

SECOND YEAR

Phys.	211	Gen. Phys. I	4	Phys.	212	Gen. Phys. II	4
Arch.	235	El. Arch. Design	4	Arch.	235	El. Arch. Design	4
Arch.	278	Hist. Arch. III	2	Arch.	280	Hist. Arch. IV	2
Arch.	300	Bldg. Matls. & Constr. ..	3	Ap. M.	205	Appl. Mech. A	3
Arch.	211	Sketching	2			Elective	2
		Air or Mil. Sci. 2a	1	Arch.	118	Air or Mil. Sci. 2b	1
Arch.	118	Arch. Assembly	0	Arch.	118	Arch. Assembly	0
Total				Total			
16				16			

THIRD YEAR

Arch.	430	Int. Arch. Design	5	Arch.	430	Int. Arch. Design	5
M. E.	406	Air Cond. A	3	Arch.	421	Timber Struc.	2
Ap. M.	220	Strength of Matls. A	3	Arch.	420	Theory of Struc. I	3
Ap. M.	224	Strength of Matls. A Lab.	1	E. E.	406	Illumination A	2
Arch.	310	Working Drawings	3	Arch.	224	Fig. & Port. Draw.	2
Engl.	090	English Proficiency	0			Elective	3
Arch.	118	Arch. Assembly	0	Arch.	118	Arch. Assembly	0
Total				Total			
15				17			

FOURTH YEAR

Arch.	422	Theory of Struc. II	4	Arch.	428	Theory of Struc. III	4
Arch.	430	Int. Arch. Design	5	Arch.	430	Int. Arch. Design	5
Arch.	435	Building Equip. I	3	Arch.	437	Building Equip. II	3
		Elective	4	Arch.	118	Arch. Assembly	0
Arch.	118	Arch. Assembly	0			Elective	4
Total				Total			
16				16			

FIFTH YEAR

Arch.	620	City Planning Prin.	3	Arch.	630	City Planning or	
Arch.	525	Arch. Design	5	Arch.	640	Urban Design	3
Arch.	535	Prof. Practice	3	Arch.	525	Arch. Design	5
		Elective	6			*Social Science or	
Arch.	390	Inspection Trip	0			Hum. Elect.	7
Arch.	118	Arch. Assembly	0	Arch.	118	Arch. Assembly	0
Total				Total			
17				15			

Number of hours required for graduation, 160.

See list of recommended electives on page 231.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

Curriculum in Architectural Engineering***B. S. in Architectural Engineering***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
	<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>	
Engl.	100 Engl. Comp. I	3	Engl.	120 Engl. Comp. II	3		
Chem.	210 Chemistry I	5	Chem.	230 Chemistry II	3		
Arch.	207 Arch. Graphics I	2	Arch.	208 Arch. Graphics II	2		
Math.	220 Anal. Geom. & Calc. I ..	4	Math.	221 Anal. Geom. & Calc. II .	4		
Arch.	202 Basic Drawing	2	Arch.	211 Sketching	2		
Arch.	220 Intro. Arch. Engg.	1	Arch.	200 Apprec. of Arch.	3		
	Air or Mil. Sci. 1a	1		Air or Mil. Sci. 1b	1		
Ph. Ed.	010 Physical Education	0	Ph. Ed.	010 Physical Education	0		
Arch.	110 Arch. Lectures	0	Arch.	118 Arch. Assembly	0		
Total	.....	18	Total	.....	18		

SOPHOMORE

Phys.	310 Engg. Physics I	5	Phys.	311 Engg. Physics II	5
Math.	222 Anal. Geom. & Calc. III	4	Math.	240 Series & Diff. Eq.	4
Arch.	300 Bldg. Matls. & Constr. .	3	M. E.	400 Elements of Thermo.	3
C. E.	220 Surveying I	2	Ap. M.	305 Statics	3
Econ.	110 Economics I	3	Spch.	105 Oral Comm. I	2
	Air or Mil. Sci. 2a	1		Air or Mil. Sci. 2b	1
Ph. Ed.	010 Physical Education	0	Ph. Ed.	010 Physical Education	0
Arch.	118 Arch. Assembly	0	Arch.	118 Arch. Assembly	0
Total	.....	18	Total	.....	18

SUMMER

Ap. M.	415 Mech. of Materials	3
Ap. M.	418 Mech. of Matls. Lab.	1
E. E.	400 Elec. Engineering C	2
E. E.	402 Elec. Engineering Lab. ..	1
Total	.....	7

JUNIOR

C. E.	421 Stress Analysis I	3	Arch.	424 Theory of Struc. I	2
C. E.	424 Stress Anal. I Lab.	2	C. E.	470 Des. Framed Struc.	3
Arch.	235 Elem. Arch. Design	4	Arch.	235 Elem. Arch. Design	4
Bot.	121 Biology I	4		Social Science Elec.*	4
Ap. M.	412 Dynamics	3	C. E.	428 Stress Analysis II	3
C. E.	450 Soil Mechanics I	2	C. E.	460 Foundations	2
Engl.	090 English Proficiency	0	Arch.	118 Arch. Assembly	0
Arch.	118 Arch. Assembly	0			
Total	.....	18	Total	.....	18

SENIOR

Arch.	430 Int. Arch. Design	5	Arch.	535 Prof. Practice	3
Arch.	310 Working Drawings	3	Arch.	436 Building Equip. II	3
Arch.	434 Building Equip. I	3	E. E.	406 Illumination A	2
C. E.	478 Rein. Conc. Design	2	Arch.	440 Arch. Engg.	3
C. E.	480 Rein. Conc. Des. Lab.	2		Social Science or	
M. E.	406 Air Conditioning A	3		Human. Elec.*	6
Arch.	390 Inspection Trip	0	Arch.	118 Arch. Assembly	0
Arch.	118 Arch. Assembly	0			
Total	.....	18	Total	.....	17

Number of hours required for graduation, 150.

See list of recommended electives on page 231.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** The Architectural Engineering Curriculum is in the process of revision in order to strengthen the offerings in Architectural Structures and Mechanical Equipment. It is anticipated that Mechanical and Structural options in Architecture will replace the single Architectural Engineering Curriculum by 1965 to permit more concentration in these important aspects of building.

Curriculum in Landscape Architecture*B. S. in Landscape Architecture***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
L. A.	100	Landscape Design	3	Hort.	270	Plant Matls. II	3
Arch.	207	Arch. Graphics I	2	Agron.	200	Plant Science	4
Bot.	200	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Engl.	100	Gen. Botany	4	Arch.	208	Arch. Graphics II	2
		Air or Mil. Sci. 1a	1	Chem.	210	Chemistry I	5
		Elective	2			Air or Mil. Sci. 1b	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
L. A.	401	L. A. Seminar	0	L. A.	401	L. A. Seminar	0
Total			16	Total			18

SOPHOMORE

L. A.	441	Planting Design	2	L. A.	481	Hist. & Theory of L. D. .	3
Hort.	260	Plant Matls. I	3	C. E.	213	Plane Surveying	3
Math.	150	Plane Trigonometry	3	Arch.	300	Bldg. Matls. & Constr. .	3
Speh.	105	Oral Comm. I	2	Arch.	235	El. Arch. Design	4
Arch.	235	El. Arch. Design	4	Hort.	600	Land. Horticulture	3
Arch.	202	Basic Drawing	2			Air or Mil. Sci. 2b	1
		Air or Mil. Sci. 2a	1	L. A.	401	L. A. Seminar	0
Engl.	090	English Proficiency	0				
L. A.	401	L. A. Seminar	0	Total			17
Total			17	Total			17

JUNIOR

L. A.	761	El. Land. Arch.	4	L. A.	761	El. Land. Arch.	4
L. A.	721	Land. Constr.	3	L. A.	721	Land. Constr.	3
Agron.	270	Soils or		Bot.	470	Plant Ecology	3
Geog.	207	Int. Phys. Geog.	4	L. A.	420	Community Planning	3
Arch.	200	Apprec. of Arch.	3	Arch.	222	Water Color Painting	2
Arch.	211	Sketching	2			Elective	3
L. A.	441	Planting Design	2	L. A.	401	L. A. Seminar	0
L. A.	401	L. A. Seminar	0	Total			18
Total			18	Total			18

SENIOR

L. A.	771	Land. Arch.	4	L. A.	785	Parks & Rec. Areas	3
Ec. Soc.	608	Economics I	3	L. A.	771	Land. Arch.	4
Ec. Soc.	110	Urban Sociology	3	L. A.	731	Prof. Practice	1
		Elective	10	Arch.	450	Sculpture	2
L. A.	401	L. A. Seminar	0			Elective	7
				L. A.	401	L. A. Seminar	0
Total			17	Total			17

Number of hours required for graduation, 138.

**Suggested electives for students enrolled in
Landscape Architecture**

Art	245	Contemporary Homes	3	Bot.	470	Plant Ecology	3
Art	265	Ceramics I	2	Bot.	690	Taxonomic Botany	3
Arch.	285	Hist. of Painting & Sculpture	3	C. E.	225	Surveying II	3
Arch.	310	Working Drawings	3	Hort.	610	Turf Management	2
Arch.	530	City Planning	3	L. A.	741	L. A. Problems cr. arr.	
Arch.	430	Inter. Arch. Des.	5	L. A.	771	Land. Arch.	4
Ag. E.	421	Drain. & Erosion Control	3	Psych.	465	Psychology of Art	3
Ag. Ec.	670	Land Use & Resource Conservation	4	Hort.	630	Forestry Practices	3
				Psych.	110	General Psychology	3
				C. E.	214	Route Surveying	3
				B. A.	325	Business Law I	3

ARCHITECTURE

EMIL C. FISCHER,* *Chairman of Curriculum*

Professors Chadwick, Fischer,* Heintzelman,* Helm* and Krider;* Associate Professors Beckman, Durgan,* Larmer,* Thorson, Tomasch* and White;* Assistant Professors Cool, Deibler,* Deines,* Mann,* McGraw, Miller* and Sanner; Instructors Lay, Rowland and Wendt; Emeritus: Professor Weigel*

For Curriculum, See Page 95

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 undergraduate curriculum terminates with the Bachelor of Architecture degree. Graduates enter private practice, public service, associate with architectural firms or one of the several branches of the building industry. Students are encouraged to get practical experience, during the summer vacation, in the building industry, either on construction projects or in an architect's office.

ARCHITECTURAL ENGINEERING

For Curriculum, See Page 96

The architectural engineer is particularly concerned with the design and integration of the mechanical, structural and electrical equipment in buildings. After thorough instruction in basic mathematics and science, students apply these principles to structural problems, lighting, sound control, water supply, waste disposal and heating and cooling systems for buildings. (See footnote, page 96.)

Advanced students maintain close cooperation with students in the Architectural Curriculum to assure an integration of all these elements that are necessary for the development of a proper physical environment.

The undergraduate curriculum terminates with the Bachelor of Science degree. Graduates enter private practice, associate with architects, engineers, large contractors, or manufacturers of building products. Students should acquire practical experience, during summer vacations, on construction projects or in the office of engineers, architects or contractors.

Graduate Work:

The degree Master of Architecture is offered in Architectural Design and Structural Design. The degree Master of Science is offered in Architectural Engineering.

A Master of Arts in drawing, painting and sculpture is available to students holding a bachelor's degree from a recognized college or university with an undergraduate program substantially equivalent to the program in art at this University or completion of suitable undergraduate preparation for graduate work in this field.

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

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

COURSES IN ARCHITECTURE AND ARCHITECTURAL ENGINEERING

FOR UNDERGRADUATE CREDIT

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.
- 115. Elementary Drawing.** (2) I, II. The principles and fundamentals of sketching and drawing intended for non-professional students. Six hours lab. a week. Not to be taken for credit by students enrolled in Architecture and Art.
- 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.
- 142. Creative Drawing.** (2) S. Creative approach to freehand drawing for beginning or advanced students. Various media, such as charcoal, pencil, or pen and ink, may be employed. Six hours studio a week. Pr.: Approval of instructor.
- 155. Elementary Painting.** (2) I, II. The principles and fundamentals of painting in oil or water color intended for non-professional students. Six hours lab. a week. Not to be taken for credit by students enrolled in Architecture and Art.
- 188. Creative Painting.** (2) S. Creative approach to painting for beginning or advanced students. Work may be carried out in water color, oil, or other media. Six hours studio a week. Pr.: Approval of instructor.
- 200. 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.
- 202. Basic Drawing.** (2) I, II. Course in fundamentals of drawing. May not be taken for more than two semesters. Six hours studio a week.
- 204. Pictorial Composition.** (2) I, II. Individuality of expression is encouraged and the student is stimulated to express his ideas and emotions graphically in various media. Further understanding of the creative impulse and activity is gained through discussions, reports, and readings. May not be taken for more than four semesters. Six hours studio a week.
- 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.
- 207. Architectural Graphics I.** (2) I. 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.
- 208. Architectural Graphics II.** (2) II. Introduction of third dimensional aspect in drawing—perspective, shades, and shadows. Six hours lab. a week. Pr.: Arch. 207 or equiv.
- 211. Sketching.** (2) I, II. Work in pencil, pen and ink, wash, and other media for sketching or rendering; both studio and outdoor work. May not be taken for more than eight credit hours. Six hours studio a week. Pr.: Arch. 202 or approval of instructor.
- 216. Introduction to Architecture.** (1) II. The theory of architecture; investigation of fundamental concepts to properly relate the profession of society and its physical environment. One hour rec. a week.
- 220. Introduction to Architectural Engineering.** (1) I. A discussion of the architectural engineering profession, including the qualifications and duties of an architectural engineer. One hour rec. a week.
- 222. Water Color Painting.** (2) I, II. Painting in water color and other water-soluble media; includes both studio and outdoor painting and sketching. May not be taken for more than eight credit hours. Six hours studio a week. Pr.: Arch. 202 or approval of instructor.

- 224. Figure and Portrait Drawing.** (2) I, II. May not be taken for more than 12 credit hours. Six hours studio a week. Pr.: Arch. 202.
- 226. Commercial Illustration.** (2) I, II. Course is planned to assist the student in developing a creative approach to commercial problems. Starting with fundamentals of the design of lettering and simple posters, subsequent semesters deal with composition of more complex problems such as magazine and newspaper advertising layouts. Following this is the study of the design of brochures, packaging, book jackets, etc. For the student wishing to major in commercial art, the last semesters will be devoted to preparing finished illustrations where well-designed layouts are developed with appropriate techniques. May not be taken for more than 12 credit hours. Six hours studio a week. Pr.: Arch. 202 or approval of instructor.
- 235. Elementary Architectural Design.** (4) I, II. A study of the fundamentals of architectural design. Discussion and graphical presentation of simple space organization and structural problems. May not be taken for more than eight credit hours. Twelve hours lab. a week. Pr.: Arch. 202, 208.
- 255. Interior Design.** (2) I, II. A study of the principles of interior architecture. Six hours lab. a week. Pr.: Arch. 235 or equiv.
- 270. History of Architecture I.** (2) I. Pre-classical and classical architecture and allied arts. Two hours rec. a week.
- 274. History of Architecture II.** (2) II. Medieval architecture and allied arts. Two hours rec. a week.
- 278. History of Architecture III.** (2) I. Renaissance architecture and allied arts. Two hours rec. a week.
- 280. History of Architecture IV.** (2) II. Cont. of Arch. 278 through modern architecture and allied arts. Two hours rec. a week. Pr.: Arch. 278.
- 285. History of Painting and Sculpture.** (3) I, II, S. Appreciation and development of painting and sculpture. Three hours rec. a week. A recommended elective for all students.
- 290. Contemporary Art.** (2) I, II, S. Appreciation and development of contemporary art. Two hours rec. a week. A recommended elective for all students.
- 300. Building Materials and Construction.** (3) I, II. An introduction to the properties and uses of the materials of construction; construction methods; occasional visits to buildings under construction. Three hours rec. a week.
- 310. Working Drawings.** (3) I, II. A study of the technique of preparing working drawings; integration of various materials and architectural units with structure. Nine hours lab. a week. Pr.: Arch. 235, 300.
- 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.
- 399. Honors Seminar in Architecture and Architectural Engineering.** Credit arranged. On sufficient demand. Selected topics in architecture and engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 406. Problems in Art.** Credit arranged. I, II, S. Work offered in drawing, painting, sculpture, commercial illustration. Pr.: Background of courses needed for work undertaken.
- 410. Etching.** Credit arranged. I, II, S. Technical principles and practice of etching on copper and zinc plate. Pr.: Arch. 224 or approval of instructor.

- 412. Block Prints.** (2) I, S. Preparation of original compositions in linoleum and wood blocks. Six hours lab. a week. Pr.: Arch. 224 or approval of instructor.
- 415. Lithography.** Credit arranged. I, II, S. Technical principles and practice of lithography on stone and metal plate and their application in creative work. Pr.: Arch. 224 or approval of instructor.
- 420. 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.
- 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. 420 or C. E. 330.
- 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. 420, 421.
- 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.
- 430. Intermediate Architectural Design.** (5) I, II, S. Discussion and analysis of more complicated building types; graphical presentation and evaluation of design solutions. May not be taken for more than 20 credit hours. Fifteen hours lab. a week. Pr.: Arch. 235.
- 435. 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.
- 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.
- 450. Sculpture.** (2) I, II. Work in three dimensions, stone, clay, metal, wood and other media to develop an understanding of mass and volume through an analysis of sculptural form. May not be taken for more than six semesters. Six hours studio a week. Pr.: Arch. 224 or approval of instructor.
- 454. Oil Painting.** (2) I, II. Principles of painting with oils and similar media; both studio and outdoor work. May not be taken for more than six semesters. Six hours studio a week. Pr.: Arch. 224 or approval of instructor.
- 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.
- 465. 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.
- 480. 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.
- 525. Architectural Design.** (5) I, II, S. Cont. of Arch. 430. May not be taken for more than 10 credit hours. Fifteen hours lab. a week. Pr.: Arch. 430.
- 535. Professional Practice.** (3) I, II. The preparation of building documents; interpretation of building codes and analysis of A. I. A. documents; office organization, client and contractor relationships. Three hours rec. a week. Pr.: Arch. 310, senior classification.

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.
- 820. Research in Painting and Sculpture.** Credit arranged. I, II, S. Original investigation or advanced study in painting, sculpture, 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. 525.
- 840. Advanced Painting and Composition.** Credit arranged. I, II, S. Advanced study and creative work in painting and composition. Pr.: Approval of instructor.
- 850. Advanced Sculpture and Composition.** Credit arranged. I, II, S. Advanced study and creative work in sculpture and composition. Pr.: Approval of instructor.

LANDSCAPE ARCHITECTURE

ROBERT P. EALY,* *Chairman of Curriculum*

Professors Ealy and Quinlan; * Assistant Professor Smith**

The degree Bachelor of Science in 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 adapting plant materials in the landscape.

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 Science in 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

- 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.
- 401. 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.)
- 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.
- 441. Planting Design.** (2) I, II. The use of plants in landscape composition; perspective and elevational sketches and plans. (May not be taken for more than six hours credit.) Six hours lab. a week. Pr.: Hort. 260 and 270.

481. History and Theory of Landscape Design. (3) I. Economic and aesthetic theory of landscape design; history and historic styles. Two hours rec. and two hours lab. a week. Pr.: L. A. 100.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 721. Landscape Construction.** (3) I, II. Construction details, grading plans, estimates, and utilities. (May not be taken for more than six credit hours.) One hour rec. and six hours lab. a week. Pr.: Arch. 208, C. E. 220, and L. A. 100.
- 731. Professional Practice.** (1) II. Ethics, office practice, contracts, and specifications. Pr.: Senior standing.
- 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.
- 761. Elementary Landscape Architecture.** (4) I, II. Graphic expression and the study of small and large home gardens and special gardens; sketch problems. (May not be taken for more than eight credit hours.) Twelve hours lab. a week. Annual field trip required. Pr.: L. A. 100 and Arch. 235.
- 771. Landscape Architecture.** (4) I, II. Designing parks, cemeteries, golf courses, recreational areas, institutional, commercial and industrial grounds; sketch problems. (May not be taken for more than 12 credit hours.) Twelve hours lab. a week. Annual field trip required. Pr.: L. A. 761.
- 785. Design of Parks and Recreational Areas.** (3) I, II. Site planning of national, state, municipal and private parks and specialized recreation areas. Pr.: L. A. 721, 761. Field trips required.

FOR GRADUATE CREDIT

- 870. Advanced Landscape Architecture.** (1-3) I, II, S. Special studies and designs in advanced landscape architecture. Pr.: L. A. 771, eight hours.
- 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.
- 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

DONALD D. WHITE, *Chairman of Curriculum*

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

- 620. City Planning Principles.** (3) I, II. A study of city planning history and procedures, land uses and controls, economic base, population projection, community facilities, rural-urban relationships, resource conservation, planning office procedures and the interrelationships of physical and non-physical factors in urban growth. Pr.: Fourth-year classification.
- 630. City Planning.** (3) I, S. Investigations of the fundamentals of planned urban and regional growth, change or redevelopment, including the interrelationships 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.
- 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.
- 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

- 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.
- 809. 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.
- 816. Advanced Planning Theory.** (3) II. Case study and analysis of concepts and trends in 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.
- 875. Planning Legislation and Regulation.** (3) I. Case studies involving public laws, enabling statutes and court precedents pertaining to planning and housing, and their local application in zoning ordinances, subdivision regulations, housing codes and other controls. Pr.: Approval of instructor.
- 885. Regional Planning.** Credit arranged. I, II, S. Original investigations in urban or regional planning and development in comprehensive form or in any of their specialized aspects. Pr.: Approval of instructor.

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, *Academic Adviser*

The College of Arts and Sciences through its 20 departments and one school, Education, 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 afforded 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
Education	Physical Science
General	Social Science
Humanities	

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 108-119.

"In each of the curriculums there are certain 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. These requirements may be fulfilled by the two-semester, eight-hour courses offered by the departments of Botany and Plant Pathology, Economics and Sociology, English and Physics. Each of these courses is designed to present an integrated study of one of these areas of human knowledge: (1) Biological Science (botany, zoology, human physiology); (2) Hu-

manities (literature, philosophy, the fine arts, religion); (3) Physical Science (astronomy, chemistry, geology, physics); and (4) Social Science (economics, history, political science, sociology). These courses are designed to give the student an idea of the fundamental principles and concepts of the subject matter involved in present-day civilization. The point of view and class activities are particularly suited to students whose professional interests are in other areas.

CURRICULUMS AND MAJORS

CURRICULUM: DEGREE:	Biological Science		Physical Science		Humanities		Social Science		General		Education		Music	
	B. S.	B. S.	B. S.	B. S.	B. A.	B. A.	B. A.	B. A.	B. A.	B. A.	B. S. in Ed.	B. S. in Ed.	B. Music	B. Music
	Bacteriology	Chemistry	Art	Economics	Area	Elementary Education	Music	Applied Music						
	Biogeography	Geography	English	Geography	Biological Science	Music Education								
	Botany	Geology	History	History	Humanities									
	Entomology	Geophysics	Mathematics	Political Science	Physical Science	Physical Education								
	Psychology	Mathematics	Modern Languages	Psychology	Social Science	Secondary Education ¹								
	Speech	Physics	Music	Sociology	Pre-Professional	Art Education								
	Technical Journalism	Statistics	Philosophy	Speech										
	Wildlife Conservation	Technical Journalism	Speech	Technical Journalism	Physical Therapy									
	Zoology		Statistics	Pre-Professional	Pre-Dentistry									
	Pre-Professional			Pre-Law	Pre-Medicine									
	Medical Technology				Pre-Law									
	Pre-Dentistry													
	Pre-Veterinary													

¹ Requirements for a major will be met in a subject-matter department.

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. 122)	Psychology (p. 179)
Biogeography (p. 140)	Speech (p. 186)
Botany (p. 124)	Technical Journalism (p. 194)
Entomology (p. 80)	Zoology (p. 197)
Fisheries and Wildlife Biology (p. 197)	

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) and Air or Military Science (for men), four hours.

III. General Education (see page 115): 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).

1. Medical Technology and Public Health Laboratory Scientists: Fulfillment of the requirements of the Curriculum in Biological Science, including Bact. 200, 250, 610, 670; Chem. 210, 230, 250, 300, 350, 420; Geog. three hours; Math. 150; Phys. 120; 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 for women or 68 semester hours for men 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. 425 or 410; 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.

V. Biological and Physical Science:

FOR ALL STUDENTS EXCEPT PRE-VETERINARY

<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
Genetics or Heredity and Eugenics ⁴	2-3	General Organic Chemistry	5
General Chemistry or Chemistry I ⁵	5	General Botany ⁸	4
Botany ⁶	4	General Entomology ⁸	3
Bacteriology ⁷	5	Bacteriology ⁶	5
General Geology or Geography elective	3	Physics (Introductory courses) ⁵	3-8
General Zoology	4		

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.

The requirements for a major in wildlife conservation are Agr. 270; Bot. 690; Stat. 320; Journ. 350; Zool. 430, 660, 670, 675, 685, 691, and 12 hours of elective to be selected from Bot. 670; Ent. 630; Zool. 405, 410, 440, 625, 630.

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
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	15 or 16

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
Air or Military Science	1	General Zoology	4
College Algebra	3	Air or Military Science	1
Physical Education	0	Physical Education	0
Social Science elective	3	Social Science elective	3
Total	16 or 17	Total	15 or 16

4. Not required of Medical Technology majors.

5. Choice to be specified by department of major.

6. Psychology and speech majors only.

7. Not required of psychology or fisheries and wildlife biology majors.

8. Not required of medical technology, psychology, and speech majors.

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

Hours required for graduation, men and women 126*

This curriculum is designed to prepare students to teach in elementary and secondary schools. Students can prepare for teaching the subjects commonly taught in these schools, including the specialized areas of art, music, and physical education.

This curriculum provides the following major fields: art education, elementary education, secondary education, music education, physical education. Special curriculums exist in Agricultural Education, page 56, and Home Economics Teaching, page 264.

The major in elementary education meets the requirements for the degree Elementary Certificate as established by the State Board of Education. 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.

Major Fields

Art Education
Elementary Education
Music Education
Secondary Education¹

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 115):

1. Social science (including history), 10 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.

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.

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.

* Except for Music Education, which requires 132 hours for men and 128 hours for women.

1. 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.

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

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 five semester hours in directed teaching and a minimum of three semester hours in methods, eight hours.

IV. Physical Education (two semesters) and Air or Military Science, four hours.

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).

Art Education: Art 100 or Arch. 204; Art 190; Art 200 or Arch. 204; Art 260, 265; Art 290 or Arch. 226; Art 365; Art 401 or Arch. 285; Art 560; Art 690 or Arch. 200; Art 787; Arch. 222, 224, 450, 454; Psych. 465; and two-hour art elective.

Elementary Education: Ph. Ed. 355, 380; Art 170; Music 205; Engl. 470; Educ. 470, 471, 472, 473; and Psych. 425. The selection of electives must be planned so that there will be at least 24 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 used as a part of the 45-hour state department general education requirement may also be counted toward the requirement of 24 hours. The general studies courses in the field of concentration, however, may be replaced by departmental courses in the field in order that there may be no duplication.

Modern Language: 24 hours of language.

Music Education: Music 201, 202, 231, 250, 304, 305, 401, 402, 412, 413, 421, 422, 501, 502, 505 and 515; Educ. 416 (six hours); and Phys. 125. Majors with an instrument option must also include Music 630. Each student must take 22 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. One year of work in Piano Ensemble is required. Recital attendance and participation in a music organization are required each semester.

Physical Education: For Women, Ph. Ed. 161, 290, 306, 310, 320, 331, 351, 356, 360, 380, 460, 506 or 560, 515, 526, 530, 555, 566, 575, 580.

Physical Education: For Men, Ph. Ed. 161, 206, 216, 225, 230, 235, 241, 290, 351, 356, 410, 450, 455, 460, 475, 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, 485 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.

Biological Science: Bact. 220; Bot. 200, 670, or 690; Chem. 110; Entom. 211; Geog. 205; Zool. 200, 425, 440; 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. 200; Chem. 210, 230, 250, 300, 511, 512, 585; Geol. 100; Math. 100, 150, 220, 221, 222; Phys. 310, 311, 560; Zool. 200.

Economics: Econ. 110, 120, 430, 710; Math. 100; B. A. 273; P. Sci. 120; Soc. 220; Stat. 320; six hours of history; three hours of sociology; 12 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 with the advice of student's adviser.

English: Engl. 230 or 240, 350 or 651, 430, 451, 475, and 16 hours in advanced courses in English and American literature.

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.

Geology: Bot. 210; Chem. 210, 230; Econ. 110; Geog. 207; Geol. 100, 110, 420, 430, 450, 460; Math. 100, 150, 220; Phys. 210, 211; P. Sci. 220; Zool. 205.

History: Hist. 111, 112, 165, 170; P. Sci. 220, 225; three hours each in economics and sociology, plus 12 hours in history.

Industrial Arts: A minimum of 40 semester hours, including basic courses and electives which are to be chosen in consultation with an adviser.

Basic Courses: I. E. 203, 212, 250, 312; Arch. 202; M. E. 211, 216.

Journalism: Engl. 270; Geog. 205; Hist. 180; Phil. 150; 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; and 12 hours of mathematics, including Math. 570 and 511 if possible.

Modern Languages: 24 hours of one language and the fulfillment of the requirements for a second teaching field.

Physical Science: Bot. 200; Chem. 210, 230, 250, 350; Geol. 100, 430; Math. 220, 221; Phys. 310, 311, 560; Zool. 200.

Physics: Bot. 200;* Chem. 210, 230, 250, 350; Geol. 100; Math. 220, 221, 222; Phys. 310, 311, 410,* 420,* 432, 450,* 460,* 472, 473, 560; Zool. 200.*

Political Science: Hist. 111, 112, 165, 170; P. Sci. 220, 225; three hours each in economics and sociology, plus 18 hours in political science.

Psychology: Math. 100 or 110; 18 hours in psychology beyond curricular requirements, and fulfillment of the requirements for a second teaching field.

Sociology: Econ. 110; Soc. 220, 615, 658, 700 or 705, 750; P. Sci. 220; three hours of college mathematics, logic or philosophy of science; three hours in economics; three hours in political science; six hours in history; 10 hours in sociology.

Speech: Spch. 106, 135, 150 or 155, 176, 210, 255, 436 or 608, 453, 460 or 150, 526, 535, 635, 680; one course in two of the following: Dramatics, Radio or Correction; and six hours of speech electives.

Students in this curriculum may use the following to plan their first-year courses:

ELEMENTARY EDUCATION

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	Art for Elementary Teachers	3
Oral Communication I	2	Personal and Community Health	3
Elective	3	Elective	3
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	15 or 16

* Recommended but not required.

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
Air or Military Science	1	Oral Communication I	2
Physical Education	0	Elective and Major	3
		Air or Military Science	1
		Physical Education	0
Total	15 or 16	Total	15 or 16

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
Biology I	4	Biology II	4
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
Air or Military Science	1	Air or Military Science	1
Total	16 or 17	Total	16 or 17

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
Natural Science	4	Natural Science	4
Intro. to Physical Education	1	History of Physical Education	2
Physical Education Activities I	2	Physical Education Activities II	1
General Psychology	3	General Zoology	4
Oral Communication I	2	Air or Military Science	1
Air or Military Science	1	Physical Education	0
Physical Education	0		
Total	16	Total	15

PHYSICAL EDUCATION (WOMEN)

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	Phys. Ed. Orientation	1
Applied Nutrition	2	English Composition II	3
Natural Science	4	Natural Science	4
General Psychology	3	General Zoology	5
Oral Communication I	2	Fund. of Rhythms	2
Tumbling, Rec. Sports	2	Physical Education Lecture	0
Physical Education Lecture	0	Physical Education	0
Physical Education	0		
Total	16	Total	15

GENERAL CURRICULUM*Bachelor of Arts*

Hours required for graduation, men 132, 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, or dentistry. Students who plan to major in physical therapy should enroll in this curriculum.

Major Fields

Area Majors	Pre-Professional Majors
Biological Science	Physical Therapy ¹
Physical Science	Pre-Medicine
Humanities	Pre-Dentistry ²
Social Sciences	Pre-Law ³

REQUIREMENTS

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

II. Physical Education (two semesters) and Air or Military Science (for men), four hours.

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 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

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.

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.

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	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
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
Air or Military Science	1	Elective or Major	4
Physical Education	0	Air or Military Science	1
	—	Physical Education	0
Total	16 or 17	Total	16 or 17

CURRICULUM IN HUMANITIES*Bachelor of Arts*

Hours required for graduation, men 124, 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. 277)	Music (p. 161)
English (p. 135)	Philosophy (p. 149)
History (p. 145)	Speech (p. 186)
Mathematics (p. 152)	Statistics (p. 192)
Modern Languages (p. 157)	

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) and Air or Military Science (for men), four hours.

V. General Education (see page 115): 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: Arch. 200, 202, 204, 222, 224, 226, 285, 290, 410, 412, 415, 450, 454; and Art 260, 265, 365, 560.

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
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	15 or 16

CURRICULUM IN APPLIED MUSIC

Bachelor of Music

Hours required for graduation, men 132, 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 161.

REQUIREMENTS

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

II. Physical Education (two semesters) and **Air or Military Science** (for men), four hours.

III. General Psychology (three hours) and **Physics for Musicians** (two hours).

IV. General Education (see page 115): 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 161.

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
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	16 or 17

CURRICULUM IN PHYSICAL SCIENCE

Bachelor of Science

Hours required for graduation, men 132, women 128

This curriculum provides for the needs of the student who desires major work in 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. 126)	Physics (p. 172)
Geochemistry (p. 140)	Option I Physics
Geography (p. 140)	Option II Industrial
Geology (p. 140)	Option III Meteorology
Geophysics (p. 140)	Option IV Biophysics
Mathematics (p. 152)	Statistics (p. 192)
	Technical Journalism (p. 194)

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, Qualitative Analysis, 10 hours.¹

IV. General Geology, three hours.

V. Engineering Physics I and II, 10 hours.²

VI. General Education (see page 114): Biological science, eight hours; social science, eight hours; humanities, eight hours.

VII. Physical Education (two semesters) and Air or Military Science (for men), four hours.

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	Air or Military Science	1
Oral Communication I	2	Physical Education	0
Air or Military Science	1		
Physical Education	0		
Total	16 or 17	Total	16 or 17

1. Change to Chemistry I and II (eight hours) for students intending to major in mathematics or statistics, or to Chemistry I and II and Chemistry II Laboratory (10 hours) for students intending to major in geography, geology, geochemistry, or physics.

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 124, 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

- | | |
|----------------------------|-------------------------------|
| Economics (p. 131) | Psychology (p. 179) |
| Geography (p. 140) | Sociology (p. 183) |
| History (p. 145) | Speech (p. 186) |
| Political Science (p. 176) | Technical Journalism (p. 194) |

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) and Air or Military Science (for men), four hours.

V. General Education (see page 115): 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
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	16 or 17

AIR SCIENCE

BERTRAM L. RUGGLES, *Head of Department*

Assistant Professors Bacon, Bright, Hetland, Hollingworth, Tolley, Whitman

The Air Force Reserve Officers Training Corps provides the principal avenue whereby college students may prepare for service as officers in the United States Air Force. Students who become advanced cadets and finish four years of Air Science courses will, upon graduation, be commissioned second lieutenants and enter active duty soon thereafter for a specified period. Distinguished graduates are offered regular commissions in the U. S. Air Force.

Freshmen and sophomores entering Kansas State University and required to receive Reserve Officer Training may elect to take their training in the Air Science Basic Course. The Basic Course is a four-semester sequence of instruction with one semester hour credit for each unit. During the first and fourth semesters, the Air Force ROTC cadet will receive two hours of instruction a week; during the second and third semesters, three.

Upon completion of the Basic Course, voluntary students who apply and are selected may enter the Advanced Course leading to the commission. During the sophomore year they are provided the opportunity to take written and physical tests to determine their qualification. (Cadets desiring pilot training upon graduation must meet somewhat higher physical standards, especially with regard to the eyes, than those not desiring pilot training.) Final acceptance of cadets into the Advanced Course will also be based upon character, scholarship, and record in the Basic Course.

Advanced cadets—those enrolled in the Advanced Course—will complete four semesters of advanced Air Science courses of three semester hours each. In addition, they will carry out responsibilities for the command, administration, and training of the cadet corps. They are also committed to a four-week period of summer training, usually at the end of their junior year. During the Advanced Course and including summer training, they receive pay at a rate fixed by federal legislation. Advanced cadets electing and qualifying for flying training will receive light aircraft instruction free of charge during their senior year unless they already possess a pilot's license.

Advanced cadets who desire to continue with graduate study may apply to have their active duty deferred until after a period of graduate study. Advanced cadets who have excellent scholastic records in engineering, science, or mathematics may apply for Air Force-sponsored graduate study at full pay while serving as Air Force officers.

The general requirement for ROTC training at Kansas State University is stated in Kansas General Statutes, 1949, 76-436, as amended by the 1957 Legislature. This stipulates that, in the land-grant colleges of this state, all regularly enrolled male students who are physically qualified shall take military training during the freshman and sophomore years, except those exempted by the Registrar due to age, religious belief, foreign citizenship, and/or previous training in the armed forces.

Transfer students entering with 25 semester hours of advanced academic credit are excused from the second year of the Basic Course; those with 59 hours, from both years. Those desiring to enter the Advanced Course must arrange to take all four semesters of the Basic Course. A student excused or exempted from any part of the Basic Course will have to take substitute courses in other departments in order to meet total requirements for graduation.

Students enrolled in the Basic Course are furnished uniforms, texts, and other necessary material. These articles are the property of the United States 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. Students enrolled in the Advanced Course are issued officer-type uniforms which become theirs upon completion of the course, but which must be returned in the event of withdrawal before graduation.

AFROTC cadets may apply for, and on a selective basis, receive draft-deferment agreements while continuing in reserve officers training.

SENIOR DIVISION, AFROTC

BASIC COURSES

- 113. Air Vehicles IA.** (1) I. Introduction to the AFROTC Program, followed by leadership training to develop self-discipline within the framework of a formal organization and to achieve competence in basic military fundamentals by participation in military formations and ceremonies. Two hours a week, including Leadership Laboratory.
- 114. Air Vehicles 1B.** (1) II. A survey of the constituent elements of air power, basic aeronautical science, and the organization and operation of the military arm of the Federal Government. Discussion of the professional opportunities offered by the United States Air Force. Three hours a week, including Leadership Laboratory.
- 200. World Military Systems 2A.** (1) I. A comparative study of world military forces to include Free World land, naval, and air forces; communist military systems, and trends in the development and employment of military power. Three hours a week, including Leadership Laboratory. (USAF: OE200A)
- 201. World Military Systems 2B.** (1) II. Cont. of 200, with emphasis on the role of the United States Air Force. Two hours a week, including Leadership Laboratory. (USAF: OE200B)

ADVANCED COURSES

- 300. Aerospace Power 3A.** (3) I. Survey of the development of air power in the United States; mission and organization of the Defense Department; Air Force concepts, doctrine, and employment. Three class hours a week, one hour of supervised research, and one hour of Leadership Laboratory. (USAF: OE300A)
- 301. Military Astronautics and Space Operations 3B.** (3) II. Survey of U. S. space programs, vehicles, systems and problems in space exploration. Includes study of the future development of aerospace power. Three class hours a week, one hour of supervised research, and one hour of Leadership Laboratory. (USAF: OE300B)
- 380. Weather and Navigation 4A.** (1) I. Introduction to weather and navigation equivalent to that required for a private pilot's license. Required of advanced Air Force ROTC cadets enrolled in Flying Instruction Program. One hour rec. a week.
- 381. Briefing for Air Force Commissioned Service 4B.** (1) II. Ordinarily taken by advanced Air Force ROTC cadets during their last semester of officer training. Provides specific understanding of processes and procedures incident to entering upon active duty as an officer in the U. S. Air Force. One hour rec. a week.
- 399. Problems in Air Science.** Credit arranged. I, II. Work offered in any of the Air Force ROTC basic or advanced courses for students out of phase for graduation; material covered in a basic or advanced course. Pr.: Consent of department head.

ATHLETICS

HORACE B. LEE, *Head of Department*

Professors Lee and Winter; Assistant Professors Dodds and Knorr; Instructor Morgan; Coach Weaver; Assistant Coaches Dissinger, Hailey, Kadlec, LaRue, Lawrence and Towers; Assistant Athletic Director Barrett

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,* Harris* and Lord;* Associate Professors Erwin,* Fina,* McMahon* and Miller;* Assistant Professor Consigli;* Instructor Vera; Emeritus: Professor Gaine*y**

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. 250 or equiv., 610, 670, 675 (or 710), and eight additional hours which may include Zool. 252 and/or any selection of bacteriology courses above the introductory level; Chem. 210, 230, 250, 300, 350, 351; Biochem. 420; Geog. 115; Phys. 211, 212; Spch. 200; and A. H. 400; Math. 100, 150 should be taken to satisfy requirement IV (p. 108).

For a minor, the following courses should be completed: Bact. 220 or equiv. and 10 semester hours in the 400-799 group.

GRADUATE

The Department of Bacteriology offers work leading to the degrees Master of Science and Doctor of Philosophy in various fields of bacteriology including dairy, food, general, microbial genetics, immunology, physiology, poultry disease, sanitary, soil, and virology.

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.

Modern equipment and facilities for pursuing graduate studies are available in the department. In addition, laboratories and research equipment of the Agricultural Experiment Station are available to graduate students. The university library is well equipped in the field of bacteriology and in the allied biological and physical sciences.

FOR UNDERGRADUATE CREDIT

190. Water and Sewage Bacteriology. (3) I, II. Water purification, analyses of water supplies, role of microorganisms in sewage disposal. One hour rec. and six hours lab. a week. For students in engineering curriculums. Pr.: Chem. 230.

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.

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.

250. Bacteriology. (5) I, II. General characteristics and methods of cultivation and identification of bacteria and closely related organisms. Study of the biochemical changes wrought by bacteria. Three hours

rec. and six hours lab. a week. Required of students majoring in biological science. Pr.: Chem. 230 and 351 or equiv.

- 310. Veterinary Microbiology.** (3) I. Morphology, physiology, biology, and classification of microorganisms; cultural and staining technique; microbiology in dairy sanitation and inspection. One hour rec. and six hours lab. a week. For students in College of Veterinary Medicine. Pr.: Biochem. 420.
- 340. Pathogenic Bacteriology and Virology.** (4) II. Cont. of Bact. 310. Microorganisms and viruses which cause infectious diseases of domesticated animals. Two hours rec. and six hours lab. a week. Pr.: Bact. 310.
- 370. Veterinary Immunology.** (3) I. Principles of immunology; preparation of antisera, antigens, and vaccines; serodiagnosis of infectious diseases. One hour rec. and six hours lab. a week. Pr.: Bact. 340.
- 399. Honors Seminar in Microbiology.** (1) I, II. Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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. 250 or equiv.
- 615. Dairy Bacteriology.** (4) II. Bacteriology of milk and milk products. Two hours rec. and four hours lab. a week. Pr.: Bact. 220 or equiv.
- 620. Poultry Sanitation.** (3) I. Methods of control of poultry diseases. Two hours rec. and three hours lab. a week. Pr.: Bact. 220 or equiv.
- 630. Soil Microbiology.** (3) II in odd years. Microbial population of the soil and its role in soil fertility. Pr.: Bact. 220 or equiv.; Chem. 351 or equiv.
- 635. Soil Microbiology Laboratory.** (2) II in odd years. Laboratory experiments illustrative of theories developed in Bact. 630. Six hours lab. a week. Pr.: Bact. 630 or conc. enrollment.
- 645. Microbiology of Foods.** (5) I. Microbial phenomena involved in the bacteriology and sanitation of foods, including food processing, microbial spoilage, food poisoning, and fermentation; microscopic and cultural analysis of fresh, processed, frozen, fermented, and spoiled foods, exclusive of dairy products. Three hours rec. and six hours lab. a week. Pr.: Bact. 220 or equiv.
- 670. Immunology.** (5) II. Principles of immunology; preparation, purification and standardization of biological products employed in human and veterinary medicine. Three hours rec. and six hours lab. a week. Pr.: Bact. 610 or equiv.
- 675. Physiology of Microorganisms.** (3) I. Chemistry and physics of microbial processes. Pr.: Eight hours in bacteriology; Biochem. 420.
- 710. Determinative Bacteriology.** (3) II. Isolation and identification of unknown bacteria. One hour rec. and six hours lab. a week. Pr.: Eight hours of bacteriology.
- 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.
- 745. Antibiotics.** (2) I. Development and exploitation of antibiotics in veterinary and human medicine and theories of the mode of action in livestock feeding; theories of antibiotics and effectiveness of individual antibiotics against microorganisms. Pr.: Bact. 340 or 610 or consent of instructor.
- 750. Microbiological Assay Methods.** (3) II in odd years. Theory and practice of the utilization of microorganisms for qualitative and quantitative determination of vitamins, amino acids, and antibiotics. One

- hour rec. and six hours lab. a week. Pr.: Bact. 220 or equiv.; Chem. 300.
- 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.
- 790. Bacteriology Seminar.** (1) I, II. Pr.: Consent of instructor.
- 799. Problems in Bacteriology.** Credit arranged. I, II, S. Work is offered in dairy, foods, poultry diseases, soils, physiology, and sanitation. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 825. Microbial Metabolism.** (3) II in even years. Cont. of Bact. 675, with special emphasis on microbial metabolism and uses of microorganisms in industrial fermentations. Pr.: Bact. 675.
- 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.
- 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.
- 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.
- 860. Microbial Genetic Techniques.** (2) II. Experiments in multiplication, recombination, and mutation in bacteria and bacteriophage. Pr.: Bact. 760, Biochem. 420, or equiv. Consent of instructor.
- 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.
- 999. Research in Bacteriology.** Credit arranged. I, II, S. Work is offered in the following fields: Dairy, foods, poultry diseases, soils, determinative, immunology, sanitary, physiology, ecology, virology, and genetics of microorganisms. Pr.: Sufficient training to carry on the line of research undertaken.

BOTANY AND PLANT PATHOLOGY

STUART M. PADY,* *Head of Department*

Professors Frazier and Pady;* Associate Professors Hulbert,* McCracken and Newcomb;* Assistant Professors Anderson,* Barkley,* Goss* and Kramer;* Emeritus: Professors Bates and Haymaker**

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. 55). 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. 49).

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,

anatomy, cytology, cytogenetics, and mycology. Graduate degrees are also offered in plant pathology (see p. 39).

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, general herbarium, cryptogamic herbarium, a botanical library of important advanced texts and numerous sets of botanical journals. There are available also greenhouse and experimental plots of the Agricultural Experiment Station and of the United States Department of Agriculture. The department awards annually some assistantships to graduate students and employs others for work on research projects.

FOR UNDERGRADUATE CREDIT

121. Biology I. (4) I, S.

122. Biology II. (4) II, S. Pr.: Bot. 121.

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. Not open to students with credit in Bot. 190, 210, or Zool. 205.

190. Nature and Development of Plants. (3) I, II, S. 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.

210. General Botany. (4) I, II. Plant groups and their evolutionary development; physiology, anatomy, ecology, and identification of seed plants; economic applications. Two hours rec. and six hours lab. a week. Not open to students with credit in Bot. 122 or 190.

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

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.

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.

620. Morphology of the Fungi. (3) I. Structure of slime molds, moldlike bacteria, and fungi studied to determine taxonomic relationships. One hour rec. and six hours lab. a week. Pr.: Bot. 210.

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.: Geol. 430.

670. 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.

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.

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.

- 705. Mycology.** (3) II in odd 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. 620.
- 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.
- 720. Botanical Microtechnic.** (3) II. Preparation of plant materials for histological or cytological study. One hour rec. and six hours lab. a week. Pr.: Bot. 210.
- 730. Field Botany.** (3) S. Identification and classification of seed plants. One hour rec. and six hours lab. a week. Pr.: Bot. 210.
- 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.
- 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

- 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.
- 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.
- 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.
- 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.
- 860. Advanced Plant Ecology.** (4) II in even years. Advanced study of the relationships of plants and environment at various plant developmental stages. Eight hours combined rec. and lab. a week. Pr.: Bot. 600 and 670.
- 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.
- 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.
- 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,* Lash,* Schrenk,* Searles* and Silker,* Associate Professors Kiser,* Lambert,* Lanning,* McDonald,* McDowell,* Meloan* and Moser,* Assistant Professors Conrow,* Copeland, Hammaker,* Johnson,* Setser and van Sway; Emeritus: Professor Hughes,* Assistant Professor Smits,* Instructor Crawford*

UNDERGRADUATE

For a major in chemistry, the student should enroll in the Curriculum in Physical Science, Chemistry Major. The standard core of courses in

the curriculum should be taken. 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. 220, Chem. 431, 432, 444, 450, 451, 585, 586, 595, 598, 599, 606, 666, 095 (each year). In addition one other 600 course is required. The prerequisite for this course is senior standing in chemistry. 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.

For a minor in chemistry the following courses should be completed: Chem. 210, 230, 250, 300, 350, and 351.

GRADUATE

Major work leading to the degrees Master of Science and Doctor of Philosophy 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

- 095. Chemistry Seminar.** (0) I, II. Required of all students in the Physical Science, Chemistry Major Curriculum. The meetings of the seminar are devoted to special topics, discussions, and items of interest to the undergraduate student majoring in chemistry.
- 110. General Chemistry.** (5) I, II, S. Principal laws and theories of chemistry; important metallic and non-metallic substances. Three hours rec. and six hours lab. a week. Not open to students having credit in any college courses in inorganic chemistry.
- 210. Chemistry I.*** (5) I, II, S. Beginning of the study of general chemistry. Three hours rec. and six hours lab. a week. Not open to students who have credit in Chem. 110.
- 230. Chemistry II.** (3) I, II, S. Completion of the study of general chemistry. Pr.: Chem. 210.
- 250. Chemistry II Laboratory.** (2) I, II, S. General principles of qualitative analysis. Six hours lab. a week. Pr.: Chem. 230 or conc. enrollment.
- 271. Chemical Equilibrium and Qualitative Analysis.** (4) II. Two hours rec. and six hours lab. a week. Pr.: Chem. 230 or conc. enrollment.
- 399. Honors Seminar in Chemistry.** (1) I or II.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 599. Senior Research.** (1, 2, 3) I, II, S. Analytical, inorganic, organic, physical, or biochemistry.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 601. Chemical Literature.** (1 or 2) I, II. One hour rec. and problem work in the library. Pr.: Chem.**
- 799. Problems in Chemistry.** Credit arranged. I, II, S. Problems may include classroom or laboratory work, and are offered in inorganic, analytical, organic, physical, agricultural chemistry, biochemistry and animal nutrition. Not for thesis research. Pr.: Background of courses needed for the problem undertaken.

* Students with high school credit in chemistry will be given an opportunity to proceed more rapidly in Chemistry I and II than those without. This plan, effective only in fall semester, will permit well-qualified students to complete Chemistry II by the end of that semester. Qualifications will be determined through an intensive review followed by an examination.

** All chemistry courses numbered 600 or above require the following as minimum prerequisites: Chem. 516 and 517 and Chem. 595 and 598. Additional prerequisites are listed where they are applicable. Non-chemistry majors may enroll upon consent of instructor.

FOR GRADUATE CREDIT

999. Research in Chemistry. Credit arranged. I, II, S. Work is offered in analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, agricultural chemistry, biochemistry, and animal nutrition. Pr.: Sufficient training to carry on the line of research undertaken.

COURSES IN INORGANIC CHEMISTRY

FOR UNDERGRADUATE AND GRADUATE CREDIT

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.*

755. Inorganic Techniques. (2, 3) I, II, S. Synthesis of selected types of inorganic compounds and separation of elements from complex ores, with emphasis on less common laboratory techniques. Six to nine hours lab. a week. Pr.: Chem.**

765. Inorganic Heterogeneous Equilibria. (2) Alt. II. Advanced study of phase equilibria, with particular emphasis on multicomponent inorganic systems. Pr.:**

FOR GRADUATE CREDIT

802. Graduate Seminar in Inorganic Chemistry. (0-1) I, II.

807. Survey of Inorganic Chemistry. (1) I, II, S. An independent study and outside reading course followed by a comprehensive written examination. Pr.:**

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.:**

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.:**

828. Chemistry of Metals. (3) II and alt. S. Descriptive and theoretical chemistry of the transition, actinide, and lanthanide elements; alloys, metallurgy, and corrosion; preparation, classification, and characterization of the metals and their compounds. Pr.:**

829. Inorganic Reaction Mechanisms. (2) Alt. II. A theoretical and descriptive study of the mechanisms of inorganic reactions, with emphasis upon coordination compounds; substitution and isomerization reactions; kinetics; theory of coordinate bonds; electron and atom transfer reactions; and methods of studying inorganic reactions. Pr.: Chem. 606.

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

300. General Quantitative Analysis. (4) I, II, S. General procedures of volumetric, 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

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.

* See page 127.

** All chemistry courses numbered 600 or above require the following as minimum prerequisites: Chem. 516 and 517 and Chem. 595 and 598. Additional prerequisites are listed where they are applicable. Non-chemistry majors may enroll upon consent of instructor.

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

602. Qualitative Microanalysis. (3) II. Basic theories and techniques of qualitative microanalysis. One hour rec. and six hours lab. a week. Pr.:*

603. Quantitative Microanalysis. (2) S. Theories and techniques of quantitative microanalysis. Six hours lab. a week. Pr.:**

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.

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.:**

667. Instrumentation in Chemistry. (3) I. 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. Pr.: Chem. 666 or consent of instructor.

750. Systematic Analytical Chemistry. (3) II, S. Theoretical aspects of modern analytical methods, with emphasis on the chemical reactions involved. Pr.:**

FOR GRADUATE CREDIT

801. Graduate Seminar in Analytical Chemistry. (0-1) I, II.

806. Survey of Analytical Chemistry. (1) I, II, S. An independent study and outside reading course followed by a comprehensive written examination. Pr.:**

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.:**

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.:**

COURSES IN ORGANIC CHEMISTRY

FOR UNDERGRADUATE CREDIT

190. Elementary Organic Chemistry. (3) I, II, S. An introduction to the principles of organic chemistry. Conc. enrollment in Chem. 191 is required in most curricula. Pr.: Chem. 110.

191. Elementary Organic Chemistry Laboratory. (2) I, II, S. Pr.: Chem. 190 or conc. enrollment.

350. General Organic Chemistry. (3) I, II, S. Principles of aliphatic and aromatic chemistry. For agriculture, pre-veterinary, medical technician, pre-medical (see also 511), and chemical and nuclear engineering students. Conc. enrollment in Chem. 351 is required in most curricula. Pr.: Chem. 230.

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

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.

* See page 127.

** All chemistry courses numbered 600 or above require the following as minimum prerequisites: Chem. 516 and 517 and Chem. 595 and 598. Additional prerequisites are listed where they are applicable. Non-chemistry majors may enroll upon consent of instructor.

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.

432. Organic Chemistry I Laboratory. (1 or 2) I. Pr.: Chem. 431 or conc. enrollment. (Chemical engineering students only may register for 1 credit.)

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.

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

651. Qualitative Organic Analysis. (3) I, S. Characterization of organic compounds and mixtures. Pr.:**

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.:**

752. Systematic Organic Chemistry. (3) and I alt. S. Advanced study of organic compounds and fundamental types of reactions. Pr.:**

760. Advanced Organic Chemistry. (3) II of alt. years. Pr.: Chem. 752.**

FOR GRADUATE CREDIT

803. Graduate Seminar in Organic Chemistry. (0-1) I, II.

808. Survey of Organic Chemistry. (1) I, II, S. An independent study and outside reading course followed by a comprehensive written examination. Pr.:*

864. Heterocyclic Compounds. (2) II of alt. years and alt. S. Pr.: Chem. 752.

865. Theoretical Organic Chemistry I. (3) I. Bond structure, stereochemistry, relation of construction to physical properties, solvents, and other general topics of a theoretical nature. Pr.: Chem. 651 and 752.

867. Theoretical Organic Chemistry II. (3) II. 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.

868. Natural Products. (3) I of alt. years. Structure proofs and synthetic approaches to important natural products, such as terpenes, alkaloids, and plant pigments. Pr.: Chem. 651 and 752.

872. Steroids and Polycyclic Compounds. (2) I of alt. years. Pr.: Chem. 752.

COURSES IN PHYSICAL CHEMISTRY

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

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.

535. Radioactive Tracer Techniques. (3) II and alt. S. (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.

* See page 127.

** All chemistry courses numbered 600 or above require the following as minimum prerequisites: Chem. 516 and 517 and Chem. 595 and 598. Additional prerequisites are listed where they are applicable. Non-chemistry majors may enroll upon consent of instructor.

- 585. Physical Chemistry I.** (3) I. Properties of matter in the gaseous, liquid, and solid state, elementary thermodynamics, solutions, atomic and molecular structure. Pr.: Chem. 250 or 271, Math. 222 or 232, Phys. 211 or 311.
- 586. Physical Chemistry I Laboratory.** (2) I. Six hours lab. a week. Pr.: Chem. 300 or 444 and 585 or conc. enrollment.
- 595. Physical Chemistry II.** (3) II. Thermodynamics and chemical equilibrium, reaction kinetics, electrochemistry, etc. Pr.: Chem. 585.
- 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

- 620. Electrochemistry.** (3) I. Fundamentals of electrochemistry and their application. Two hours rec. and three hours lab. a week. Pr.:**
- 625. Colloid Chemistry.** (3) I. Pr.:**
- 701. Chemical Thermodynamics.** (3) I, S. Pr.:**
- 702. Chemical Kinetics.** (3) II, S. Pr.:**
- 753. Systematic Physical Chemistry.** (3) II and alt. S. Pr.:**
- 770. Radiochemistry.** (3) I. Principles of nuclear and radiochemistry, including the study of nuclear reactions, applications of radioactivity to chemical research, hot-atom chemistry, and radiation chemistry. Pr.:* and Chem. 535 or Phys. 535.
- 771. Radiochemistry Laboratory.** (1) I. Selected experiments in the application of radioisotopes to chemical research problems. Pr.: Chem. 770 or conc. enrollment.

FOR GRADUATE CREDIT

- 804. Graduate Seminar in Physical Chemistry.** (0-1) I, II.
- 809. Survey of Physical Chemistry.** (1) I, II, S. An independent study and outside reading course followed by a comprehensive written examination. Pr.:**
- 850. Chemical Statistical Thermodynamics.** (3) II. Pr.: Chem. 701, Math. 421 or 621.
- 884. Molecular Structure.** (3) I. Pr.: Chem. 753 or equiv.; Math. 421 or 621.
- 895. Theoretical Chemistry I.** (3) II. Pr.: Chem. 884 and Phys. 640.
- 896. Theoretical Chemistry II.** (3) I. Pr.: Chem. 895.

ECONOMICS

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

JOHN A. NORDIN,* *Head of Department*

Professors Bagley, Chalmers,* Fisher* and Nordin;* Associate Professor DeCou;* Assistant Professors Benson, Emerson,* Fan, French* and Rogers; Instructors Madden and Reed; Emeritus: President Farrell**

ECONOMICS

(Courses in Agricultural Economics and Rural Sociology 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,

* See page 127.

** All chemistry courses numbered 600 or above require the following as minimum prerequisites: Chem. 516 and 517 and Chem. 595 and 598. Additional prerequisites are listed where they are applicable. Non-chemistry majors may enroll upon consent of instructor.

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 119. Requirements for an economics major in this curriculum (X, page 119) 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 119. Econ. 110 should be taken to satisfy the economics requirement in VII, page 119.

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, 626; 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.

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

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.

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.

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

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

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.

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.

626. Collective Bargaining and Labor Relations Law. (3) II. A critical analysis of labor relations laws, labor-management negotiations; the administration of the collective bargaining agreement through grievance procedure and arbitration; case studies of union-management problems. Pr.: Econ. 620 or consent of instructor.

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.

636. Economic Systems. (2) I, II, some S. A survey of economic systems, Marxian socialism and modern socialism, giving attention of English socialism, communism, and to the essential characteristics of the free enterprise capitalistic system. Pr.: Econ. 110.

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.

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.

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.

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.

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.

- 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.
- 725. National Income Analysis.** (3) I. A study of interaction of the principal sectors of the economy in the functioning of the system as a whole, including the effects of changes in consumer behavior, fiscal policy and other significant economic variables. Pr.: Econ. 110, 120, and consent of instructor.
- 730. Introduction to Econometrics.** (3) II. Analytical and quantitative methods used in economics. Applications to specific problems. Pr.: One course in college algebra or equiv.; one course in statistics; one course in economics; senior or graduate standing or consent of instructor.
- 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.
- 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
- 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.
- 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.
- 820. Labor Economics Seminar.** (3) I. A critical analysis of wage theories, collective bargaining and unemployment problems. Pr.: Econ. 620 or consent of instructor.
- 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.
- 835. Econometric Methods.** (3) Offered on sufficient demand. Quantitative methods of research used in economics. Pr.: Econ. 730 or consent of instructor.
- 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.
- 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.
- 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.
- 880. Seminar in Economics.** (3) I, II. Special topics in economic theory. Pr.: Graduate standing.
- 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,* French, Hart, Jones,* Miller,* Noonan,* Rogerson* and Soellner,* Assistant Professors Adamany, Ansdell,* Brondell, Eitner,* Glenn,* Koch,* Laman,* Nichols, Pennel,* White* and Wroten;* Instructors Cohen, Conover, Epstein, Pederson 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 should consult the Secondary Education curriculum. They are advised to take Advanced Composition, Modern English Grammar, and Literature for Adolescents in addition to the Surveys and the Comprehensive examination (Engl. 599).

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 his adviser concurs.

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, creative or technical 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 also 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

020. English Assembly. (0) I, II.

030. Writing Laboratory. (0) I, II. 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.

- 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.
- 075. English for Foreign Students.** (0) I, II. 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.
- 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.
- 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.
- 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.
- 120. English Composition II.** (3) I, II, S. Cont. of Engl. 125, 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.
- 143. Introduction to Humanities I.** (3) I, S. Classical cultures.
- 144. Introduction to Humanities II.** (3) II. Medieval and Renaissance culture.
- 146. Introduction to Humanities III.** (3) I, S. Culture of the Baroque Period and the Age of Reason.
- 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.
- 200. English Composition III.** (3) I, II, S. Composition and argumentation. Pr.: Engl. 120.
- 230. Introduction to Fiction.** (2) I, II. Selected novels from world literature, with emphasis on the present.
- 251. English Literature I.** (3) I, II, S. Pr.: Engl. 120.
- 256. English Literature II.** (3) I, II, S. Pr.: Engl. 120.
- 270. American Literature I.** (3) I, II, S. Pr.: Engl. 120.
- 275. American Literature II.** (3) I, II, S. Pr.: Engl. 120.
- 345. Introduction to Drama.** (3) I, II. Study of classical, medieval, French neoclassical, and nineteenth century continental drama. Pr.: Engl. 120.
- 350. Introduction to Shakespeare.** (3) I. An introductory study of representative comedies, tragedies, and histories. Pr.: Engl. 120.
- 370. Books and Men I.** (3) I, II, S. Introduction to great world classics from present to past. Pr.: Engl. 120.
- 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. 120.

- 397. Honors Seminar in Humanities.** (1) I, II. Colloquium on the inter-relationships of the humanities fields, including art, literature, music, and philosophy. Pr.: Honors students only.
- 398. Junior Honors Colloquium.** (Variable credit) I, II. Open only to juniors in the Arts and Sciences Honors Program.
- 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
- 406. Advanced Composition.** (3) I, II, S. Expository writing, primarily for candidates for the teaching certificate in Secondary Education. Pr.: Engl. 120.
- 416. Scientific Report Writing.** (2) I, II. 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. 120.
- 420. English Survey I.** (3) I, II. 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. 120.
- 425. English Survey II.** (3) I, II. Rise of Puritanism and its influence on English literature; classical movement; Romanticism and its development. Required of majors with English emphasis program. Pr.: Engl. 120.
- 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. 120.
- 436. Narrative Writing II.** (3) I. 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. 120.
- 440. American Survey I.** (3) I, II, S. The colonials to the Civil War. Required of majors with American emphasis program. Pr.: Engl. 120.
- 445. American Survey II.** (3) I, II, S. Whitman to the present. Required of majors with American emphasis program. Pr.: Engl. 120.
- 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. 120.
- 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. 120.
- 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.
- 520. English Bible.** (3) The Bible as literature along with emphasis on the cultural and historical backgrounds of the Old Testament.
- 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. 120.
- 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. 120. (English majors who have credit for either semester of 19th Century American Fiction may not take this course for credit.)

- 580. Twentieth Century American Novel.** (3) I, S. The modern American novel from Dreiser and Wharton to Hemingway and Faulkner. Pr.: Engl. 120.
- 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 620. The Epic Tradition.** (3) II in alt. years. Greek and Roman masterpieces in translation as a background for the study of English literature. Pr.: Junior standing.
- 625. Medieval Narrative.** (3) II in alt. years with Engl. 645. A survey of non-Chaucerian medieval literature, with emphasis on the Arthurian romance cycle. Pr.: Engl. 120.
- 630. Chaucer.** (3) I. Pr.: Engl. 120.
- 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. 120.
- 645. English Drama I.** (3) I, II, S in alt. years. A survey of the dramatic literature of Elizabethan and Jacobean times, exclusive of Shakespeare. Pr.: Engl. 120.
- 646. English Drama II.** (3) I, II, S. Offered in alt. years. A survey of the dramatic literature of the Restoration and Neoclassical periods. Pr.: Engl. 120.
- 651. Shakespearean Drama.** (3) I, II, S. A study of Shakespearean drama, with special attention to the criticism and bibliography. Pr.: Engl. 120 and junior standing.
- 652. Introduction to Linguistics.** (3) I. Study of the basic concepts of modern descriptive linguistics. Pr.: Junior standing.
- 655. The Folk Tale.** (3) II. Study of development of oral tradition in the folklore of basic cultures, with literary analogues. Pr.: Engl. 560.
- 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.
- 665. Seventeenth Century Literature.** (3) I in alt. years. A survey of the principal non-dramatic writers, apart from Milton, 1600-1660, with emphasis on Donne and the Metaphysicals. Pr.: Engl. 136, 120.
- 671. Milton.** (3) II. Pr.: Engl. 120.
- 674. Methods and Techniques of Learning a Second Language.** (3) II. 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.
- 675. American Colonial Literature.** (3) I. American literature from the beginning to the close of the Revolutionary War. Pr.: Junior standing.
- 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.
- 686. Eighteenth Century II.** (3) I. The age of Dr. Johnson and the beginnings of Romanticism. Pr.: Engl. 120.
- 691. English Novel I.** (3) I. Survey of British fiction from Defoe and Fielding to the Brontes. Pr.: Engl. 120.
- 696. English Novel II.** (3) II. Survey of British fiction from Dickens and Thackeray to Galsworthy and Bennett. Pr.: Engl. 120.
- 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.

- 705. The Romantic Movement.** (3) I. Pr.: Engl. 120.
- 710. Romanticism in America.** (3) I, II, S. Emphasis on Emerson, Thoreau, Whitman and Dickinson. Pr.: Engl. 440 or consent of instructor.
- 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.
- 718. Nineteenth Century American Fiction II.** (3) II, S. Emphasis on Twain, James, Howells, Crane, Norris. Pr.: Engl. 445 or consent of instructor.
- 720. The Victorian Era.** (3) II. Pr.: Engl. 120.
- 740. Twentieth Century English Novel.** (3) II in alt. years. British fiction from Conrad and Joyce to Greene and Waugh. Pr.: Engl. 120.
- 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.
- 750. Twentieth Century English Poetry.** (3) I. Development of English poetry from Hardy and Yeats to the present time. Pr.: Engl. 120.
- 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.
- 760. Twentieth Century English Drama.** (3) I. Special emphasis on Shaw. Pr.: Engl. 120.
- 765. Twentieth Century American Drama.** (3) S. American drama from O'Neill and Anderson to Miller and Williams. Pr.: Engl. 120.
- 775. Creative Writing.** (3) I, II. Imaginative writing, with particular emphasis on the short story. Pr.: Engl. 430, or consent of instructor.
- 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.
- 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.
- 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

- 802. Bibliography and Methods of Research.** (3) I, II, S. Pr.: Graduate standing.
- 810. Old English.** (3) II in alt. years. The elements of Old English grammar, with conc. readings in prose and poetry. Pr.: Engl. 790 or consent of instructor.
- 811. Old English Poetry.** (3) I in alt. years. Pr.: Engl. 810 or consent of instructor.
- 812. Middle English Poetry.** (3) II in alt. years. Pr.: Engl. 790 or consent of instructor.
- 820. Selected Topics in the Study of Language.** (3) II in alt. years. Pr.: Engl. 790 or consent of instructor.
- 830. Chaucer Seminar.** (3) I in alt. years. Pr.: Engl. 630.
- 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.
- 850. Shakespeare Seminar.** (3) II in alt. years. Pr.: Engl. 651.
- 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.
- 870. Milton Seminar.** (3) II in alt. years. Pr.: Engl. 671.

- 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.
- 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.
- 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.
- 920. Topics in Poetry.** (3) I in alt. years. Intensive study of a poet or group of poets, either English or American. Pr.: Graduate standing.
- 930. Topics in Drama.** (3) II in alt. years. Intensive study of a dramatist or group of dramatists, either English or American. Pr.: Graduate standing.
- 940. Topics in Fiction.** (3) I in alt. years. Intensive study of a novelist or group of novelists, either English or American. Pr.: Graduate standing.
- 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*

Professors Beck, Chelikowsky,* Shenkel* and Stacey,* Associate Professors Twiss* and Walters,* Assistant Professors Brookins,* Estlow, Riseman,* Self,* Siddall and Wingard,* Instructors Bussing and Clark; Emeritus: Professor Sperry,* Instructor Larson*

UNDERGRADUATE

The Department of Geology and Geography offers opportunities for study in geology, geophysics, geochemistry, geography, and biogeography. For detailed plans of study in these fields and for information regarding Engineering Geology, consult the head of the department.

Curriculum in Physical Science (VIII, p. 118)

The requirements for a *major in Geology* are: Geol. 110, 420, 430, 450, 460, 470, 480, 510, 530, 600, 640, 690, and 750.

The requirements for a *major in Geophysics* are: Geol. 110, 430, 450, 460, 470, 510, 530, 750; Math. 222, 240; Phys. 421, 432, 472, 473, 601, 602, and 621.

The requirements for a *major in Geochemistry* are: Geol. 110, 430, 450, 460, 470, 510, 530, 600, 612, 614, 640, 690, 750; Zool. 205; Bot. 630; Math. 222, 240; Phys. 535; Chem. 300, 350, 351, 585, 586, 595, 598.

The requirements for a *major in Geography* are: Geol. 110; Geog. 105, 207, 215, 605, 685; Geol. 420, 470, 750; Phys. 135; Agron. 400; and 12 additional hours in geography.

Curriculum in Biological Science (p. 108)

The requirements for a *major in Biogeography* (VI, p. 109) are: Bot. 670; Phys. 135; Zool. 645; three hours in American History; Geol. 100, 110, 420; Geog. 207, 215, 685; and 15 additional hours in geography; Math. 100, 150 to satisfy IV, p. 108; Econ. 110; sociology or anthropology, three hours; and P. Sci. 220 to satisfy the Social Science requirement (III, p. 108).

Curriculum in Social Science (X, p. 119)

The requirements for a *major in Geography* are: Geol. 110; Geog. 207, 215, 685; and 15 additional hours in geography.

GRADUATE

Work leading to a master's degree is offered in both Geology and Geography.

Geology: Prerequisite to graduate work in geology is the completion of a four-year undergraduate curriculum including suitable preparatory work in mathematics, the physical and the biological sciences.

Kansas State University is unusually well situated for investigations in sedimentary petrology, stratigraphy, groundwater geology, soil mineralogy, petroleum geology, plains-type structures, and the study of invertebrate fossils.

Geography: Prerequisite to graduate work in geography is the completion of a four-year undergraduate curriculum including suitable preparatory work in one or more of the following areas: social science, physical science, or biological science.

The department has a good collection of maps, and a well-equipped cartography laboratory. Its location in the heart of the Flint Hills is ideal for land use studies. Work is offered in Cartography, Economic Geography, Climatology, Biogeography, Regional Geography and Urban Geography.

COURSES IN GEOLOGY

FOR UNDERGRADUATE CREDIT

- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 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 or 400.
- 450. Crystallography.** (4) I or II. The fundamentals of crystallography and their uses in mineral identification. Two hours rec. and six hours lab. a week.
- 460. Mineralogy.** (4) I or II. Physical and chemical mineralogy. Description, identification, and classification of minerals. Two hours rec. and six hours lab. a week. Pr.: Chem. 210 and Geol. 450.
- 470. Field Methods in Geology.** (3) I or II. Construction of geologic maps; application of field methods to the problems of geology. One hour rec. and six hours lab. a week. Pr.: Geol. 430.
- 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.
- 510. Stratigraphic Geology.** (4) I or II. Description, classification, and correlation of stratigraphic units, with emphasis on those of Kansas. Three hours rec. and three hours lab. a week. Pr.: Geol. 480.

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 or 400.

570. Economic Geology. (3) I or II. Origin and mode of occurrence of non-metallic minerals, including coal and petroleum, and of metallic mineral deposits. Pr.: Geol. 430, 460.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Optical Mineralogy. (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.

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.

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.

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.

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.

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.

620. Geology of Subsurface Water. (3) I or II. Three hours rec. a week. Pr.: Geol. 510, 530.

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.

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.

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.

680. Vertebrate Paleontology. (3) I or II. Evolution, geologic history, and classification of the vertebrates. Pr.: Geol. 430 or 10 hours of zoology.

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.

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.

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.

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.

- 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.
- 740. Regional Geology.** (3) I or II. Structure and the stratigraphy of the major tectonic units of North America. Pr.: Geol. 510, 530.
- 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.
- 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.
- 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

- 800. Mineragraphy.** (3) I or II. Methods of studying opaque minerals and applications to problems in ore genesis and history. Two hours rec. and three hours lab. a week. Pr.: Geol. 570, 600.
- 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.
- 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.
- 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.
- 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.: Geol. 760.
- 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.

COURSES IN GEOGRAPHY

FOR UNDERGRADUATE CREDIT

- 105. Geography of Kansas.** (2) I, II, S. The agricultural, manufacturing, and population distribution in Kansas, as based on the physical resources of climate, soils, landform, water, and minerals.
- 115. World Regional Geography.** (3) I, II, S. An introduction to the fundamentals of geography through an examination of the physical, cultural, and economic features of the world's major regions.
- 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.
- 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.
- 225. Geography of Man.** (2) I, II, S. World-wide patterns of man, his habitats, use of resources, and his adjustments to climate and land-

form environments in modern urban and rural societies. Illustrations from underdeveloped areas in the modern world. Two hours rec. a week.

399. Honors Seminar in Geography. (1) Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE AND GRADUATE CREDIT

605. Cartography. (3) I, II. Methods of constructing projections, and of representing landscape features and geography data by means of maps and graphs; techniques in lettering, scales, symbolization, block diagram construction, simple map drafting, and reproduction. One hour rec. and six hours lab. a week. Pr.: Geol. 100 or Geog. 205.

625. Climatology. (3) I or II. A systematic analysis of climatic elements and controls and a world regional study of climate. Pr.: Geog. 205 or Phys. 135 or junior standing.

645. Political Geography. (3) I or II, S. Formation of political units as affected by their geography: the influence of topography, location, rivers and seas, resources, and people in the development of nations and their boundaries. Colonial systems and strategic problems are considered. Pr.: Three hours of geography or junior standing.

650. Conservation of Mineral and Water Resources. (3) I or II. Pr.: Junior standing or consent of instructor.

685. Geography of Anglo-America. (3) I or II. Modern Canada, Alaska, and United States: agricultural and manufacturing regions, stressing interdependence of all. Pr.: Three hours of geography or junior standing.

695. Geography of Latin America. (3) I or II. The present-day economy and peoples of South America and the Caribbean shores; agricultural and mineral production, developing manufacturing centers, rapid urban changes. Pr.: Three hours of geography or junior standing.

701. Comprehensive Geography. (3) II, S. A survey of physical, cultural and social geography particularly appropriate for teachers. Two hours rec. and three hours lab. a week. Pr.: Six hours of geography or consent of instructor.

705. Geography of Western Europe. (3) I or II. The nations and regions of Europe west of the U. S. S. R., with present economies as a result of cultural and physical differences in the environment; trends of development as affected by new political and economic factors. Pr.: Three hours of geography or junior standing.

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.: Three hours of geography or junior standing.

735. Geography of Eastern Asia. (3) I or II. The nations and peoples of eastern and southern Asia; major emphasis on China, Japan, and India; relationships between oriental agriculture, industry, and the land resources. Trends are emphasized to show the impact of the new nationalism on ancient lands. Pr.: Three hours of geography or junior standing.

755. Advanced Economic Geography. (3) I, II. An analysis of geographic principles related to production and distribution of important agricultural and mineral products; special attention given to factors causing changes in location of manufactural industries in certain regions. Emphasis on prevailing conditions in world today. Three hours rec. a week. Pr.: Geog. 215 or consent of instructor.

765. Advanced Cartography. (3) I, II. Advanced techniques of cartographic presentation of geographic data, including map compilation, interpretation of aerial photos, and methods of graphic representation of physical and cultural features. One hour rec. and six hours lab. a week. Pr.: Geog. 605.

- 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. Three hours rec. a week. Pr.: Six hours of geography or consent of instructor.
- 776. Geography of Transportation.** (3) I, II. Principles involved in the development of route patterns, origin-destination of commodities, and competitive strategy of the different forms as they operate within the U. S. and selected world regions. Three hours rec. a week. Pr.: Six hours of geography or consent of instructor.
- 786. Seminar in Regional Geography.** (1 to 3) I, II, S. Pr.: Consent of instructor.
- 787. Seminar in Cultural-Economic Geography.** (1 to 3) I, II, S. Pr.: Consent of instructor.
- 789. History and Philosophy of Geography.** (2) I. Survey and discussion of the philosophical and methodological development of the field of geography. Required of graduate majors in geography. Pr.: Consent of instructor.
- 795. Problems in Geography.** Credit arranged. I, II, S. Pr.: Nine hours of geography and consent of instructor.

FOR GRADUATE CREDIT

- 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 AND PHILOSOPHY

HOMER E. SOCOLOFSKY,* *Acting Chairman of Department*

Professors Acschbacher, Carcy,* Sageser,* Socolofsky,* Sweedlun* and Wilcoron;* Associate Professors Barth,* Crawford,* Higham,* Jones* and Riggs;* Assistant Professors Freeman,* Gallanar,* Greene,* Schaeffer and Turner;* 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 course in non-western history, a minimum of 15 hours from courses numbered 600 and above, and a senior colloquium (Hist. 790). 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, with the consent of their adviser, select courses in the history of science and technology, intellectual history, and the history of ideas in lieu of one of the fields given above.

GRADUATE

Graduate study in history is offered in medieval and early modern European, modern European, Russian, British, United States, Latin American, and to a limited extent in Asiatic history. Advanced graduate work is offered in most of the above fields and in the history of science and technology, intellectual history, and the history of ideas. Candidates for advanced degrees are required to enroll for Hist. 801 and 802 and such seminars in the field of their concentration as may be determined by their advisory committee.

FACILITIES FOR GRADUATE STUDY

Facilities for graduate study include the resources of the University Library with its collections in the field of the history of science and technology, intellectual history, the eighteenth century, and its extensive holdings of microprint and government documents. Specialized libraries

in the area include the Linda Hall Library in Kansas City which emphasizes material related to the history of science and holds excellent files of scientific periodicals; the Eisenhower Presidential Library in Abilene with its large collection of papers related to the Eisenhower administration and materials pertaining to military history, and the Truman Presidential Library in Independence with its collection of papers covering the Truman administration, the history of the American presidency, and foreign policy in the twentieth century.

FOR UNDERGRADUATE CREDIT

- 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.
- 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.
- 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.
- 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.
- 211. Asian Civilization I.** (3) I and alt. S. A survey of Asian Civilization to 1650, emphasizing cultural and political developments.
- 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.
- 221. History of England to 1660.** (3) I. A survey of English history from Roman and Teutonic Britain to the Restoration.
- 222. History of England from 1660.** (3) II. Political, constitutional, economic, and cultural history of modern England.
- 251. History of the United States to 1877.** (3) I, II, S. Colonial and Revolutionary America, the federal union, Civil War, and Reconstruction.
- 252. History of the United States since 1877.** (3) I, II, S. The American nation from Reconstruction to the present.
- 255. American Economic History.** (3) I, II. American economic growth from the colonial period to the present.
- 257. American Social History.** (3) I or II. A study of social changes and esthetic developments in American history.
- 258. History of Kansas.** (2) II, S. Land, people, problems, and cultural development of Kansas.
- 399. Honors Seminar in History.** (1) I or II.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 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.
- 621. Medieval Thought and Institutions.** (3) I, S. Interrelationship between thought and institutions of the Middle Ages. Pr.: Hist. 202 or 211 and consent of instructor.
- 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.: Hist. 111 or 202.

- 637. History of Science I.** (3) I and alt. S. The growth of scientific thought in earliest times, in Egypt, Mesopotamia, Ancient Greece and Rome, the Moslem world, and Medieval Europe. Pr.: Hist. 111.
- 638. History of Science II.** (3) II and alt. S. The development of scientific thought from early modern times to the recent past. Pr.: Hist. 112.
- 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.: Hist. 111.
- 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.: Hist. 111.
- 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.: Hist. 112. Recommended: Hist. 642.
- 646. Europe, 1815-1914.** (3) II and alt. S. Social, economic, and political developments during the century of optimism, progress, and peace. Pr.: Hist. 112.
- 648. Europe, the Two World Wars.** (3) I, S. The major European developments from 1914 to 1945. The challenge of extremist ideologies and their impact upon the West. Pr.: Hist. 112.
- 649. Europe since 1945.** (3) II, S. An evaluation of the significant European developments since World War II; the Soviet challenge, revival of Western Europe, European integration, and the Cold War. Pr.: Hist. 648.
- 652. Tudor England.** (3) I in alt. years. The history of England under the Tudors. Pr.: Hist. 221.
- 653. Stuart England.** (3) II in alt. years. The history of England in the seventeenth century. Pr.: Hist. 221.
- 656. England in the Eighteenth Century.** (3) I in alt. years. The history of England in the eighteenth century. Pr.: Three hours European history.
- 658. Victorian England.** (3) I. The history of England in the nineteenth century. Pr.: Hist. 111, 221, or 652.
- 659. England in the Twentieth Century.** (3) II in alt. years. The history of England in the twentieth century. Pr.: Three hours European history.
- 663. Modern France.** (3) II in alt. years and S. Major trends in the development of the history of France. Pr.: Hist. 111.
- 669. Modern Germany.** (3) I, S. Major developments in Central Europe from 1848 to the present. Stress is placed upon the forces that have shaped modern Germany. Pr.: Hist. 112.
- 683. Foundations of the Russian State.** (3) I in alt. years. Founding of the first Russian state; origin and development of Muscovite institutions. Pr.: Hist. 111 or 202.
- 684. The Russian Empire.** (3) I, S. Growth, decline, and fall of the Russian Empire; the revolutionary era. Pr.: Hist. 683 or 112 and consent of instructor.
- 685. Russian Intellectual History.** (2) II. A study of intellectual developments in Russia from 1762. Pr.: Hist. 684.
- 687. The Soviet Union.** (3) II, S. Development of the Soviet state from the Revolution to the present. Emphasis is placed on economic, scientific, and cultural developments and on the role of Soviet foreign policy. Pr.: Hist. 684 or 112 and consent of instructor.
- 691. Technology and War I.** (3) I. The history of military technology, 1000 to 1900. Pr.: Six hours European history or Hist. 637, 638.
- 692. Technology and War II.** (3) II. The history of military technology, 1900 to 1960. Pr.: Six hours European history or Hist. 637, 638.

- 695. European Economic History.** (3) I, S. Major economic developments, institutions, and ideas since the seventeenth century. Pr.: Hist. 112 or 646.
- 704. The American Revolution and Age of Washington.** (3) I and alt. S. A study of the foundations of the American Republic, 1763-1799. Pr.: Hist. 251.
- 706. The Age of Jefferson and Jackson.** (3) II and alt. S. A study of Jeffersonian and Jacksonian democracy and the development of sectionalism. Pr.: Hist. 251.
- 708. Civil War and Reconstruction.** (3) II and alt. S. Economic, diplomatic, military, and social history of the Civil War, the problems of reconstruction, and the postwar society of the South. Pr.: Hist. 251.
- 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.: Hist. 251 or 252.
- 711. The United States in the Twentieth Century.** (3) I, S. Major developments in recent American history, emphasizing the period since World War I. Pr.: Hist. 252.
- 712. Frontier America.** (3) I, S. Environmental factors, peoples, settlements, and institutions of the frontier. Pr.: Hist. 251 or 252.
- 719. The South.** (3) I and alt. S. Major trends and themes in the history of the American South. Pr.: Hist. 251.
- 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.: Hist. 251 or 252 or 712.
- 735. American Intellectual History.** (3) II. The role of social, political, and economic ideas in American life; the influence of intellectual institutions. Pr.: Three hours of American history at the 700 level.
- 738. History of American Science.** (3) I. The development of pure and applied science in America; institutional, social and intellectual aspects of American science; selected examples from representative sciences and the contributions of leading scientists. Pr.: Three hours American history or Phil. 650.
- 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 or 252 or consent of instructor.
- 745. American Immigration History.** (3) I and alt. S. Ethnic variegation as a factor in American historical development; immigration and the labor movement. Pr.: Hist. 252.
- 746. American Urban History.** (3) II and alt. S. The history of the city in America, with emphasis on the growth of urbanization in the Midwest. Pr.: Hist. 252.
- 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.: Hist. 252.
- 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.: Hist. 111.
- 758. 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. Pr.: Hist. 751 or 112 and consent of instructor.
- 760. Far East.** (3) I and alt. S. Modern and contemporary Chinese, Japanese, and other peoples of Eastern Asia and the western Pacific. Pr.: Hist. 111 and 112.
- 765. India and Southeast Asia.** (3) II. Modern and contemporary institutions and culture of South Asia and Indonesia. Pr.: Hist. 111 and 112.

- 770. History of Religions.** (3) II and alt. S. Development of the world's living religions, the relation of each to its natural and cultural environment; dominant concepts, leaders, and historic growth which characterize each. Pr.: Hist. 111 or 201 and 202.
- 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 in history and graduate students.
- 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. Required of all honors students in history. Open to majors in history and to graduate students with the consent of instructor.
- FOR GRADUATE CREDIT
- 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.
- 802. Historiography II.** (2) II and alt. S. Cont. of Hist. 801. Required of all graduate students in history.
- 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.
- 881. History of Ideas.** (3) I or II. An examination of the theory, methodology, and applicability of the history of ideas to specific unit-ideas; impact of revisionary methodology on the analysis of materials. Pr.: Consent of instructor.
- 883. Seminar in History.** (3) I, II, S. Seminars will be given in Early Modern Europe, Modern Europe, English, Early American, Recent American, Latin American, Russian, and Asiatic history.
- 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.
- 995. Research in History.** Credit arranged. I, II, S. Work offered in Modern European, American, Latin American, English, Russian, and Asiatic History, and in the history of science and technology, the history of ideas, and intellectual history.

PHILOSOPHY

Professor Miller; Associate Professors Hausman* and Tremmel;* Assistant Professor Goedecke;* Instructor Cagle*

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 and successful completion of comprehensive examinations in the history of philosophy and one other area. 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 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

- 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.
- 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.
- 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.
- 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.
- 210. Oriental Philosophy.** (2) I in alt. years. Confucianism, Carvaka, Buddhism, Vedanta, Yoga. Emphasis will be placed on basic assumptions, methods of reasoning, and ways of life associated with each.
- 221. Ethics.** (2) I, II, S. An inquiry into ideas of right and wrong, duty, happiness, and the good life.
- 300. Man and Ideas.** (3) I or II. Examines philosophically such basic ideas as God, Immortality, Freedom, Self.
- 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.
- 398. Honors Colloquium.** Credit arranged. I or II. Open only to juniors in the Arts and Sciences Honors Program.
- 399. Honors Seminar in Philosophy.** (1) I or II.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 400. Comparative Religion.** (3) 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.: Phil. 165 or 175 or consent of instructor.
- 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.
- 420. Existentialism.** (3) II. A study of prominent thinkers in the existentialist tradition.
- 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

- 610. 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.

- 620. History of Philosophy II.** (3) II. The development of philosophical ideas from the Renaissance to the nineteenth century. Pr.: Phil. 165 or equiv.
- 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.
- 637. History of Science I.** (3) I and alt. S. The growth of scientific thought in earliest times, in Egypt, Mesopotamia, Ancient Greece and Rome, the Moslem world, and Medieval Europe. Pr.: Consent of instructor.
- 638. History of Science II.** (3) II and alt. S. The development of scientific thought from early modern times to the recent past. Pr.: Consent of instructor.
- 670. The Philosophy of Plato.** (3) II, S. Study of the dialogues, their major doctrines and methods, against the background of Greek thought and culture.
- 680. Philosophy of Science.** (3) II, S. Philosophic ideas and problems encountered by physicists, mathematicians, economists, psychologists, and biologists in basic and frontier areas of research. Pr.: One course in philosophy.
- 700. Social Philosophy.** (3) I, II, and alt. S. A comparative study of the principles and practices associated with contemporary economic and social systems.
- 710. Political Philosophy.** (3) II and alt. S. A combined systematic and historical examination of political philosophy from antiquity to the present.
- 715. Materialism.** (3) I and alt. S. An approach to materialistic systems through a study of their origins in Democritus and Epicurus; Hobbs, Gassendi, Spinoza; the French Encyclopaedists; Feuerbach and Hegel; Marx, Engels, and in the literature of communism.
- 720. Aesthetics.** (3) I or II, S. A critical examination of contemporary theories of artistic creation, aesthetic experience, the nature of art, its role in society, the foundations and function of art criticism. Pr.: One course in art, literature, music, or philosophy.
- 725. 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.
- 740. Philosophy in Literature.** (3) I. An exploration of philosophical ideas as they appear in literary expression. Pr.: Phil. 165 or equiv. or at least one course in literature.
- 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.

FOR GRADUATE AND ADVANCED UNDERGRADUATE CREDIT

- 770. Seminar in Philosophy.** (2 to 3) Pr.: Consent of instructor and five hours of credit basic to the field involved.
- 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

- 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.

MATHEMATICS

RALPH G. SANGER,* *Head of Department*

Professors Fuller, Marr,* Parker,* Sanger and Stamey;* Associate Professors Dixon,* Folland,* Janes and Mossman;* Assistant Professors Bechtel,* Meux,* Sloat and Yates;* Instructors Chatelain, Leslie, Livesay, Miller, Pence and Sitz; Emeritus: Professors Babcock,* Stratton* and White**

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. 118) are: Math. 222, 240, Stat. 320, and 15 semester hours chosen from among courses in mathematics numbered 400 to 799. For a mathematics major in Humanities (IX, p. 116) the following courses are required: Math. 220, 221, 222, 240, Stat. 320, 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. 116).

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 the master's degree.

Admission as a graduate student does not imply admission to candidacy for the master's degree with a major in mathematics. The special requirements of the Department of Mathematics concerning admission to candidacy for this degree may be obtained from that office.

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.

FOR UNDERGRADUATE CREDIT

- 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.
- 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.
- 150. Plane Trigonometry.** (3) I, II, S. Pr.: Plane geometry and $1\frac{1}{2}$ units of high school algebra.
- 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.
- 221. Analytic Geometry and Calculus II.** (4) I, II, S. Cont. of Math. 220 to include transcendental functions. Pr.: Math. 220.
- 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.
- 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.
- 325. Basic Mathematics.** (4) II. Selected topics in elementary mathematics taught from an advanced viewpoint. Designed to broaden the student's understanding of elementary concepts.
- 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.

- 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 or 110.
- 356. Elementary Differential Equations.** (2) I, II. Techniques of solving differential equations. Credit cannot be obtained for this course and Math. 240. Pr.: One year of calculus or Math. 222.
- 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

- 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.
- 409. Intuitive Geometry.** (2) S. Measurement, triangles, quadrilaterals, non-metric geometry, similarity, volumes, elementary coordinate geometry. Pr.: Membership in Institute for Elementary School Teachers.
- 416. Foundations of Mathematics.** (3) II. Postulates used in development of geometry and algebra. Pr.: Math. 222.
- 470. History of Mathematics.** (3) II in alt. years. Pr.: Math. 220.
- 505. Determinants and Matrices.** (3) I. Applications of determinants and matrices to genetics, economics, electronics, and other fields. Pr.: Math. 100 and junior standing.
- 511. Introduction to Modern Algebra.** (3) I. Simpler concepts in the theory of numbers, groups, rings, integral domains, fields, polynomials over a field, determinants and matrices. Pr.: Math. 222.
- 550. Mathematics for Engineers and Physicists I.** (3) I. Complex analytic functions and power series, complex integrals, Taylor and Laurent expansions, residues, Laplace transformation and the inversion integral. Pr.: Math. 240.
- 551. Mathematics for Engineers and Physicists II.** (3) II in alt. years. 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.
- 552. Mathematics for Engineers and Physicists 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.
- 570. Modern Geometry.** (3) II. An introduction to metric methods in the geometries of Euclid, Lobatchevsky, and Riemann. Pr.: Math. 222 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 575. Advanced Analytic Geometry.** (3) II. Properties of conic sections; poles and polars; selected topics in Solid Analytic Geometry. Pr.: Math. 240.
- 601. Differential Equations.** (3) I, II. Properties of solutions of differential equations; existence theorems; special differential equations; singular solutions. Pr.: Math. 240 or 356.
- 606. Theory of Numbers.** (3) II in alt. years. Pr.: Math. 221.
- 621. Advanced Calculus 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.
- 622. Advanced Calculus 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. 240.

- 625. Introduction to Abstract Analysis.** (3) II. Set theory, properties of metric and general topological spaces, properties of functions over these spaces. Pr.: Math. 621 or consent of instructor.
- 671. Higher Geometry I.** (3) I in alt. years. An introduction to the projective geometry of one and two dimensions. Pr.: Math. 511.
- 672. Higher Geometry II.** (3) II in alt. years. An introduction to the differential geometry of curves and surfaces. Pr.: Math. 601.
- 701. Theory of Matrices I.** (3) I in alt. years. Pr.: Math. 240, 511.
- 702. Theory of Matrices II.** (3) II in alt. years. Cont. of Math. 701. Pr.: Math. 701.
- 715. Fields and Domains.** (3) I. Fields, algebraic and transcendental extensions, polynomial domains, quotient fields, Galois fields. Pr.: Math. 511.
- 716. Theory of Groups.** (3) II in alt. years. Properties of groups, Abelian groups, p-groups, sub-groups, permutation groups, applications. Pr.: Math. 511.
- 717. Rings and Ideals.** (3) I in alt. years. Rings, ideals, Boolean rings and algebra, prime and primary ideals. Pr.: Math. 511.
- 721. Theory of Functions of a Complex Variable I.** (3) I. Pr.: Math. 621.
- 722. Theory of Functions of a Complex Variable II.** (3) II. Pr.: Math. 721.
- 740. Calculus of Variations.** (3) II in alt. years. Necessary and sufficient conditions for an extreme value; applications to geometry and mechanics. Pr.: Math. 622.
- 747. Advanced Differential Equations.** (3) II in alt. years. Sturmian theory; equations in the complex domain; systems of differential equations. Pr.: Math. 601, 622.
- 752. Tensor Analysis.** (3) On sufficient demand. Introduction to theory of tensors, with applications to geometry, relativity, and applied mathematics. Pr.: Math. 551, 621.
- 761. Numerical Methods 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.
- 762. Numerical Methods 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.
- 763. Numerical Methods III.** (3) I in alt. years. 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.
- 765. Scientific Digital Computing Techniques.** (3) II. Science and practice of solving scientific problems on a digital computer. Pr.: Math. 240, 350 and preferably 761.
- 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.
- 772. Topology II.** (3) II in alt. years. Cont. of Math. 771. Pr.: Math. 771.
- 799. Topics in Mathematics.** Credit arranged. I, II, S. Pr.: Background of courses needed for topic undertaken and consent of instructor.

FOR GRADUATE CREDIT

- 821. 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.
- 822. Theory of Functions of a Real Variable II.** (3) II in alt. years. Cont. of Math. 821. Pr.: Math. 821.

- 850. 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.
- 851. Partial Differential Equations.** (3) II in alt. years. Solutions of partial differential equations. Pr.: Math. 621, 622 and preferably 721.
- 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 AND TACTICS

THOMAS J. BADGER, *Head of Department*

Professor Badger; Associate Professors Freer, Jones and Smith; Assistant Professors Brown, Bryant, Clark, Nelson, Plotkin, Prawl and Yoder; Instructors Doner, Dougherty, Kuehnel, Larson, Lee, Petersen and Roberts

Kansas General Statutes, 1949, 76-436, as amended by the 1957 Legislature, stipulate that in land-grant colleges of this state, all regularly enrolled male students who are physically qualified shall take military training during the freshman and sophomore years, except those exempted by the Registrar due to age, religious belief, foreign citizenship, and/or previous training in the armed services.

Non-veteran men who matriculate with 25 semester hours of advanced academic credits are excused from the second year of military training; those with 59 hours are excused from both years. Any exemption from the Basic Course, however, may bar the students from enrollment in the voluntary Advanced Course ROTC, normally offered to selected juniors and seniors. Therefore, students interested in the Advanced Course are urged to have all previous military training evaluated by the PMST prior to registration, to insure that credit granted by the University toward fulfillment of the requirements of State Law does not operate to bar admission to the Advanced Course.

Whenever basic ROTC is excused for any reason, other subjects must be taken to replace the hours involved.

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.

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; the successful completion of this course fulfills the requirements of Kansas state law. 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 and Tactics 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 course 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. Students not enrolled in English Composition I, IA or II must request the approval of the Military Science Department to substitute another course in lieu of English Composition I, IA or II.

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.

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 three years on active duty with the Army following graduation.

SENIOR DIVISION, ROTC

BASIC COURSE

FOR UNDERGRADUATE CREDIT

- 113. Military 1A.** (1) I. Organization of the Army and ROTC; 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.
- 114. Military 1B.** (1) II. United States Army and National Security; 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.
- 125. Military 2A.** (1) I. American military history; leadership laboratory (drill and command). Two hours rec. and one hour leadership lab. a week.
- 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

- 233. Military 3A.** (1) I. Principles of leadership; leadership laboratory (drill and command). Conc. enrollment in an approved elective course. One hour rec. and one hour leadership lab. a week.
- 234. Military 3B.** (3) II. Branches of the Army; military teaching principles, small unit tactics and communications; countersurgency; lead-

ership laboratory (drill and command). Four hours rec. and one hour leadership lab. a week.

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.

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 elective course. One hour rec. and one hour leadership lab. a week.

MODERN LANGUAGES

RICHARD C. CLARK,* *Head of Department*

Professors Clark, Meras and Moore;* Associate Professors Munro,* Pettis* and Pyle;* Assistant Professors Beeson* and Evans; Instructors Cantrell, Diaz, Reiling, Scholl and Weinglass; Emeritus: Professor Limper**

UNDERGRADUATE

Students majoring in language should enroll in the Curriculum in Humanities (See page 116).

For a minor, 18 hours in a single language are to be taken.

For a major (IX, p. 116), 30 hours 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 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, and 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 German, French and Spanish. The candidate must demonstrate a reading knowledge in an additional foreign language.

See page 19 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

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

652. Introduction to Linguistics. (3) I. Study of the basic concepts of modern descriptive linguistics. Pr.: Junior standing.

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.

674. Methods and Techniques of Learning a Second Language. (3) II. 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.

- 750. Introduction to Philology.** (2) I or II. A survey of the various synchronic and diachronic approaches to the study of language. Pr.: Thirty hours of modern languages or equiv.
- 799. Problems in Modern Languages.** Credit arranged. I, II, S. Pr.: Consent of department head and instructor involved.

FOR GRADUATE CREDIT

- 999. Research in Modern Languages.** Credit arranged. Pr.: Thirty hours in one modern language or equiv.

FRENCH

FOR UNDERGRADUATE CREDIT

- 131. French I.** (3) I, II, S. Introduction to the grammar of Modern French, with the use of the language laboratory's facilities.
- 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.
- 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.
- 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

- 430. French V.** (3) I, II. An introduction to the finest representatives of French writing. Pr.: Mod. L. 235 or equiv.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

- 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.
- 636. Nineteenth Century French Literature I.** (3) I, II. A study of Pre-romanticism and Romanticism. Pr.: Eighteen hours of college French or equiv.
- 637. Nineteenth Century French Literature II.** (3) I, II. A study of Naturalism and Symbolism. Pr.: Eighteen hours of college French or equiv.
- 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

- 105. Technical German I.** (3) I. Introduction to the grammar of German and the reading of basic material selected from modern German scientific writing.
- 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.
- 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.
- 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.
- 205. Technical German III.** (3) I. Reading of advanced German scientific prose. Pr.: Mod. L. 111 or 126 or equiv.
- 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.
- 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

- 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.
- 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.
- 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

- 720. German Drama I.** (3) I or II. Reading and discussion of selected plays from the late eighteenth and nineteenth centuries. Pr.: Twenty-four hours of college German or equiv.
- 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.
- 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.
- 723. Goethe.** (3) I or II. Reading and discussion of selected dramas, poetry, and prose from the work of Goethe. Pr.: Fifteen hours of college German or equiv.

- 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.
- 725. Survey of German Literature I.** (3) I or II. Introduction to German literature from Ulfilas to German Classicism. Pr.: Eighteen hours of college German or equiv.
- 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.
- 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.

ITALIAN

FOR UNDERGRADUATE CREDIT

- 151. Italian I.** (3) I. Introduction to the structure of modern Italian.
- 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.

LATIN

FOR UNDERGRADUATE CREDIT

- 115. Latin I.** (3) I. An introductory study of the structure of Latin.
- 116. Latin II.** (3) II. Cont. and completion of the study of the structure of Latin. Pr.: Mod. L. 115 or equiv.

RUSSIAN

FOR UNDERGRADUATE CREDIT

- 161. Russian I.** (3) I. Introduction to the structure of modern Russian and reading of elementary prose. Pr.: Six hours of another foreign language.
- 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.
- 261. Russian III.** (3) I. Reading of selected prose on the intermediate level. Pr.: Mod. L. 165 or equiv.
- 265. Russian IV.** (3) II. Reading and discussion of selected nineteenth and twentieth century poetry and prose. Pr.: Mod. L. 261 or equiv.

SPANISH

FOR UNDERGRADUATE CREDIT

- 141. Spanish I.** (3) I, II, S. Introduction to the grammar of modern Spanish, with the use of the language laboratory's facilities.
- 145. Spanish II.** (3) I, II, S. Completion of the grammar of modern Spanish. Pr.: Mod. L. 141 or equiv.
- 241. Spanish III.** (3) I, II, S. Reading of selections from contemporary prose and review of the structure of the language as needed. Pr.: Mod. L. 145 or equiv.
- 245. Spanish IV.** (3) I, II. Reading of important types of prose and poetry from the Middle Ages to contemporary times. Pr.: Mod. L. 241 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 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.
- 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.

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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 638. Comparative Study of the Phonology and Morphology of French and Spanish.** See French 638.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 687. Spanish-American Novel.** (3) I or II. The reading of representative novels from Latin America. Pr.: Eighteen hours of college Spanish or equiv.

MUSIC

LUTHER O. LEAVENGOOD,* *Head of Department*

Professors Leavengood and Steunenberg;* Associate Professors Fischer,* Hayes,* Hays,* Leedham,* Pelton* and Walker;* Assistant Professors Jussila,* Painter, Shull and Tanner; Instructors Sherman, Sloop and B. Walker; Emeritus: Professor Stratton*

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 117.

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 majoring 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 163 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 instrument (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

Students planning to major in the Curriculum in Music Education or Applied Music must take an examination for musical aptitude.

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 167.

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 is also 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

- 100. Music Fundamentals.** (3) I, S. Elementary instruction in the theory of music. Three hours rec. a week. Not open to music students.
- 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.
- 202. Theory of Music II.** (3) II, S. Cont. of Music 201. Five hours rec. a week. Pr.: Music 201.
- 203. Voice Class.** (1) I, II, S. Basic rudiments of voice production and fundamentals of singing. Not open to majors in voice.
- 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.
- 205. Music for Elementary Teachers.** (3) II, S. Pr.: Music 100.
- 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.
- 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.
- 305. Theory of Music IV.** (3) II, S. Cont. of Music 160. Four hours rec. a week. Pr.: Music 304.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 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.
- 402. Counterpoint II.** (2) II, S. Cont. of Music 170. Contrapuntal composition in three or four voices. Analysis of the fugue. Pr.: Music 401.
- 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.
- 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.
- 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.
- 422. History of Music II.** (2) II, S. Cont. of Music 421.

- 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.
- 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.
- 502. Instrumentation and Orchestration II.** (2) II, S. Simple and familiar compositions scored for ensemble, including full orchestra. Pr.: Music 501.
- 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.
- 515. Theory of Conducting.** (2) I, S. Basic meters and the proper methods of executing each; introduction to score reading and transposition. Pr.: Music 304.
- 521. Composition I.** (2) I, S. Composition in the small forms for piano, voice, and instruments. Development of style conception. Pr.: Music 402.
- 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
- 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.
- 602. Advanced Analysis II.** (3) II and alt. S. Modern chord structures, atonality, polytonality, form used in contemporary compositions. Pr.: Music 305, 505.
- 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.
- 611. Seminar in Music Education.** (3) I. Special phases of music education adapted to need of the student enrolled. Pr.: Music 413, 505.
- 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.
- 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.
- 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.
- 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.
- 625. Workshop in Piano Pedagogy.** (1) S. Methods, materials, and teaching techniques for all grade levels. Pr.: Consent of instructor.
- 626. Psychology of Music.** (3) S. Physical and emotional appeal of music, perceptual and musical organization of sound and rhythm; psychology of listening, performing, and composing, with a review of experimental studies in these areas; measurement and diagnosis of musical abilities; musical personality. Pr.: Psych. 110.
- 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.
- 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.
- 634. Advanced Instrumental Methods.** (2) II. Methods, repertoire, conducting, contest, interpretation, individual instruction, and ensembles. Pr.: Music 515.
- 636. Advanced Conducting.** (2) S. Score reading, crosscueing, development of left-hand technique. Pr.: Music 515 and consent of instructor.
- 640. Ensemble.** (1) I, II, S. A graduate course in ensemble techniques and materials. Pr.: Consent of instructor.
- 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.
- 644. Practice Teaching in Applied Music.** (1) II. Practice teaching in private classes for students in Applied Music. Pr.: Music 642.
- 650. Music in History.** (3) I, S. Historical developments of music; its relationship to architecture, painting, sculpture, fine art; its relationship to political, economic, social, and religious life. Pr.: Senior standing.
- 651. Music Literature I.** (2) I, S. Style characteristics of music as revealed through a careful analysis of the music of different periods.
- 652. Music Literature II.** (2) II, S. Cont. of Music 651. Pr.: Music 651.
- 654. Baroque Music: Bach and Handel.** (2) II. Study of the music of the Baroque period, c. 1600-1750, with emphasis on the music of Bach and Handel. Pr.: Music 305 and Engl. 142 or equiv.
- 656. The Opera.** (2) I. Survey of the history of opera from 1600 to the present, with a detailed study of a number of the most important operas. Pr.: Music 422 or Engl. 142 or equiv.
- 658. The Symphony.** (2) S. History of the symphony from 1750 to the present, including a survey of pre-symphonic orchestral literature. Pr.: Senior standing.
- 799. Problems in Music.** Credit arranged. I, II, S. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 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

- 050. Recital Attendance.** (0) I, II.
- 111. A Cappella Choir.** (1) I, II. Membership by tryout.
- 115. Band.** (1) I, II. Membership by tryout.
- 121. Oratorio Chorus.** (1) I, II, S. Membership by tryout.
- 125. Kansas State Singers.** (1) I, II. Membership by tryout.
- 130. Orchestra.** (1) I, II. Membership by tryout.
- 135. Varsity Men's Glee Club.** (1) I, II, S. Membership by tryout.
- 136. Apollo Men's Glee Club.** (1) I, II, S. Membership by tryout.
- 140. Women's Glee Club.** (1) I, II. Membership by tryout.
- 230. Wind Class.** (3) I, S. Rudiments of playing woodwind and brass instruments.
- 231. String Class.** (3) II, S. Rudiments of playing stringed 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.

- | | | |
|-------------------------|------------------------|-------------------------|
| 252. Baritone | 264. Oboe | 276. Trumpet |
| 254. Bassoon | 266. Organ | 278. Tuba |
| 256. Clarinet | 268. Percussion | 280. Viola |
| 258. Double Bass | 270. Piano | 282. Violin |
| 260. Flute | 272. Saxophone | 284. Violoncello |
| 262. French Horn | 275. Trombone | 287. Voice |
- 288. Instrumental Ensemble.** (1) I, II, S. Three hours lab. a week. Elective for selected students.
- 290. Vocal Ensemble.** (1) I, II, S. Two hours lab. a week. Elective for students of superior vocal talent.
- 291. Madrigal Ensemble.** (1) I, II.
- 450. Junior Recital.** (1) I. A joint solo recital appearance. For students in Applied Music.
- 550. Senior Recital.** (2) II. An individual solo recital appearance. For students in Applied Music.

FOR GRADUATE CREDIT

- 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.

PHYSICAL EDUCATION

THOMAS M. EVANS,* *Head of Department*

Professors Evans and Geyer,* Associate Professor Lyman,* Assistant Professors Green, McKinney, Shroyer, Snyder,* Thompson* and Wauthier,* Instructors Fedosky, Hick and Railsback; 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 have been granted. All university students, after completion of 011 or equivalent, are also encouraged to enroll in Ph. Ed. 108 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

- 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.
- 108. Physical Education.** (1) I, II, S. Open to students in all university curriculums. May not be taken for more than two credit hours. Development of skills and appreciation in specific activities, Rhythmics, Aquatic Activities, Team Sports and Individual Activities. No activity shall be repeated unless it is selected on an advanced basis following a beginning course. Pr.: Ph. Ed. 011 or equiv.
- 206. Introduction to Physical Education.** (1) I. Introductory survey of the field and study of the principles of health and physical education.
- 290. Kinesiology.** (2) II. Mechanics of movement; body movements analyzed and principles involved applied to the teaching of physical education. Pr.: Zool. 210.
- 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.
- 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.
- 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.
- 375. First Aid.** (2) I, II, S. Prevention of accidents and the treatment of injuries in an emergency. Upon satisfactory completion of this course

* Option on Ph. Ed. 216 and 241.

** Option on Zool. 200, 210, and 425.

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

- 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.
- 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.
- 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.
- 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

- 600. Physiology of Exercise.** (2) II, S. Effects of exercise on the tissues, systems, and organs of the body.
- 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.
- 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.
- 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.
- 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.
- 675. Seminar in Physical Education.** Credit arranged. Recent trends and problems in physical education. Pr.: Senior standing and consent of instructor.
- 700. Seminar in Health Education.** Credit arranged. Recent trends and problems in health education. Pr.: Ph. Ed. 486 and consent of instructor.
- 799. Problems in Physical Education.** Credit arranged. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 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.
- 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.
- 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.
- 999. Research in Physical Education.** Credit arranged. Pr.: Sufficient training to carry on the line of research undertaken.

COURSES FOR MEN

FOR UNDERGRADUATE CREDIT

- 111. Tennis and Golf.** (1) II. Study of rules, theory, and practice; methods of coaching.
- 116. Sports Officiating.** (1) I. Principles and practices of officiating athletic games.
- 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.
- 225. History of Physical Education.** (2) I. Pr.: Ph. Ed. 206. The leaders in development of the Physical Education Program. Early European through today's public school systems.
- 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.
- 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.
- 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.
- 245. Swimming for Elementary and Secondary Schools.** (1) II, S. Methods of teaching swimming, water safety, theory and practice of "drown-proofing," diving, Red Cross swimming strokes; competitive swimming, its stroke theory and meet organization.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 410. Health Examinations.** (3) I. Methods of giving health examinations; postural deviations; corrective exercise. Pr.: Ph. Ed. 230.
- 415. Technics of Basketball.** (2) I. Study of rules, theory, and practice; methods of coaching.
- 420. Technics of Baseball.** (2) I. Study of rules, theory, and practice; methods of coaching.
- 426. Technics of Track and Field.** (2) II. Study of rules, theory, and practice; methods of coaching.
- 430. Technics of Football.** (2) II. Study of rules, theory, and practice; methods of coaching.
- 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.
- 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 message, taping, and care of minor athletic injuries. Pr.: Zool. 210.
- 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, 556,* and 580.*

FOR UNDERGRADUATE CREDIT

- 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.
- 306. Tumbling and Recreational Sports.** (2) I. Theory and practice of tumbling and recreational sports. One hour rec. and three hours lab. a week.
- 320. Recreational Leadership W.** (2) II in even years. Principles and methods of organizing communities for leisure activities.
- 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.
- 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.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 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.
- 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.
- 560. Sports Officiating W II.** Principles and practices of officiating athletic games: soccer, speedball, and basketball. Pr.: Team Sports II or consent of instructor.
- 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.
- 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.

* Optional.

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, Curmutte,* Dragsdorf,* Ellsworth,* Hall,* Katz,* K. Lark,* Leaf,* Mandeville* and Williams;* Associate Professors Avery, Bark,* Chapin,* Crawford* and Dale;* Assistant Professors Blatt,* C. Lark, McKinley,* Nelson* and Potnis;* Instructor Green; 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, and V. Physics Teaching in Secondary Schools, all of which are based on the common physical science curriculum (p. 118).

For majors in physics, under any of the options, the following courses, in addition to those specified in the core curriculum (VIII, p. 118), 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. 621, 622; 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 and Chem. 511, 512, 516, 517, 585, 595; Option V. 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 calculus, 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. Kansas State University is a participating institution in the Argonne National Laboratory. 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

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 curricula of the School 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.
- 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.
- 112. Descriptive Physics.** (4) I, II. Two hours rec. and three hours lab. a week.
- 115. Household Physics.** (4) I, II. Physical laws and principles involved in household appliances. Three hours rec. and three hours lab. a week.
- 121. Physics for Medical Technicians.** (4) I. Physical laws and principles involved in medical technology. Three hours rec. and three hours lab. a week.
- 125. Physics for Musicians.** (2) I, II. Selected topics applied to the physics of music and musical instruments.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 330. General Astronomy I.** (3) I. 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.
- 331. General Astronomy II.** (2) II. Cont. of Phys. 330. Two hours lec. a week. Pr.: Phys. 330.
- 333. Observational Astronomy.** (1) II. Observation laboratory for use with Phys. 331. Two hours observ. a week. Pr.: Conc. enrollment in Phys. 331.
- 398. Junior Honors Colloquium.** Variable credit. I, II. Open only to juniors in the Arts and Sciences Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 401. Microclimate.** (3) Fundamental meteorological and climatological processes near the ground. Pr.: Math. 100, Phys. 211.
- 405. Physics for Science Teachers.** (2) S. Apparatus and demonstration methods in teaching physics. One hour rec. and three hours lab. a week. Pr.: Phys. 212 or 311.
- 407. Intermediate Physics.** (3) I, II, S. 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.
- 410. Light.** (3) I. Pr.: Math. 240 or 421.
- 421. Geophysics I.** (3) I. Principles and methods of exploration geology by physical methods. Pr.: Phys. 212 or 311, Math. 221 or 232.
- 432. Mechanics I.** (3) I. 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.
- 435. Mechanics II.** (3) II, S. Cont. of Phys. 432. Pr.: Phys. 432.
- 440. Sound.** (3) I. Pr.: Math. 222 or 231, Phys. 212 or 311.
- 472. Electricity and Magnetism.** (3) II, S. 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.
- 473. Electromagnetic Circuits and Measurements.** (2) II, S. 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.
- 480. Dynamic Meteorology I.** (3) I. Mathematical treatment of atmospheric thermodynamics and hydrodynamics. Pr.: Phys. 212, Math. 222.
- 481. Dynamic Meteorology II.** (3) II. Cont. of Phys. 480. Pr.: Phys. 480.
- 500. Physics Laboratory I.** (2) I, II, S. See Phys. 610. Pr.: One year of college physics.
- 501. Physics Laboratory II.** (2) I, II, S. Cont. of Phys. 500. See Phys. 610.
- 535. Radioactive Tracer Techniques.** (3) II, S. (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.
- 560. Atomic Physics.** (3) I, II, S. Contemporary theories and problems. Pr.: Math. 222 or 232, Phys. 212 or 311.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. Electronic Physics I.** (3) I. Pr.: Math. 222 or 232; Phys. 472, 473, and 560 or conc. enrollment.
- 602. Electronic Physics II.** (3) Pr.: Phys. 472.
- 604. X-ray and Crystal Physics.** (3) I. Pr.: Phys. 472.
- 607. X-ray Laboratory.** (1) I. Three hours lab. a week. Pr.: Phys. 604 or conc. enrollment.
- 610. Advanced Physics Laboratory.** (2) I, II, S. 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 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 501 or 473.
- 613. Introduction to Astrophysics.** (3) I, II. 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.
- 621. Geophysics II.** (3) II. An extension of Phys. 421 to include a quantitative treatment of geophysical principles. Pr.: Phys. 472 and 421.
- 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.
- 640. Introductory Quantum Mechanics.** (3) I. 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.
- 645. Thermodynamics.** (3) Pr.: Phys. 435 or conc. enrollment; Math. 240 or 421.
- 675. Nuclear Physics.** (3) II. Modern theories of nuclear physics. Pr.: Phys. 560.
- 680. Modern Physics Laboratory.** (1) I, II, S. 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.
- 690. Biophysics I.** (2) I, II. 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.
- 701. Journal Club.** Credit arranged. I, II. Seminar in current topics in physics or biophysics. Pr.: Consent of instructor.
- 705. Theoretical Physics I.** (3) I. Pr.: Phys. 432; Math. 240 or 421, 621.
- 710. Theoretical Physics II.** (3) II. Pr.: Phys. 705, Math. 622.
- 720. Introduction to Solid State Physics.** (3) Pr.: Phys. 600 and 640.
- 740. Colloquium in Physics.** Required of graduate majors and undergraduate majors.
- 799. Topics in Physics.** Credit arranged.
- FOR GRADUATE CREDIT
- 825. Advanced Dynamics.** (3) Pr.: Phys. 710.
- 835. Electrodynamics.** (3) Pr.: Phys. 710.
- 855. Statistical Mechanics.** (3) Pr.: Phys. 845.
- 860. Advanced Statistical Mechanics.** (3) Advanced equilibrium statistical mechanics; approach to equilibrium; topics from applications to many-body problems. Pr.: Phys. 855.
- 865. Quantum Mechanics I.** (3) I. Pr.: Phys. 705 or conc. enrollment, Phys. 640, Math. 621.
- 875. Quantum Mechanics II.** (3) I. Pr.: Phys. 865.
- 890. Atomic and Molecular Spectra.** (3) II. Atomic and molecular energy levels and the origins of spectra. Pr.: Phys. 640.
- 899. Problems in Physics I.** (1) II. Independent study of the solution of advanced problems in physics at a level appropriate to the M. S. degree. Pr.: Graduate standing and consent of instructor.
- 915. Advanced Molecular Spectra.** (3) Pr.: Phys. 890.
- 925. X Ray.** (3) Pr.: Math. 240 or 421, Phys. 604.
- 936. Solid State Physics I.** (3) Pr.: Phys. 604 or 720, 855, 875 or conc. enrollment.
- 937. Solid State Physics II.** (3) Pr.: Phys. 936.
- 945. Advanced Nuclear Physics.** (3) Pr.: Math. 622; Phys. 675, 865.
- 955. Mathematical Physics.** (3) Pr.: Phys. 875.
- 970. Quantum Field Theory.** (3) Pr.: Phys. 835, 865.
- 998. Problems in Physics II.** (1) I. 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.

999. Research in Physics. Credit arranged. Work is offered in electronics and gaseous electronics, meteorology, nuclear physics, solid state physics and theoretical physics. Pr.: Consent of instructor.

POLITICAL SCIENCE

LOUIS H. DOUGLAS,* *Acting Chairman of Department*

Professor Douglas; Associate Professor Hajda;* Assistant Professors Caldwell, Clarke and Gustafson;* Instructor Waters; Emeritus: Professor Iles**

Students electing a major in political science should take a minimum of 27 semester hours in political science courses, including P. Sci. 110 and/or 220, and at least 15 hours from courses numbered 400 and above. Upper-division courses should be distributed over at least three of the following:

- I. Political Theory
- II. Politics and Public Policy
- III. Comparative Government and International Relations
- IV. Public Law and Administration

Honor students and students planning to do graduate work should enroll for P. Sci. 795 during their senior year. Students desiring to prepare for law school should normally enroll in a specified major and provide themselves with a sound background of courses in science, social science, history, and literature, under the guidance of the pre-law adviser.

Except for students in the Honors Program, students should complete at least six hours of basic work at the 100-399 level before continuing their major study. Courses numbered 400 and above are not open to sophomores except with the consent of the instructor.

Graduate Work

Requirements for the M. A. degree consist of a minimum of 30 semester hours of which approximately 24 shall be in the major field. Candidates for the M. A. degree must write an acceptable thesis, pass a reading knowledge examination in at least one modern foreign language, and pass a comprehensive written examination covering the field of study and an oral examination covering the thesis. Graduate students are expected to maintain grades of B or better in their major field of study.

Facilities for Graduate Study

Facilities for graduate study include the resources of the university library with its files of federal and state documents and its collection on agricultural policy. Other facilities in the vicinity of the University include the Eisenhower and Truman Libraries, the State Historical Library in Topeka, the State Party Headquarters in Topeka, the material available through the Kansas Citizenship Clearing House, and other university and college libraries.

Pre-Law: The objective of pre-legal training is to acquire a background that will help the student in his law studies and will prove useful to the lawyer in practice. An undergraduate curriculum should prepare the student for law school by educating him in comprehension and expression of language, an understanding of political, economic, social, and cultural institutions and values, and the ability to think logically and creatively. Courses leading to the attainment of those objectives are included in the core curriculum in Arts and Sciences. A pre-law student may elect a course of study leading to the A. B. degree in the general Social Science curriculum or he may major in one of the regular disciplines in the social sciences. A variety of combinations of study are available and a special pre-law adviser helps in planning the student's program. In addition, the College of Arts and Sciences sponsors a Chancery (pre-law) Club to stimulate interest in the legal profession.

FOR UNDERGRADUATE CREDIT

- 110. Introduction to Political Science.** (3) I, II, S. Introduction to the principles and major fields of political science.
- 220. American Government.** (3) I, II, S. National, state, and local governments, with emphasis on constitutional principles and basic structure.
- 320. State and Local Government.** (3) I, II, S. The government of the American states and their subdivisions. Pr.: P. Sci. 220.
- 350. American Foreign Policy.** (3) II, S. Examination of American external relations since 1945 and evaluation of the processes involved in the formulation and conduct of the foreign policy of the United States in the 1960's. Pr.: P. Sci. 220.
- 380. Introduction to Public Law.** (3) I, S. The values of the rule of law and how it is maintained in the Western democracies; the general significance of the legal order; private rights and public duties; nature of the judicial process; sources of law. An introductory comparison of foreign and American national and state concepts and practices. Pr.: P. Sci. 220.
- 399. Honors Seminar in Political Science.** (1) I or II.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 450. Introduction to Public Administration.** (3) I or II, S. Survey of governmental administration in the United States, with particular emphasis on the national government; organization and management, personnel, budgeting, planning, administrative law, and public relations. Pr.: P. Sci. 220.
- 455. Constitutional Law.** (3) II, S. Development of the government of the United States through judicial interpretation of the Constitution. Pr.: P. Sci. 220.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. American Political Ideas.** (3) I or II, or S. Major political ideas underlying the American Union, the doctrine of rights, the nature of union, liberty and property, democracy, and recent trends. Pr.: P. Sci. 220.
- 605. The American Presidency.** (3) I. The presidency as an institution, its historical evolution; Congressional relationships; executive organization. Pr.: P. Sci. 110 and 220.
- 610. Public Policy Toward Business.** (3) II, S. Examination of the relationship between the state and economic institutions; political theory and economic theory. Pr.: Three hours of political science and three hours of economics.
- 615. City Government.** (3) I, II, S. Government and administration of American cities. Pr.: P. Sci. 220.
- 635. Public Personnel Administration.** (3) I or II. Growth of the Civil Service system and its role in the modern state; selection, training, promotion, discipline, classification, compensation, loyalty, and security. Pr.: P. Sci. 450.
- 637. Public Organization.** (2) I or II in alt. years. Theory and practice of organization; problems of authority, delegation, control, line and staff concepts; managerial and specialized functions, decentralization and coordination. Pr.: P. Sci. 600.
- 640. International Relations.** (3) I, S. Analysis of contemporary world society, with emphasis on the behavior of states and current international problems. Pr.: P. Sci. 110 or 220.
- 655. Administrative Law.** (3) II. A study of the development of administration and a study of certain cases involved. Pr.: P. Sci. 380.
- 660. International Law.** (3) I or II, S. Theories of international law, classic and modern; general problems, such as subjects of international law and recognition, individual and collective responsibility, war crimes trials, sources and evidences of international law, codification

- and progressive development of international law, international legislation, settlement of disputes. Pr.: P. Sci. 110 or 220.
- 665. Civil Liberties.** (3) I or II or S. The history, theory, and development of the First Amendment freedoms, with emphasis upon speech and religious issues. Civil rights problems related to the Bill of Rights and the Fourteenth Amendment. Pr.: P. Sci. 220 or consent of instructor.
- 670. History of Political Theory I.** (3) I. This course traces the development of ideas about the state and about government from Greek antiquity to the fifteenth century. Pr.: P. Sci. 220.
- 675. History of Political Theory II.** (3) II. Cont. of P. Sci. 670 from the sixteenth century to the French Revolution. Pr.: P. Sci. 220 and 670.
- 676. Recent Political Thought.** (3) I or II. Development of political ideas from the nineteenth century to the present. Pr.: P. Sci. 110 or 220.
- 690. Chinese Political Thought.** (3) I or II. History of Chinese political thought from the beginnings to the Chin dynasty. Pr.: P. Sci. 110.
- 715. International Organization.** (3) S, II in alt. years. The structure and functions of international institutions; the value and effectiveness of international organization in the contemporary world. Pr.: P. Sci. 110 or 220.
- 735. Far Eastern Government and Politics.** (3) I or II or S. Examination and analysis of the organization and operation and the political, social, and economic problems of China and Japan. Pr.: P. Sci. 110 and 220.
- 740. Political Parties and Pressure Groups.** (3) I, S. Relationships of interest groups in the United States to the development of public policy; nature and evolution of the American party system. Pr.: P. Sci. 220.
- 750. European Political Systems I.** (3) I and alt. S. A comparative analysis of two types of the European political experience: British democracy and totalitarianism, both fascist and communist. Pr.: P. Sci. 110 or 220.
- 755. European Political Systems II.** (3) II and alt. S. A comparative analysis of Continental European political systems. Pr.: P. Sci. 110 or 220.
- 770. Postwar Organization of Europe.** (3) I, S. The structure, authority, and politics of the European institutions created since World War II. Chief emphasis will be placed on the political aspects of the Common Market and other steps toward European unity. Pr.: P. Sci. 110 or 220.
- 780. Soviet System.** (3) II. Government and politics of the Soviet Union and other Communist-controlled nations. Pr.: P. Sci. 110 and 220.
- 785. Readings in Political Science.** (1 to 3) I, II, S. Students will read in sources relevant to a particular topic. Discussions will be held at weekly meetings and students will prepare a terminal report. Pr.: A minimum of 15 hours in political science and consent of the instructor.
- 795. Problems in Political Science.** (2 to 3) I, II. Students will prepare an original paper in a particular field of study. Discussions will be held at weekly meetings. Pr.: A minimum of 15 hours in political science and consent of the instructor. Required as a colloquium of all honors students in political science.
- FOR GRADUATE CREDIT
- 801. Seminar in Public Policy.** (3) I. Selected aspects of public policy and decision making. Pr.: Graduate standing and consent of instructor.
- 811. Seminar in International Politics.** (3) II. Selected aspects of recent international politics. Pr.: Graduate standing and consent of instructor.
- 821. Seminar in Political Theory.** (3) I. Selected topics in Western Political Thought. Pr.: Graduate standing and consent of instructor.
- 831. Seminar in Public Administration.** (3) II. Major problems in public administration. Pr.: Graduate standing and consent of instructor.
- 890. Research in Political Science.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

PSYCHOLOGY

MERRILL E. NOBLE,* *Head of Department*

Professors Bevan, Helson,* Langford,* Noble* and Phares;* Associate Professors Danskin,* Rohles,* Samelson,* Sinnett, E.* and Trumbo;* Assistant Professors Brown,* Duncan and Sinnett, K.;* *Visiting Professors Glad and Murphy; 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 a minimum of 24 hours of course work, including Psych. 110, Stat. 620, 720, 775 and one of the following: Psych. 409, 410, or 600. 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 Sciences curriculum take Math. 100 and A. H. 400; and six hours of zoology beyond Zool. 205 in addition to curricular 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, 600 or 532, and 625 as well as Econ. 620 and 626, Soc. 602 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. 170 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 counseling 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

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.

398. Honors Colloquium. Credit arranged. Selected interdisciplinary problems. Open only to juniors in the Arts and Sciences Honors Program.

399. Honors Seminar in Psychology. (1) I, II. Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

405. Abnormal Psychology. (3) I, S. An introductory study of behavior pathologies, with emphasis on their etiology and treatment. Pr.: Junior standing; Psych. 110 or consent of instructor.

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. 620.

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. 620.

415. Psychology of Childhood and Adolescence. (3) I, S. Survey of behavioral development from birth through adolescence. Pr.: Sophomore standing; Psych. 110.

420. Personality Development. (3) I, II. 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.

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.

435. Social Psychology. (3) II, S. 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.

465. Psychology of Art. (3) II. A study of 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.

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.

515. Personnel Psychology. (3) I, II, S. 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.

531. Occupational Information. (3) II, S. A study of the style of life of persons in various occupations, with attention to the collection, evaluation, filing and use of occupational information. Pr.: Junior standing.

532. Use of Tests in Counseling. (3) I, S. Training in the selection and administration of psychometric instruments in the counseling setting and in the evaluation of results obtained with them. Pr.: Psych. 110 and Stat. 320 or 620.

550. Group Dynamics. (3) I, S. The study of behavior in small groups, including a consideration of communication, the development of standards, the effect of pressures, the characteristics of leadership. Pr.: Junior standing and six hours in psychology or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Psychological Measurement. (4) I, II. 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. 620.

- 605. Quantitative Methods in Psychology.** (3) I, II. 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. 620 or equiv.
- 607. Individual Differences.** (2) I in odd years. A study of systematic differences in behavior as a function of differences in genetic background, physical status, individual experience, and culture. Pr.: Psych. 600.
- 625. Industrial and Engineering Psychology.** (3) I. 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 and a course in statistics or consent of instructor.
- 711. Physiological Psychology I.** (4) I. Survey of data from supportive physical and biological disciplines in order to provide the student with a sufficient background for a discussion of the physiological correlates of behavior. Consideration of physiological mechanisms underlying sleep and wakefulness, the sensory processes, simple motor integration, and instinctive behavior. Three hours rec. and three hours lab. a week. Pr.: Psych. 110, Zool. 205 or consent of instructor.
- 712. Physiological Psychology II.** (4) II. Consideration of the physiological correlates of learning and intelligence, motivation, emotion, and behavior disorders. Three hours rec. and three hours lab. a week. Pr.: Psych. 714.
- 716. Comparative Psychology.** (4) II in even years. A study of 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.
- 720. Psychology of Personality.** (3) I. Discussion of different approaches to the study of personality. Pr.: Any of the following: Psych. 409, 410, 600 and consent of instructor.
- 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.
- 790. Topics in Psychology.** Credit arranged. I, II, S. Pr.: Psych. 110 and consent of instructor.
- 799. Problems in Psychology.** Credit arranged. I, II, S. Pr.: Psych. 110 and consent of instructor.

FOR GRADUATE CREDIT

- 800. Advanced Measurement.** (3) II. A consideration of the logic of measurement, scaling theory, psychophysics and psychometrics, and problems in classification and prediction. Pr.: Psych. 600.
- 805. Experimental Design in Psychology.** (3) II. Introduction to techniques of research planning and experimental design, including critical evaluation of selected experiments. Pr.: Psych. 605 or Stat. 621 or consent of instructor.
- 809. Advanced Experimental Psychology I.** (4) I in odd years. Experimental study of sensory and perceptual processes, with emphasis on recent developments in the field. Two hours rec. and four hours lab. a week. Pr.: Psych. 409 or consent of instructor.
- 810. Advanced Experimental Psychology II.** (4) II. Experimental study of learning and motivation, with emphasis on recent developments in the field. Two hours rec. and four hours lab. a week. Pr.: Psych. 410 or consent of instructor.
- 811. Vision.** (3) I in even years. 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.
- 816. The Evolution of Behavior.** (3) I in even years. A discussion of behavior development, both ontogenetic and phylogenetic, as a means toward understanding basic psychological principles. Pr.: Psych. 714 and 716 or consent of instructor.
- 820. Personality Theory.** (3) I. A comparative examination of contemporary theories of personality structure. Pr.: Psych. 720 or consent of instructor.
- 822. Psychopathology.** (3) II in odd years. A systematic review of behavior disorders, their etiology, and treatment. Pr.: Psych. 405 and 720 or consent of instructor.
- 825. Clinical Testing I: Intelligence.** (3) I, S in odd years. Theory and techniques of intellectual evaluation in the clinical setting, including supervised practice in the use of selected individual tests of intelligence. Pr.: Psych. 600 or consent of instructor.
- 826. Clinical Testing II: Personality.** (3) II in even years. Theory and techniques of personality assessment, with emphasis on the administration and interpretation of projective tests. Pr.: 822, 825, and consent of instructor.
- 830. Advanced Social Psychology.** (3) II. Intensive examination of the social determinants of behavior, with emphasis upon problems of current professional interest. Pr.: Psych. 435 or consent of instructor.
- 835. Introduction to Clinical Psychology.** (3) I, S in even years. Survey of the problems and methods of the clinical psychologist. Pr.: Nine hours of psychology and consent of instructor.
- 844. Counseling Psychology.** (3) II, S. Survey of the problems and methods of the counseling psychologist, with major emphasis on theories of counseling. Pr.: Psych. 532 or 600, and 405, 420 or 720, and consent of instructor.
- 845. Vocational Psychology.** (3) I in odd years. Environmental and human factors in occupational adjustment; appraisal of vocational fitness. Pr.: Psych. 844 and consent of instructor.
- 846. Advanced Industrial Psychology.** (3) I in even years. 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.
- 847. Performance Theory.** (3) II in alt. years. 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.
- 850. Seminar in Personnel and Industrial Psychology.** Credit arranged. II. 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.
- 852. Seminar in Counseling Psychology.** Credit arranged. In even years. 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.: Psych. 844 and consent of instructor.
- 854. Seminar in Experimental Psychology.** Credit arranged. In alt. years. 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.
- 856. Seminar in Psychological Measurement.** Credit arranged. In even years. 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.

- 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.
- 860. Practicum in Counseling Psychology.** Credit arranged. I, II. Supervised practical experience in counseling. Pr.: Psych. 844 and consent of instructor.
- 865. Internship in Counseling or Industrial Psychology.** Credit arranged. I, II, S. Pr.: For counseling students: Psych. 826, 845, 860, third-year standing and consent of the supervisory committee; for industrial students: Psych. 515, 525, and consent of supervisory committee.
- 999. Research in Psychology.** Credit arranged. I, II, S. Pr.: Consent of the supervisory committee.

SOCIOLOGY AND ANTHROPOLOGY

RANDALL C. HILL,* *Acting Chairman of Department*

Professors Dakin and Hill;* Associate Professor Rohrer; Assistant Professors Julian, Long,* Rogers, Stanislawski and Taylor*

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, social work, teaching in the social sciences, and social research. The student who desires to major in sociology with any of the objectives above should refer to the Curriculum in Social Science with a major in sociology. (See page 119.) 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 (X, p. 119) are: 21 semester hours of sociology, including Soc. 480, 615, 671, 700 or 705. Soc. 220 should be taken to satisfy the three hours required in sociology (VII, p. 119). Three hours of economics and three hours of department-approved courses should be taken to satisfy the Social Science elective requirement (IX, p. 119).

Major work leading to the degree Master of Arts is offered in the following areas: Social problems, social work, population problems, criminology, anthropology, community organization, social theory, and research.

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 supporting subjects preparing the student for advanced study.

COURSES IN SOCIOLOGY

FOR UNDERGRADUATE CREDIT

- 150. Courtship and Marriage.** (2) I, II. Basic principles and problems which pertain to ideal family life.
- 200. Introduction to Anthropology.** (3) I, II, S. Basic concepts; man's biological origin and development; nature and significance of race differences; prehistoric archaeology of the Old and New Worlds; material, social, and religious characteristics of non-literate cultures.
- 210. 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.

- 215. 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.
- 220. Introduction to Sociology.** (3) I, II, S. Development, structure, and functioning of human groups; social and cultural patterns; and the principal social processes.
- 240. 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. Pr.: Soc. 220 or consent of instructor.
- Rural Sociology.** (See Ag. Ec. 180.)
- 399. Honors Seminar in Anthropology and Sociology.** (1) I, II. Readings and discussion of selected topics. Open to non-majors in the Honors Program.
- 480. Senior Seminar in Sociology.** (2) II. Summarization and integration of courses in sociology. Pr.: Senior standing and nine hours of sociology.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 602. Industrial Sociology.** (3) II. Human relations in industry, interrelationships of industry and the social order. Pr.: Junior standing or consent of instructor.
- 606. Community Organization and Leadership.** (3) II. American community organization; special emphasis on community problems and planning. Pr.: Soc. 220 or consent of instructor.
- 608. 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. 220 or consent of instructor.
- Advanced Rural Sociology.** (See Ag. Ec. 660.)
- 615. 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. 220.
- 641. Criminology.** (3) I, II, some S. Nature, extent, and causes of crime; programs for prevention and treatment. Pr.: Soc. 220.
- 642. Juvenile Delinquency.** (3) I. Nature, extent, and causes of delinquency; characteristics of delinquents; means of prevention and treatment. Pr.: Soc. 220.
- 644. 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. 641 or 642 or consent of instructor.
- 646. 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. 220.
- 648. Social Differentiation and Stratification.** (3) I. Analysis of societal organization based on age, sex, residence, occupation, community, class, caste, and race. Pr.: Soc. 220.
- 650. Population and Human Ecology.** (2) I. Early theories, policies, growth, composition, spatial aspects, movements, and population trends. Pr.: Six hours sociology, economics, or history.
- 653. 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. 220 or consent of instructor.
- 656. Cultural Anthropology.** (3) I, some S. Culture as a concept for understanding human behavior; comparative study of material, economic, kinship, associational, political, religious, aesthetic, ideological,

and linguistic customs of non-literate and folk cultures; processes of cultural stability and change. Pr.: Soc. 200, 220, or consent of instructor.

658. Social Systems. (3) I. Comparison of social systems in the Orient, Middle East, Europe, and the Americas. Pr.: Soc. 220.

Advanced Rural Sociology. (See Ag. Ec. 660.)

661. 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. 220.

666. Social Organization of the Great Plains. (3) I in odd years. The Great Plains as a cultural region; cultural adaptation, problems of the region, and forms of social organization. Pr.: Soc. 220 and three additional hours in sociology.

668. Indians of North America. (3) II. Aboriginal cultures of Canada, the United States, Mexico, and Guatemala; culture contact and change among surviving groups. Pr.: One of Soc. 200, 220, 656 or consent of instructor.

671. Methods in Social Research. (3) I. Development, use, and interpretation of findings of the case method, social survey, and other techniques of social investigation. Pr.: At least two courses in sociology.

676. Social Institutions. (3) I in odd years. The development and character of the major social institutions in contemporary American society; functions, interrelationships, and trends. Pr.: Soc. 220.

700. 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 human origins and human nature, character and results of associative life, social trends, and social betterment. Pr.: Soc. 220.

705. Recent and Contemporary Social Thought. (3) I in even years. 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. 220.

797. Problems in Sociology. Credit arranged. I, II, S. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

860. 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.

865. Seminar in Sociological Research. Credit arranged. II. Application of scientific techniques to the design and execution of a research project. Pr.: Soc. 671 or equiv.

997. Research in Sociology. Credit arranged. I, II, S. Research for thesis or master's report.

Research in Rural Sociology. (See Ag. Ec. 870.)

COURSES IN INTRODUCTORY SOCIAL SCIENCE

FOR UNDERGRADUATE CREDIT

131. Introductory Social Science I. (4) I, II, S.

132. Introductory Social Science II. (4) I, II, S. Pr.: Int. Soc. Sci. 131.

These courses introduce the student to one of the major areas of knowledge. They are designed to integrate the component parts of social science. They give students who are not planning to specialize in any social science a background knowledge of society and its functions. They may also be used by students who wish to explore the major areas of knowledge to select their specialized fields of study. Social institutions and processes are studied with the purpose of en-

abling the student to understand them and to realize that change in society is inevitable. The student is encouraged to develop his ability to apply objective thinking and to see the significance of alternative value systems in a social problem or situation. As a citizen, the student is given the opportunity to recognize his responsibility in making decisions which determine social policy in a democracy. The courses are not only introductory but also terminal.

SPEECH

NORMA D. BUNTON,* *Head of Department*

Professors Bunton, Given* and Howe;* Associate Professors Dace* and Engler;* Assistant Professors Barnes,* Darnell,* Hannah, Thorne* and Welden;* Instructors Cleary, Denning, Dugas,* Rast and Reed; 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, and 608 or 652. 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

- 070. Spoken English for International Students.** (0) Semi-intensive aural-oral familiarization in American English as a second language.
- 080. Speech Seminar.** (0) Special topics and lectures for speech majors. Required of all majors each semester.
- 105. Oral Communication I.** (2) Selection and outlining of speech material, with emphasis on content, organization, and oral presentation.
- 106. Oral Communication Ia.** (3) Alternate to Spch. 105, permitting greater emphasis on preparation and delivery of speech material. Credit not granted for both Spch. 105 and 106.
- 107. Oral Communication I (B).** (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.
- 120. Speech and Drama Participation.** (1 or 2) Pr.: Consent of director of the activity.
- 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.
- 176. Argumentation and Debate.** (3) Basic theories of argumentation, with emphasis on their application in academic debate. Pr.: Spch. 105 or 106.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 652. Introduction to Linguistics.** (3) Study of the basic concepts of modern descriptive linguistics.
- 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.

- 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.
- 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.
- 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.
- 799. Problems in Speech.** Credit arranged. Open to students in any speech area. Pr.: Junior standing and consent of instructor.

FOR GRADUATE CREDIT

- 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.
- 999. Research in Speech.** Credit arranged. Open to students in any speech area. Pr.: Junior standing and consent of instructor.

COURSES IN THEATER AND INTERPRETATION

FOR UNDERGRADUATE CREDIT

- 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.
- 245. Acting I.** (2) Theory and practice in the fundamentals of acting for the theater. One hour rec. and three hours lab. a week.
- 255. Technical Production I.** (2) 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.
- 350. Techniques of Makeup.** (2) Techniques of makeup for stage, movies, and television.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 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.
- 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.
- 555. Acting II.** (2) 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

- 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.
- 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.
- 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.
- 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.
- 615. Development of the Theater II.** (3) The theater in modern times. Cont. of Spch. 605. Pr.: Junior standing.
- 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.
- 625. Oral Interpretation of Shakespearean Plays.** (2) Oral interpretation of selected plays by Shakespeare, with attention to techniques for effective public reading presentation. Pr.: Junior standing; Spch. 526 for students with drama concentration.
- 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.
- 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.
- 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.
- 667. Stage Lighting.** (2) History and techniques of lighting for the stage and television. Pr.: Junior standing.

COURSES IN SPEECH PATHOLOGY

FOR UNDERGRADUATE CREDIT

- 090. Remedial Instruction in Speech.** (0) Remedial instruction in individual problems of voice and diction. Open to students upon recommendation of any faculty member.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 761. Clinical Practice.** (2) Supervised practice in clinical teaching 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.
- 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

- 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

- 132. KSDB-FM Participation.** (1) Supervised performance in the various departments of the campus FM station.
- 150. Radio-Television Speech I.** (2) Training in voice, diction, pronunciation, and announcing for broadcasting, with emphasis on radio. One hour rec. and three hours lab. a week. Required of students with radio-television concentration.
- 160. Survey of Broadcasting.** (2) Survey of the radio industry; economic, political and social significance of broadcasting. Required of students with radio-television concentration.
- 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.

- 250. Broadcast Station Procedures.** (2) Study of the problems and procedures in the various departments of a broadcasting station. Required of majors. Pr.: Spch. 225 for students with radio-television concentration.
- 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.
- 345. Sports Broadcasting.** (2) Study of techniques, materials, writing, and editing sports copy. Experience in broadcasting play-by-play sports in season, and sports news; use of newswire, Western Union reports, electronic tape, and remote equipment; live experience in ad libbing sports events. Pr.: Spch. 150 for students with radio-television concentration.
- 390. Radio-Television Production I.** (3) Production and direction of individual programs for broadcast, with emphasis on radio. Pr.: Spch. 225 for students with radio-television concentration.
- 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

- 660. Radio-Television Production II.** (3) Cont. of Spch. 390, with emphasis on television. Pr.: Spch. 326 for students with radio-television concentration; consent of instructor for non-majors.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 695. Radio-Television Writing II.** (3) Cont. of Spch. 685. Pr.: Spch. 685 or consent of instructor.
- 726. Radio-Television Station Management.** (3) Study of the principles and the problems of broadcast station management. Pr.: Junior standing.
- 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.

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 and Fryer;* Associate Professor Wearden;* Assistant Professors Conover, Krause* and Marcus**

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. 116) and completing Math. 222 or 232, 240, Stat. 320, either 321 or 510, 410-411 and 620-621; or the student may seek a bachelor of science degree by satisfying the requirements of the Curriculum in Physical Science (p. 118) and completing the aforementioned courses in mathematics and statistics. The student should consult someone in the Department of Statistics about this choice before enrolling.

GRADUATE

The Department of Statistics offers graduate studies leading to the Master of Science degree in statistics. It also offers graduate studies for persons seeking the master's or doctor's degree in other areas, and wishing to minor in 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

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.

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.

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

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.

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.

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.

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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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.

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.

620. 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.

621. 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. 620.

710. Sample Survey Methods. (3) II in alt. years. Design, conduct, and interpretation of sample surveys in the social sciences. Pr.: Stat. 620.

716. Non-parametric Statistics. (3) II. Testing hypotheses when the form of the parent population is unknown; rank and sign tests. Pr.: Stat. 610 or 620.

720. Designing Experiments. (3) I, S. Planning experiments so as to minimize error variance, and avoid bias; Latin squares; split-plot designs; switch-back, or reversal, designs; incomplete block designs; efficiency. Pr.: Stat. 621.

725. Introduction to Operations Research. (3) II in alt. years. Analysis of complex organizations by scientific methods; inventory allocation, waiting-time, replacement, and competitive models. Pr.: Stat. 610 or 620.

- 730. Statistical Genetics.** (3) I in alt. years. Analysis of quantitative inheritance; tests of genetic hypotheses; estimation of genetic components of variance. Pr.: Stat. 620 and six hours of genetics.
- 735. Linear Models.** (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. 611, 621; Math. 507 or 701.
- 740. 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. 735, Math. 621.
- 745. Foundations of Probability.** (3) I in alt. years. Kinds of probability; probability laws; Bayes' Postulate and its analog for continuous variates; fiducial and confidence probabilities; applications to problems in estimation and hypothesis testing. Pr.: Stat. 611, Math. 622 or conc. enrollment.
- 750. Stochastic Processes.** (3) II in alt. years. Chance events whose probability density functions vary in time and/or space; e. g., Brownian motion, life and death processes, competition, learning; stochastic models; Markov processes; applications to physics, biology, psychology, epidemiology, and engineering. Pr.: Stat. 745, Math. 505 or 701.
- 770. Intermediate Theory of Statistics I.** (3) I. Study of generating functions, random variables; probability, limiting and non-central distributions; contingency tables; order statistics. Pr.: Stat. 611 and Math. 622.
- 771. Intermediate Theory of Statistics II.** (3) II. Statistical inference, linear hypotheses; polynomial, regression, and experimental design models; introduction to multivariate analysis. Pr.: Stat. 770 and Math. 505 or 701.
- 799. Topics in Statistics.** Credit arranged. I, II, S. Pr.: Consent of instructor.

FOR GRADUATE CREDIT

- 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.
- 835. 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. 611 or 621.
- 999. Research in Statistics.** Credit arranged. I, II, S. Pr.: Consent of instructor.

TECHNICAL JOURNALISM

RALPH R. LASHBROOK,* *Head of Department*

Professors Ellis, Lashbrook* and Medlin;* Associate Professor Macy; Assistant Professors Backer* and Eaton; Emeritus: Professor Hostetter* and 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 118) lead to the Bachelor of Science degree; the Social Science Curriculum (page 119) 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, 118, 119.)

Students interested in Agricultural Journalism should note requirements on page 53; those interested in Home Economics and Journalism should note requirements on page 275.

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 School 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

- 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.
- 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.
- 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.
- 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.
- 310. Reporting Laboratory.** (1) I, II.
- 316. Reporting II.** (3) I, II. Two hours rec. and six hours reporting for the *Kansas State Collegian* each week. Pr.: Journ. 306.
- 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.
- 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.
- 330. Editing.** (2) I, II. Six hours lab. a week. Pr.: Journ. 316.
- 335. News Photography.** (2) I, II, S. Planning and taking news and feature pictures; writing and editing cutlines.
- 340. Royal Purple.** (1) I, II. Writing copy, preparing layouts, editing, advertising, and business practices on the yearbook under supervision of an instructor. Three hours lab. a week. Pr.: Consent of instructor.
- 345. Kansas State Collegian.** (1) I, II, S. Gathering and writing of news, or advertising practice, on student publications under the supervision of an instructor. Three hours lab. a week. Pr.: Consent of instructor.

- 350. Agricultural Journalism.** (3) I, II, S. Survey of agricultural information techniques, with emphasis on principles of news and feature writing.
- 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.
- 400. Radio and Television News.** (2) II. Processing and broadcasting of radio news. Pr.: Journ. 306. For non-journalism students, Spch. 295.
- 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

- 600. Reporting III.** (3) I. Reporting news of local, state, and national affairs. Two hours rec. and three hours lab. a week. Pr.: Journ. 316, P. Sci. 450, or consent of instructor.
- 606. History of Journalism.** (3) I. Pr.: Junior standing and Hist. 165, 170 or consent of instructor.
- 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.
- 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.
- 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.
- 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.
- 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.
- 630. Public Information Methods.** (2) I. Pr.: Journ. 316.
- 635. Public Relations.** (3) II. Media, methods, principles, and practices of public relations. Pr.: Junior standing or consent of instructor.
- 645. Readings in Journalism.** (2) I, II. Investigation of the literature of journalism. Pr.: Junior standing and consent of instructor.
- 652. Workshop in School Publications.** Credit arranged. S. Supervision of high school yearbooks and newspapers. Pr.: Graduate standing or consent of instructor.
- 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.
- 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.
- 799. Problems in Technical Journalism.** Credit arranged. I, II, S. Pr.: Background of courses needed for problem undertaken.

FOR GRADUATE CREDIT

- 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* and Zimmerman; Instructor Johnson; Emeritus: Professor Ackert**

UNDERGRADUATE

Students majoring in zoology should enroll in the Curriculum in Biological Science (See p. 108). The requirements for a major in zoology include at least 19 credit hours chosen from the 400 to 799 group in addition to Zool. 205 or equiv.

GRADUATE

Advanced work leading to the degree Master of Science is offered in the fields of bird study, parasitology, cytology, embryology, ecology, physiology, endocrinology, protozoology, animal behavior, 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

- 205. General Zoology.** (4) I, II, S. Two hours rec. and six hours lab. a week.
- 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.
- 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.
- 252. Hematology.** (2) I. Characteristics and analyses of blood samples. For students in medical technology. One hour rec. and six hours lab. a week. Pr.: Zool. 425 and Bact. 220 or 250.
- 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

- 405. Comparative Anatomy of Vertebrates.** (4) II. Two hours rec. and six hours lab. a week. Pr.: Zool. 205.
- 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.
- 425. Human Physiology.** (4) I, II, S. Functions of various organ systems of the body. Three hours rec. and three hours lab. a week. Pr.: Zool. 205 or equiv.
- 430. Wildlife Conservation.** (3) I. Methods and techniques in the management and propagation of wildlife. Pr.: Zool. 205 or equiv.

440. Ornithology. (3) II or (2) S. Lecture, laboratory, and field studies in identification and adaptation of birds. Two hours rec. and three hours lab. a week the second semester or two hours rec. and six hours lab. a week in summer school. Pr.: Zool. 205 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Advanced Embryology. (3) II in odd years. Principles of embryology as determined by comparative and experimental methods. One hour lec. and six hours lab. a week. Pr.: Zool. 410.

605. Cytology. (3) I in odd years. Structure and physiology of cells, with an introduction to modern methods of studying cells. One hour lec. and six hours lab. a week. Pr.: Zool. 205 and one of Zool. 410, 425, or 656.

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. 425.

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.

622. 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 and consent of instructor.

625. Animal Parasitology. (3) I. Biology, pathology, and prophylaxis of the principal external and internal parasites of domestic animals. Two hours rec. and three hours lab. a week. Pr.: Zool. 205.

626. Human Parasitology Recitation. (3) II. Pr.: Zool. 205 or equiv.

627. Human Parasitology Laboratory. (1) II. Three hours lab. a week. Pr.: To be taken concurrently with Zool. 626.

630. Invertebrate Zoology. (3) I. Essentials of structure, function, and classification of the invertebrates. One hour rec. and six hours lab. a week. Pr.: Zool. 205. (See also course number 636, Special Topics in Invertebrate Zoology.)

636. Special Topics in Invertebrate Zoology. (1) I. Special phases of development, embryology, phylogeny, and historical perspectives in the classification of invertebrates. To be elected only concurrently with Zool. 630.

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.

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.

656. Zoological Technic. (2) I, II, S. Methods and processes in preparation of microscopical slides; principles of photomicrography. Pr.: Zool. 205.

660. Animal Ecology. (3) II in even years. 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.

661. Special Topics in Animal Ecology. Varied 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.

- 670. Ichthyology and Herpetology.** (3) II in even years. Taxonomy and natural history of fresh-water fishes, amphibians, and reptiles. One hour rec. and six hours lab. a week. Pr.: Zool. 205.
- 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.
- 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.
- 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. Two hours rec. and six hours lab. a week. Pr.: Zool. 670 or consent of instructor.
- 693. Limnology.** (2) I in even years. Studies of fresh-water lakes and streams, with stress on the physical, chemical, and biological factors which determine their biological productivity. Two hours lec. per week. Pr.: One lab. course in science, Chem. 110 or 210, or consent of instructor.
- 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. per week. Pr.: Zool. 693 or conc. enrollment, two lab. courses in biology, Phys. 112 or equiv., or consent of instructor.
- 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.
- 795. Zoology and Entomology Seminar.** (1) I, II. Pr.: Consent of department head. (See Entom. 795.)
- 799. Problems in Zoology.** Credit arranged. I, II, S. Work is offered in animal behavior, bird study, 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

- 801. Taxonomy of Parasites.** (2) II. Offered on demand. One hour rec. and three hours lab. a week. Pr.: Zool. 625 or 627 and consent of instructor.
- 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 a week of combined rec. and lab. Pr.: Zool. 420 or equiv.
- 999. Research in Zoology.** Credit arranged. I, II, S. Work is offered in animal behavior, bird study, 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.

School of Education

WILLIAM H. COFFIELD,* *Dean*

FLOYD H. PRICE, *Assistant to the Dean*

Professors Agan, Coffield,* DeMand,* Green,* Moggie,* O'Fallon* and Olson;* Associate Professors Bradley,* Drumright,* Hall,* Littrell,* Peterson,* Trennepohl* and Trent;* Assistant Professors Bartel,* Bracken,* Champoux,* Craig,* Donelson,* Friesen,* Hawkins,* Hunt,* Kaiser,* Loeb,* McAnarney,* Peccolo* and Swaim; Instructor Price; Emeritus: Professors Baker,* Davidson,* Rust* and Strickland;* Associate Professor Baxter**

UNDERGRADUATE

The School 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 school 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, within the resources of the School and the University, work in the various areas of special education of exceptional children; (5) providing educational consultative services within the limits of the special competencies of the staff and the resources of the School; (6) cooperating in placement services. Implicit in these statements are varying degrees of cooperation between the School of Education and other University colleges and departments, characteristic of the work of a teacher-education program in a multi-purpose institution.

The majority of the students in the teacher education program are in four-year curriculums leading to the Bachelor of Science or Bachelor of Arts degree. In the undergraduate curriculums, students are prepared for elementary teaching and for secondary teaching in 22 subject fields. For further information about the undergraduate program in teacher education see the "Curriculum in Education" under "College of Arts and Sciences."

A student enrolled in any program leading to secondary certification is provided with an adviser from the School of Education and a co-adviser from the academic teaching field. A student in the Elementary Curriculum is assigned to an adviser in the School of Education.

Each student who plans to prepare for teaching must submit an application for admission to teacher education in the second semester of the sophomore year (March 1), or in the case of transfer students, at the beginning of the junior year at the latest (November 1). Each application is reviewed by the Committee on Admission and Retention of the School of Education. The application is available from the School of Education. Students will be expected to meet the following minimum requirements:

1. An over-all grade point of 2.2.
2. Recommendation by the applicant's adviser or advisers.
3. Recommendation by the Dean of Students.
4. Recommendation by the Director of Student Health.
5. A grade of 2.0 or better in one of the following: Speech 105, 106, 135, 200, 472 or 526.
6. A grade of 2.0 or better in English Comp. I or English Comp. II.

The application for a teaching certificate must be accompanied by the recommendation of the Dean of the School of Education. The recommendation is based on the following factors: evidence that all University requirements in the applicant's curriculum in teacher education have been satisfactorily completed—character, speech habits, and health, both physical and mental.

GRADUATE

At the master's level, classroom teachers may continue their education with a concentration in either professional education or a teaching field. At this level there are also programs which prepare teachers for special responsibilities as administrators, supervisors, and guidance counselors.

Students in this program may also be prepared to become curriculum consultants and curriculum directors in the elementary or secondary school.

Graduate study is offered in the School of Education in the fields of adult education, agricultural education, educational administration, guidance and counseling, home economics education, secondary education, and elementary education.

The application for admission to candidacy for the Master of Science Degree in Education must be made on or before the completion of nine semester hours of credit applicable toward the degree in courses offered in the School of Education. The application procedures, approval of programs of study, periodic reviews, and recommendations will be administered by a Selection and Retention Committee of the School of Education.

For a major in the School a person must have completed a minimum of 20 semester hours of undergraduate credit in the field of the major, for a minor in the School a minimum of 12 semester hours of undergraduate credit in the field of the minor. All work counted toward a major in the School must average B or better in scholarship. Graduate students majoring in the School of Education should have at least one year of teaching experience.

COURSES IN EDUCATION

FOR UNDERGRADUATE CREDIT

- 200. Principles of Elementary Education.** (3) I, II, S. An over-all view of the elementary school: organization, management, purposes, curriculum trends, and pupil characteristics. Pr.: Sophomore standing.
- 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.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 400. Educational Psychology II.** (3) I, II, S. The learning process, with special emphasis on the school environment, the teacher, and the evaluation of school learning. Pr.: Educ. 202 and junior standing.
- 414. Methods of Teaching Industrial Arts.** (3) I. Methods of teaching, lesson planning, organization of subject matter, and class projects applied to general shop work, woodworking, sheet metal, arc and oxy-acetylene welding, machine shop practice, motor mechanics, and other industrial arts subjects. Pr.: Educ. 400 and consent of instructor.
- 417. Teaching Participation in Elementary Music.** (3) I, II, S. Observation in teaching under the direction of selected teachers in elementary music school programs. Application for admission to course is made through Education adviser during spring semester preceding school year in which course is desired. Pr.: Educ. 400, Music 412, Engl. 090; grade-point average of 2.0 in all resident courses taken, and a grade-point average of 2.5 in teaching field; September Observation.
- 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. Application for admission to course is made through Education adviser during spring semester preceding school year in which course is desired. Pr.: Educ. 400, Music 413, Engl. 090; grade-point average of 2.0 in all resident courses taken, and a grade-point average of 2.5 in teaching field; September Observation.
- 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. 400.
- 461. School Music I.** (3) I, II, S. (See Music 412.)
- 462. School Music II.** (3) I, II, S. (See Music 413.)

- Band Administration and Percussion Techniques.** (3) II, S. (See Music 630.)
- 463. Instrumental Methods.** (3) I, II, S. (See Music 510.)
- 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.: Educ. 200 or consent of instructor.
- 471. Language Arts for Elementary Schools.** (3) I, II, S. Modern trends in the teaching of reading, oral language, composition, and spelling. Pr.: Educ. 200 or consent of instructor.
- 472. Social Studies for Elementary Schools.** (3) I, II, S. Course of study content as a basis for consideration of modern classroom procedures; objectives and problems in the teaching of social studies. Pr.: Educ. 200 or consent of instructor.
- 473. Arithmetic for Elementary Schools.** (3) I, II, S. The teaching of arithmetic in the elementary schools, including the nature of arithmetical processes, curriculum, methods of instruction, instructional materials, and the evaluation of outcomes. Pr.: Educ. 200 or consent of instructor.
- 474. Methods of Teaching in the Elementary School.** (3) I, II. Consideration of teaching techniques, materials, and subject matter used by effective elementary school teachers; classroom organization and management. Pr.: Educ. 200; conc. enrollment in Educ. 475 and consent of instructor.
- 475. Teaching Participation in the Elementary School.** Credit arranged. I, II. Observation and teaching participation under the direction of selected elementary teachers. Application for admission to course is made through the Education adviser during spring semester preceding school year in which course is desired. Pr.: Educ. 200, 470, 471, 472, 473; Engl. 090; conc. enrollment in Educ. 474; 90 hours of completed course work; and a grade-point average of 2.0 in all resident courses taken; September Observation.
- 476. Methods of Teaching in the Secondary School.** (3) I, II. General principles of teaching applied to high school instruction; selection and organization of teaching materials, individual adaptation, organization, and management of classroom. Pr.: Educ. 400, senior standing, and consent of instructor.
- 477. Teaching Participation in the Secondary School.** Credit arranged. I, II. Observation and teaching participation under the direction of selected teachers in junior and senior high schools. Application for admission to course is made through Education adviser during spring semester preceding school year in which course is desired. Pr.: Educ. 400; Engl. 090; senior standing; a grade-point average of 2.0 in all resident courses taken, and a grade-point average of 2.5 in teaching field; September Observation.
- 561. Occupational Information.** (3) (See Psych. 531.)

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 602. Audio-Visual Aids in Instruction.** (2 or 3) S. Principles and technics in the use of visual and audio-visual materials, operation and maintenance of equipment, and sources of supply. Pr.: Educ. 474 or 476 or conc. enrollment.
- 603. Junior High School.** (2 or 3) S. Origin, objectives, program, and administration of the junior high school, and relations with lower and higher education units. Pr.: Teaching experience.
- 604. Extra-class Activities.** (3) II, S. Organization, sponsorship, and objectives of clubs, publications, athletics, dramatics, musical organiza-

- tions, assemblies, home room, and student council in junior and senior schools. Pr.: Educ. 450, senior standing, or consent of instructor.
- 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.
- 607. Elementary School Reading.** (3) On sufficient demand. Reading as a developmental process; problems in reading as problems in total pupil development; reading readiness and interests at succeeding levels of development; diagnosis and prevention of reading difficulties. Pr.: Educ. 471, teaching experience, or consent of instructor.
- 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 200 or 450.
- 609. Psychology of Exceptional Children.** (3) (See Psych. 425.)
- 610. 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 play-groups, and the various youth-serving agencies with the school. Pr.: Senior standing.
- 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.: Teaching experience and consent of instructor.
- 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.)
- 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.
- 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

- 800. Statistical Methods in Education.** (3) On sufficient demand. Nature and measurement in education, organization of data, computation and interpretation of basic statistics, and sampling methods and theory. Pr.: Sophomore standing and nine hours of education or consent of instructor. Not open to students who have credit in Stat. 320 or 620.
- 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.
- 802. Research Methods and Treatment of Data.** (3) I, 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.

- 803. Curriculum Development.** (3) I, S in odd years. 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.
- 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.
- 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.
- 806. Philosophy of Education.** (3) 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.
- 807. General School Administration.** (3) I, 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.
- 808. School Business and Finance.** (3) 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.
- 809. Supervision and Improvement of Instruction.** (3) S. A course designed for administrators, supervisors, and classroom teachers who wish to help themselves and others isolate and analyze teaching problems. Pr.: At least one year of teaching experience.
- 810. Elementary School Administration.** (3) 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. 200 and teaching experience.
- 811. Curriculum Construction for Elementary Schools.** (2 or 3) On sufficient demand. Procedures for organizing and conducting programs for curriculum improvement in the elementary schools; techniques for the development and evaluation of curriculum materials. Opportunity is provided for work on individual curriculum problems. Pr.: Educ. 803 and teaching experience.
- 812. The School Plant.** (3) S of 1956, 1959, and every third year thereafter. Determination and provision of building and other plant needs by the local public school district, including planning, financing, construction, and utilization. Pr.: At least one year of teaching experience.
- 813. School-Public Relations.** (2 or 3) S of 1958, 1961, and every third year thereafter. 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.
- 814. Secondary School Administration.** (3) 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.
- 815. Audio-Visual Programming.** (3) I, 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 the program. Pr.: Educ. 602 or consent of instructor.

- 816. Adult Education.** (3) Offered 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.
- 817. Organization and Administration of the Guidance Services Program.** (2 or 3) S of even years. 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 and at least two years of successful teaching experience.
- 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.
- 819. Seminars in Education.** Credit arranged. On sufficient demand. These seminars will consider research problems in the several fields of education represented in terms of the special interests of the students. (1) Agricultural Education, (2) Curriculum and Improvement of Instruction, (3) Educational Administration, (4) Elementary Education, (5) Guidance Services, (6) Secondary Education, (7) Social Foundations, (8) Special Education, (9) Adult Education. Pr.: Consent of adviser.
- 820. Public School Law.** (1 to 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.
- 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.: Educ. 817; Psych. 600, 844; teaching experience; and consent of instructor.
- 841. Principles of Student Personnel Administration.** (2) Offered 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.
- 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.
- 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, student personnel services, and the problems of admission. Pr.: Consent of instructor.
- 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 fields and teaching interests of the students enrolled in the class. Pr.: Consent of instructor.

- 845. Topics in Mathematics for the Elementary Teacher I.** (2) I. A study of history of numerals, numbers and numerals, sets, systems of numeration, fundamental operations of arithmetic, number systems, computational theory and history, and relations and rational numbers. Limited to students in the In-Service Institute in Mathematics for elementary school personnel. Pr.: Graduate standing and consent of instructor.
- 846. Topics in Mathematics for the Elementary Teacher II.** (2) II. Consideration of a fractional numeration system, theory and history of computing with decimals and per cents, the real numbers, elementary logic and proof, modern algebra, intuitive geometry, measurement and statistics. Limited to students in the In-Service Institute in Mathematics for elementary school personnel. Pr.: Graduate standing and consent of instructor.
- 847. Elementary Mathematics Curriculum I.** (1) I. A study of the recent curricular developments in elementary school mathematics, research in the field and program evaluation are stressed. Limited to students in the In-Service Institute in Mathematics for elementary school personnel. Pr.: Graduate standing and consent of instructor.
- 848. Elementary Mathematics Curriculum II.** (1) II. Cont. of Elementary Mathematics Curriculum I. Limited to students in the In-Service Institute in Mathematics for elementary school personnel. Pr.: Graduate standing and consent of instructor.
- 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

- 500. Methods of Teaching Agriculture.** (3) I, II. Lesson plans; organization of materials and direction of class, laboratory and field instruction work in vocational agriculture; individual farming programs and class and group activities; coordination of farm mechanics work; administration, organization, and coordination of the Future Farmers of America organization with the program of instruction in vocational agriculture. Pr.: Educ. 400.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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 needs. Pr.: Consent of instructor.
- 701. Administration and Supervision of Vocational Education.** (2) Offered 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 which offers vocational education. Problem basis of treatment is used. Pr.: Educ. 450 and one year of teaching experience.
- 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. 400.
- 703. Teaching Adult Classes in Agriculture.** (2 or 3) Offered on sufficient demand. Organization and preparation of materials, and methods used in teaching adult classes in vocational education in agriculture for young farmers and adults. Departments are visited for evaluation of programs and results. Pr.: Educ. 702.

- 704. Technics in Agricultural Education.** (3) Offered 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.
- 705. Organization Problems in Teaching Farm Mechanics.** (2) Offered on sufficient demand. Analysis of the farm mechanics course of study; needs and interests of boys; learning difficulties; skills and technical knowledge required; correlation with agriculture; application of laws of learning to the teaching process; determination of objectives. Pr.: Educ. 477.
- 706. Field Experience in Agricultural Education.** (1 or 2) Offered 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

- 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.
- 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.
- 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.
- 825. Curriculum in Agriculture II.** (2 or 3) S. Cont. of Educ. 824. Pr.: Educ. 824 or consent of instructor.
- 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

- 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.
- 550. Methods of Teaching Home Economics.** (3) I, II. Selection of techniques and organization of materials for teaching secondary programs.
- 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

- 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.
- 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

- 827. Organization and Presentation of Home Economics.** Credit arranged. I, II, S.
- 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.
- 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.
- 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.
- 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.
- 840. Occupational Home Economics Education.** (3 or 2) On sufficient demand. Development of curriculums and teaching materials pertinent to programs for job training in home and community service occupation. Pr.: Teaching experience.

The College of Commerce

C. CLYDE JONES,* *Dean*

JAMES B. HOBBS,* *Associate Dean*

Professors Clark and Jones,* Associate Professors Bowlin,* Eriksen,* Gugler,* Laughlin and Ridgway,* Assistant Professors Gilkison, Gudgell, Hobbs,* Mulanax,* Tidwell and Tuxbury; Instructors Barton-Dobenin, Davis, Fiek and Rapp; 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 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. A limited amount of specialization is possible in Business Administration.

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 enroll in the School of Education within the College of Arts and Sciences. (See page 110 for specific requirements.)

Effective for all students entering the College of Commerce after September 1, 1964, and all students graduating after September 1, 1969.

COMMUNICATIONS

Engl.	100	English Composition I	3	
Engl.	120	English Composition II	3	
Spch.	106	Oral Communication Ia	3	
		One of:		
	Engl.	200 English Composition III	(3)	} 2-3
	Engl.	416 Scientific Report Writing	(2)	
	Engl.	430 Narrative Writing I	(3)	
	Engl.	436 Narrative Writing II	(3)	
	Spch.	200 Oral Communication II	(2)	
	Spch.	608 Persuasion	(3)	
	Spch.	616 Group Discussion Methods	(3)	
	Spch.	618 Discussion and Conference Leadership	(3)	
Engl.	090	English Proficiency	0	
				11-12

QUANTITATIVE

Math.	100	College Algebra	3
Stat.	320	Elements of Stat.	3
Math.	220	Anal. Geom. & Cal. I or 4 or	3
Math.	340	Intro. to Analytic Proc. .	3
Stat.	321	Bus. and Econ. Statistics	3

12-13

NATURAL SCIENCES*

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SOCIAL SCIENCES

P. Sci.	220	American Government	3
Psych.	110	General Psychology	3
Soc.	220	Intro. to Soc.	3
		Geog., Hist., Pol. Sci.,	
		Psych., and/or Soc.	6

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HUMANITIES

6

BUSINESS ADMINISTRATION AND ECONOMICS

B. A.	272	Introd. Accounting	5
B. A.	305	Managerial Accounting ..	3
Econ.	110	Economics I	3
Econ.	120	Economics II	3
B. A.	325	Business Law I	3
B. A.	326	Business Law II	3
B. A.	400	Administration	3
B. A.	405	Business Finance	3
B. A.	431	Personnel Admin.	3
B. A.	440	Marketing	3
B. A.	600	Business Policy	3
B. A.	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.	430	Money and Banking	(3)
Econ.	686	Business Fluctuations and Forecasting	(2)
Econ.	710	Intermediate Economic Analysis	(3)
Econ.	720	Income and Employment Theory	(3)

Field of Specialization (see "Fields of Specialization" below) 12

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OTHER

Air or Mil. Sci. (men only)	4
Phys. Educ. (two semesters)	0
Free Electives	<u>8-14</u>

Total credit hours required
 of all students126

* 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.	505	Investments	3
B. A.	615	Financial Mngt.	3

PLUS

Six Credit Hours Selected from the Following Course Work

B. A.	312	Insurance	3
B. A.	342	Credits and Collections ..	2
Econ.	430	Money and Banking*	3
Econ.	610	Public Finance	3
Econ.	681	International Trade	3
Econ.	690	Monetary, Cr., Fis. Pol.	2

GENERAL BUSINESS

Required

Cr. Hrs.

Twelve credit hours to be selected from the following courses, with a minimum of three groups being represented:

GROUP I

B. A.	601	Advanced Mngt.	3
B. A.	610	Bus. Meas. & Forecast.	3

GROUP II

B. A.	631	Organ. Behav. & Admin.	3
Psych.	515	Personnel Psychology	3

GROUP III

B. A.	505	Investments	3
B. A.	615	Financial Mngt.	3

GROUP IV

B. A.	540	Retailing or	
B. A.	542	Sales Management	3
B. A.	640	Marketing Analysis	3

MANAGEMENT

Required

Cr. Hrs.

B. A.	601	Advanced Mngt.	3
B. A.	610	Bus. Measure. & Fore'g .	3

PLUS

Six Credit Hours Selected from the Following Course Work

B. A.	615	Financial Mngt.	3
B. A.	617	Controllership	3
B. A.	631	Organ. Behav. & Admin.	3
B. A.	640	Marketing Analysis	3
Econ.	620	Labor Economics	3
Econ.	636	Economic Systems	2
Econ.	710	Intermed. Econ. Anal.* .	3
Econ.	740	Managerial Economics	3
P. Sci.	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.	341	Salesmanship	2
B. A.	540	Retailing or	
B. A.	542	Sales Management	3
B. A.	640	Marketing Analysis	3

PLUS

Four Credit Hours Selected from the Following Course Work

B. A.	342	Credits and Collections ..	2
B. A.	540	Retailing or	
B. A.	542	Sales Management	3
Journ.	320	Prin. of Advertising	3
Psych.	505	Consumer Psychology	3

PERSONNEL ADMINISTRATION

Required

Cr. Hrs.

B. A.	631	Organ. Behav. & Admin.	3
Psych.	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.	435	Social Psychology	3
Psych.	505	Consumer Psychology	3
Psych.	531	Occupational Infor.	3
Psych.	532	Use of Tests in Counsel.	3
Psych.	550	Group Dynamics	3
Psych.	625	Indus. & Engg. Psych. ..	3

GROUP II

Econ.	620	Labor Economics	3
Econ.	626	Collec. Bargain. and Labor Relation Law	3

GROUP III

Soc.	602	Indus. Sociology	3
P. Sci.	635	Pub. Personnel Admin. ..	3

SECRETARIAL TRAINING

Required

Cr. Hrs.

B. A.	236	Transcription I	3
B. A.	237	Office Prac. & Tech.	3
B. A.	238	Office Machines Lab.	0
B. A.	301	Office Management	3
B. A.	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.	230	Typewriting I	3
B. A.	231	Typewriting II	3
B. A.	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.	100	English Composition I	3		
Engl.	120	English Composition II	3		
Spch.	106	Oral Communication Ia	3		
		One of:			
		Engl. 200 English Composition III	(3)	}	2-3
		Engl. 416 Scientific Report Writing	(2)		
		Engl. 430 Narrative Writing I	(3)		
		Engl. 436 Narrative Writing II	(3)		
		Spch. 200 Oral Communication II	(2)		
		Spch. 608 Persuasion	(3)		
		Spch. 616 Group Discussion Methods	(3)		
		Spch. 618 Discussion and Conference Leadership	(3)		
Engl.	090	English Proficiency	0		
					<u>11-12</u>

QUANTITATIVE

Math.	100	College Algebra	3
Stat.	320	Elements of Stat.	3
Math.	220	Anal. Geom. & Cal. I or 4 or	3
Math.	340	Intro. to Analytic Proc. .	3
Stat.	321	Bus. and Econ. Statistics	3
			<u>12-13</u>

SOCIAL SCIENCES

P. Sci.	220	American Government	3
Psych.	110	General Psychology	3
Soc.	220	Intro. to Soc.	3
		Geog., Hist., Pol. Sci.,	
		Psych., and/or Soc. ..	3
			<u>12</u>

NATURAL SCIENCES*

12

HUMANITIES

6

BUSINESS ADMINISTRATION AND ECONOMICS

B. A.	272	Introd. Accounting	5
Econ.	110	Economics I	3
Econ.	120	Economics II	3
B. A.	325	Business Law I	3
B. A.	326	Business Law II	3
B. A.	400	Administration	3
B. A.	405	Business Finance	3
B. A.	431	Personnel Admin.	3
B. A.	440	Marketing	3
B. A.	600	Business Policy	3
B. A.	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.	430	Money and Banking	(3)
Econ.	686	Business Fluctuations and Forecasting	(2)
Econ.	710	Intermediate Economic Analysis	(3)
Econ.	720	Income and Employment Theory	(3)

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ACCOUNTING

B. A.	371	Intermed. Accounting	3
B. A.	361	Cost Accounting	3
B. A.	461	Adv. Cost Aectg.	2
B. A.	472	Valuation Accounting	3
B. A.	480	Tax Accounting	3
		Accounting Electives	
		(selected in consultation	
		with faculty adviser) .	<u>6</u>

OTHER

Air or Mil. Sci. (men only)	4
Phys. Educ. (two semesters)	0
Free Electives	<u>10-16</u>
Total credit hours required	
of all students	<u>130</u>

20

* 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		<i>Cr. Hrs.</i>	SECOND SEMESTER		<i>Cr. Hrs.</i>		
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Math.	100	College Algebra	3	Spch.	106	Oral Comm. Ia	3
P. Sci.	220	American Government	3	Psych.	110	General Psych. or	
		Nat. Sci. and/or Human.	5-6	Soc.	220	Intro. to Sociol.	3
		Air or Mil. Sci.	1			Nat. Sci. and/or Human.	5-6
Ph. Ed.	011	Basic Phys. Educ.	0	Ph. Ed.	011	Air or Mil. Sci.	1
						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.	272	Introd. Accounting	5
B. A.	305	Managerial Accounting ..	3
Econ.	110	Economics I	3
Econ.	120	Economics II	3
B. A.	325	Business Law I	3
B. A.	326	Business Law II	3
B. A.	400	Administration	3
B. A.	405	Business Finance	3
B. A.	431	Personnel Admin.	3
B. A.	440	Marketing	3
B. A.	600	Business Policy	3
B. A.	602	Business and Society	3

Business Electives, including at least one of the following courses offered by the Department of Economics				6
Econ.	430	Money and Banking	(3)	
Econ.	686	Business Fluctuations and Forecasting	(2)	
Econ.	710	Intermediate Economic Analysis	(3)	
Econ.	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 cumula-

- tive 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</i> (including courses for which WD's are reported)	<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 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 re-admission, 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 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 Dean, College of Commerce, Kansas State University, Manhattan, Kansas 66504.

Program Leading to the Degree,

MASTER OF SCIENCE IN BUSINESS ADMINISTRATION

The program leading to the degree of Master 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 Controllership	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 course work in a minor field in consultation with his major professor and the department head of the minor field. Normally, the minor 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 in consultation with his major professor and the department head of the minor field. Normally, the minor field 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

- 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.
- 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.
- 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.
- 231. Typewriting II.** (3) I, II. Cont. of Typewriting I. Pr.: B. A. 230.
- 235. Shorthand I.** (4) I, II, S. Fundamentals of Gregg Shorthand. Meets five hours each week. Pr.: B. A. 231.
- 236. Transcription I.** (3) I, 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.
- 237. Office Practice and Technique.** (3) I. Training for the executive secretary. The course work covers dictation and transcription, secretarial functions and responsibilities, and the use of office machines. Pr.: B. A. 236 and conc. enrollment in B. A. 238.
- 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.
- 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.
- 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.
- 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. 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.
- 312. Insurance.** (3) II. A study of life, property, casualty, and health insurance from a business point of view. Pr.: Econ. 110.
- 320. Land Law.** (2) II. Interests and rights in land; methods by which such interests and rights are acquired and protected; relation of landlord and tenant and that of mortgagor and mortgagee, developed by study of Kansas cases.
- 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.
- 326. Business Law II.** (3) I, II, S. Cont. of Business Law I. Pr.: B. A. 325.
- 341. Salesmanship.** (2) I. 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 throughout the University as well as to those majoring in business. Pr.: Junior standing.
- 342. Credits and Collections.** (2) II. A study of the fundamental principles involved in extending credit and an analysis of present collection practices. Pr.: B. A. 440.
- 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
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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

- 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.
- 601. Advanced Management.** (3) I. 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.
- 602. Business and Society.** (3) I, II, S. The impact of changes in the non-market environment on business; the relationship of business to social, economic and political forces. Pr.: Senior or graduate standing plus nine hours of credit in the social sciences.
- 610. Business Measurements and Forecasting.** (3) II. 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.
- 615. Financial Management.** (3) II. Analysis of problems in advanced financial planning and control. Pr.: B. A. 405.
- 617. Controllership.** (3) II. 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.
- 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.
- 640. Marketing Analysis.** (3) I. A study of market analysis and research methods. Pr.: B. A. 440 and consent of instructor.
- 798. Problems in Business Administration.** Credit arranged. I, II, S. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 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.
- 810. Business Finance Seminar.** (3) I. 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.
- 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.
- 840. Seminar in Marketing.** (3) II. A study of current literature and research in marketing theory. Pr.: B. A. 440 or consent of instructor.
- 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

- 272. Introductory Accounting.** (5) I, II, S. The fundamentals of accounting for business administration and accounting majors. Pr.: Sophomore standing.

- 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. 272 or 170.
- 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

- 461. Advanced Cost Accounting.** (2) I, II. Budgetary control with standard costs. Cost and profit analyses for decision-making purposes. Pr.: B. A. 361 or 305.
- 471. Advanced Accounting.** (3) I. Home office and branch accounting, consolidated statements, receiverships, and other special topics. Pr.: B. A. 371.
- 472. Valuation Accounting.** (3) I, II, S. Valuation of balance sheet accounts. Pr.: B. A. 371.
- 480. Tax Accounting.** (3) I, II. Principles and problems of federal income taxation of individuals, partnerships, estates, and trusts and corporations. Pr.: B. A. 305 or 371.
- 570. Specialized Accounting.** (3) II. Partnership accounting, installment sales, consignment sales, insurance, mergers, estates and trusts. Pr.: B. A. 472.
- 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.
- 580. Governmental Accounting.** (2) I. State and municipal accounts and accounts for public institutions. Pr.: B. A. 361 or 371.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 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.
- 672. Accounting Systems.** (3) I. Function, design, and installation of systems for various types of business. Pr.: B. A. 471 and consent of instructor.
- 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.
- 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.
- 799. Problems in Accounting.** Credit arranged. I, II, S. Pr.: Background of courses needed for the problem undertaken.

FOR GRADUATE CREDIT

- 815. Advanced Accounting Problems.** (3) I in even years. A study of the more complex problems in various areas of accounting, with emphasis on theoretical background and presentation. Pr.: Consent of instructor.
- 816. Corporation Accounts and Statements.** (3) I in odd years. An intensive treatment of problems related to corporation accounting and reporting, with emphasis on income determination and balance sheet valuation. Pr.: Consent of instructor.
- 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.
- 999. Research in Accounting.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

The College of Engineering

PAUL E. RUSSELL, *Dean*

JOHN W. SHUPE, *Associate 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. The Engineering Manpower Commission reports that the annual number of engineering graduates required by 1970 will nearly double. 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 222
- Chemical Engineering—curriculum on page 223
- Civil Engineering—curriculum on page 224
- Electrical Engineering—curriculum on page 225
- Industrial Engineering—curriculum on page 226
- Mechanical Engineering—curriculum on page 227
- Nuclear Engineering—curriculum on page 229

A general description of each of these curriculums, including a list of the faculty and departmental course offerings, is presented on pages 232 through 260. 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 37.

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 begin with the Analytic Geometry and Calculus I, are urged to investigate the possi-

bility 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.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
I. E.	221	Ind. Productions	2	M. E.	213	Graphical Comm. I	3
Math.	220	Anal. Geom. & Calc. I	4	Math.	221	Anal. Geom. & Calc. II ..	4
Spch.	105	Oral Comm. I	2	C. E.	213	Plane Surveying	3
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Physical Education	0
		Air or Mil. Sci. 1A	1			Air or Mil. Sci. 1B	1
G. E.	110	Engg. Lectures	0	G. E.	115	Engg. Assembly	0
Total			17	Total			17

SOPHOMORE

Phys.	310	Engg. Physics I	5	Phys.	311	Engg. Physics II	5
Math.	222	Anal. Geom. & Calc. III ..	4	Math.	240	Series & Diff. Equa.	4
M. E.	218	Graphical Comm. II	2	Ag. E.	310	Agri. Machinery	3
Ag. E.	375	Agri. Hydrology	3	Ap. M.	305	Statics	3
Bot.	190	Nat. & Dev. of Plants	3			Humanities Elective*	2
		Air or Mil. Sci. 2A	1			Air or Mil. Sci. 2B	1
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

Agron.	200	Plant Science	4	E. E.	423	Electronics & Controls ..	3
Ap. M.	412	Dynamics	3	E. E.	424	Electron. & Con. Lab. ...	1
M. E.	411	Engg. Thermodynam. I ..	4	Ag. E.	440	Func. Req. of Ag. Str. ..	3
E. E.	419	Elec. Circuits & Mach. ..	4	Ag. E.	446	Tractors	3
G. E.	350	Engg. Materials	2	Ap. M.	471	Fluid Mechanics	3
G. E.	351	Engg. Materials Lab.	1	Ap. M.	415	Mechanics of Materials .	3
Engl.	090	English Proficiency	0			Social Science Elective* .	2
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

SENIOR

Ap. M.	418	Mechanics of Matls. Lab. .	1	Econ.	110	Economics I	3
Ag. E.	435	Design of Farm Mach. ..	3	Ag. E.	480	Soil & Water Conserv. ..	3
Ag. E.	466	Anal. of Agri. Struct.	3	Ag. E.	550	Agri. Systems Engg.	2
Ag. E.	500	Rural Electrification	3			Humanities Elective*	4
Agron.	270	Soils	4			Electives**	6
		Social Science Elective* .	4	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0	Total			18

Number of hours required for graduation, 142.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** To 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. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I	4	Chem.	271	Chem. Equi. & Qual. An. .	4
Econ.	110	Economics I	3	Math.	221	Anal. Geom. & Calc. II .	4
		Air or Mil. Sci. 1A	1	Spch.	105	Oral Comm. I	2
Ph. Ed.	011	Physical Education	0			Air or Mil. Sci. 1B	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	011	Physical Education	0
				G. E.	115	Engg. Assembly	0
Total			16	Total			17

SOPHOMORE

Phys.	310	Engg. Physics I	5	Phys.	311	Engg. Physics II	5
Math.	222	Anal. Geom. & Calc. III ..	4	Math.	240	Series & Diff. Equa.	4
Chem.	511	Organic Chemistry I	3	Chem.	516	Organic Chemistry II	3
Chem.	432	Org. Chemistry I Lab. ..	1	Chem.	451	Org. Chemistry II Lab. .	1
G. E.	350	Engg. Materials	2	Ch. E.	211	Indus. Stoichiometry	4
G. E.	351	Engg. Materials Lab.	1			Air or Mil. Sci. 2B	1
		Air or Mil. Sci. 2A	1	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0	Total			18
Total			17	Total			18

SUMMER

Ap. M.	305	Statics	3			Humanities Elective*	3
		Social Science Elective* .	3	Total			9
				Total			9

JUNIOR

Ch. E.	420	Unit Operations I	3	Ch. E.	428	Unit Operations II	3
Ch. E.	492	Ch. E. Thermo. I	3	Ch. E.	496	Ch. E. Thermo. II	3
E. E.	419	Elec. Circuits & Mach. ..	4	Ch. E.	422	Chemical Engg. Lab. I ..	2
Chem.	585	Physical Chem. I	3	E. E.	423	Electronics & Controls ..	3
Chem.	586	Physical Chem. I Lab. ..	2	Chem.	595	Physical Chem. II	3
Ap. M.	412	Dynamics	3	M. E.	213	Graphical Comm. I	3
Engl.	090	English Proficiency	0	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0	Total			17
Total			18	Total			17

SENIOR

Ch. E.	435	Unit Operations III	2	Ch. E.	442	Chem. Engg. Lab. III	2
Ch. E.	432	Chemical Engg. Lab. II .	2	Ch. E.	508	Chem. Proc. Dynamics ..	2
Ch. E.	503	Chem. Reaction Engg.	3	Ch. E.	516	Ch. E. Design II	3
Ch. E.	510	Chem. Engg. Design I	3			Technical Elective**	5
		Technical Elective**	5			Social Science Elec.*	3
		Humanities Elective*	3			Soc. Sci. or Hum. Elec.*	3
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

Number of hours required for graduation, 148.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** To 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>
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I ..	4	Chem.	250	Chemistry II Lab.	2
Engl.	100	Engl. Comp. I	3	Math.	221	Anal. Geom. & Calc. II .	4
M. E.	213	Graphical Comm. I	3	Phys.	310	Engg. Physics I	5
		Air or Mil. Sci. 1A	1	Engl.	120	Engl. Comp. II	3
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. 1B	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	Physical Education	0
				G. E.	115	Engg. Assembly	0
Total			16	Total			18

SOPHOMORE

Math.	222	Anal. Geom. & Calc. III	4	Math.	240	Series & Diff. Equa.	4
Phys.	311	Engg. Phys. II	5	M. E.	400	El. of Thermodynam.	3
Ap. M.	305	Statics	3	Ap. M.	415	Mechanics of Matls.	3
I. E.	372	Comp. & Data Proc.	2	Ap. M.	418	Mech. of Matls. Lab.	1
C. E.	213	Plane Surveying	3	Ap. M.	412	Dynamics	3
		Air or Mil. Sci. 2A	1	C. E.	214	Route Surveying	3
G. E.	115	Engg. Assembly	0			Air or Mil. Sci. 2B	1
				G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

C. E.	330	Struc. Analysis I	4	C. E.	332	Struc. Analysis II	3
Ap. M.	471	Fluid Mechanics	3	C. E.	422	Soil Mechanics I	3
E. E.	403	Elec. Circ. & Cont.	4	C. E.	356	Hydrology	2
G. E.	350	Engg. Materials	2	Econ.	110	Economics I	3
G. E.	351	Engg. Materials Lab.	1	Gl. Gg.	100	General Geology	3
		Hum. or Soc. Sci. Elec.*	4			Hum. or Soc. Sci. Elec.*	4
Engl.	090	English Proficiency	0	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0				
Total			18	Total			18

SENIOR

C. E.	441	Struc. Engg. in Metals ..	4	C. E.	442	Struc. Engg. in Conc.	4
C. E.	452	Hydraulic Engg.	3	C. E.	461	Sanitary Engg.	3
Bact.	190	Water & Sewage Bact.	3	C. E.	411	Photogrammetry	3
C. E.	426	Foundations	3	C. E.	471	Trans. Engg.	3
Spch.	105	Oral Comm. I	2	Ap. M.	421	Hwy. & Airport Matls. ..	2
		Hum. or Soc. Sci. Elec.*	3			Hum. or Soc. Sci. Elec.*	3
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

Number of hours required for graduation, 142.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

Curriculum in Electrical Engineering*B. S. in Electrical Engineering***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I ...	4	Math.	221	Anal. Geom. & Calc. II .	4
M. E.	211	Engg. Graphics I	2			Humanities Elective*	6
Spch.	105	Oral Comm. I	2			Air or Mil. Sci. 1B	1
Ph. Ed.	011	Air or Mil. Sci. 1A	1	Ph. Ed.	011	Physical Education	0
G. E.	110	Physical Education	0	G. E.	115	Engg. Assembly	0
		Engg. Lectures	0				
Total			17	Total			17

SOPHOMORE

Phys.	310	Engg. Physics I	5	Phys.	311	Engg. Physics II	5
Math.	222	Anal. Geom. & Calc. III ..	4	Math.	240	Series & Diff. Equa.	4
I. E.	372	Comp. & Data Proc.	2	E. E.	395	Basic Elec. Engg.	4
Econ.	110	Economics I	3	G. E.	350	Engg. Materials	2
		Soc. Sci. or Hum. El.* ..	3			Social Science Elective* ..	2
		Air or Mil. Sci. 2A	1			Air or Mil. Sci. 2B	1
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

E. E.	426	A-C Circuits	5	E. E.	461	Electronics I	3
E. E.	411	D-C Machinery	3	E. E.	462	Electronics I Lab.	1
E. E.	414	D-C Machinery Lab.	1	E. E.	494	Elec. Meas. Lab.	1
E. E.	450	Circuit Analysis	3	E. E.	539	Networks	3
E. E.	490	Elec. Measurements Rec. ..	2	E. E.	430	A-C Machinery I	3
		Social Science Elective* ..	4	E. E.	437	A-C Laboratory	1
Engl.	090	English Proficiency	0	Ap. M.	305	Statics	3
G. E.	115	Engg. Assembly	0	Phys.	560	Atomic Physics, or	
				N. E.	410	Intro. to Nuclear Engg. .	3
				G. E.	115	Engg. Assembly	0
Total			18	Total			18

SENIOR

E. E.	465	Electronics II	3	M. E.	531	Mech. Engg. Lab. E	1
E. E.	466	Electronics II Lab.	1	E. E.	576	Elec. Engg. Summary	2
Ap. M.	412	Dynamics	3	Ap. M.	415	Mech. of Materials	3
M. E.	411	Engg. Thermodynam. I ..	4	E. E.	670	Servomechanisms	3
E. E.	550	Electromag. Waves	3	E. E.	554	Electromag. Waves Lab. ..	1
E. E.	541	Networks Lab.	1	G. E.	115	Engg. Assembly	0
E. E.	439	A-C Machinery II	2			OPTION	
E. E.	442	A-C Machinery Lab.	1	M. E.	511	Engg. Thermodynam. II ..	2
G. E.	115	Engg. Assembly	0			Technical Elective**	6
						or	
				E. E.	605	Electronics III	4
				E. E.	606	Electronics III Lab.	1
						Technical Elective**	3
Total			18	Total			18

Number of hours required for graduation, 142.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** To 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			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Math.	220	Anal. Geom. & Calc. I	4	Math.	221	Anal. Geom. & Calc. II .	4
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Spch.	105	Oral Comm. I	2	M. E.	213	Graph. Comm. I	3
		Soc. Sci. or Hum. Elec.*	3	Econ.	110	Economics I	3
		Air or Mil. Sci. 1A	1			Air or Mil. Sci. 1B	1
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Physical Education	0
G. E.	110	Engg. Lectures	0	G. E.	115	Engg. Assembly	0
Total			18	Total			17

SOPHOMORE

Phys.	310	Engg. Physics I	5	Phys.	311	Engg. Physics II	5
Math.	222	Anal. Geom. & Calc. III	4	Math.	240	Series & Diff. Equa.	4
Stat.	410	Intro. to Prob. & Stat. I	3	Stat.	411	Intro. to Prob. & Stat. II	3
B. A.	170	Prin. of Accounting	3	I. E.	401	Indus. Management I	3
I. E.	221	Indus. Production I	2	I. E.	372	Comp. & Data Proc.	2
		Air or Mil. Sci. 2A	1			Air or Mil. Sci. 2B	1
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

I. E.	451	Work Measurement	3	I. E.	441	Engg. Rel. & Qual.	
I. E.	471	Indus. Econ. Studies	3			Assur.	3
G. E.	350	Engg. Materials	2	I. E.	481	Indus. Plant Studies	0
G. E.	351	Engg. Materials Lab.	1	E. E.	419	Elec. Circuits & Mach. ..	4
Ap. M.	305	Statics	3	Ap. M.	415	Mechanics of Matis.	3
		Social Science Elective*	3	Ap. M.	412	Dynamics	3
		Humanities Elective*	3	M. E.	411	Engg. Thermodynam. I ..	4
Engl.	090	English Proficiency	0	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0	Total			17
Total			18	Total			17

SENIOR

I. E.	552	Job Eval. & Wage Inc. ..	2	I. E.	571	Ind. Opers. Res. & Anal.	3
I. E.	511	Prod. & Inv. Con.	2	I. E.	581	Ind. Fac. Layout Des. ..	3
I. E.	502	Indus. Management II	2	I. E.	522	Tool Engineering	3
I. E.	521	Metal Mach. & Forming .	2			Technical Elective**	3
E. E.	423	Electronics & Controls ..	3			Social Science Elective*	3
E. E.	424	Electronics & Con. Lab. .	1			Humanities Elective*	3
Ap. M.	471	Fluid Mechanics	3	G. E.	115	Engg. Assembly	0
		Technical Elective**	3	Total			18
G. E.	115	Engg. Assembly	0	Total			18
Total			18	Total			18

Number of hours required for graduation, 142.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** To 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.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
M. E.	213	Graph. Comm. I	3	M. E.	218	Graph. Comm. II	2
Math.	220	Anal. Geom. & Calc. I ..	4	Math.	221	Anal. Geom. & Calc. II ..	4
		Air or Mil. Sci. 1A	1	I. E.	221	Indus. Production	2
Ph. Ed.	011	Physical Education	0			Humanities Elective*	3
G. E.	110	Engg. Lectures	0	Ph. Ed.	011	Air or Mil. Sci. 1B	1
				G. E.	115	Physical Education	0
						Engg. Assembly	0
Total			16	Total			18

SOPHOMORE

Phys.	310	Engg. Phys. I	5	Phys.	311	Engg. Phys. II	5
Math.	220	Anal. Geom. & Calc. III	4	Math.	240	Series & Diff. Equa.	4
Econ.	110	Economics I	3	Ap. M.	305	Statics	3
Spch.	105	Oral Comm. I	2	G. E.	350	Engg. Materials	2
		Soc. Sci. or Hum. Elec.*	3	G. E.	351	Engg. Materials Lab.	1
		Air or Mil. Sci. 2A	1			Social Science Elective* .	2
G. E.	115	Engg. Assembly	0			Air or Mil. Sci. 2B	1
				G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

M. E.	411	Engg. Thermo. I	4	M. E.	511	Engg. Thermo. II	2
E. E.	419	Elec. Cir. & Mach.	4	E. E.	423	Electron. & Cont.	3
E. E.	420	Elec. Cir. & Mach. Lab. .	1	E. E.	424	Electron. & Cont. Lab. ..	1
Ap. M.	412	Dynamics	3	M. E.	451	Machine Design I	5
Ap. M.	415	Mech. of Matls.	3	Ap. M.	471	Fluid Mech.	3
M. E.	560	Engg. Economics	3			Social Science Elective* .	4
Engl.	090	English Proficiency	0	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0				
Total			18	Total			18

SENIOR

M. E.	521	Heat Transfer	3	M. E.	580	Prof. Develop.	1
M. E.	551	Machine Design II	3	M. E.	656	Mach. Vibra. I or	
M. E.	533	Mech. Engg. Lab. I	2	M. E.	524	Environm'l Engg. I	3
M. E.	575	Thermo. Systems Anal. .	3	Phys.	560	Atomic Physics or	
		Option	6 or 7	N. E.	410	Intro. to Nuclear Engg. .	3
G. E.	115	Engg. Assembly	0			Humanities Elective*	3
						Option	7 or 8
				G. E.	115	Engg. Assembly	0
Total			17 or 18	Total			17 or 18

Number of hours required for graduation, 141.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

Aeronautical Option

M. E.	528	Aerodynamics I	4	M. E.	628	Aerodynamics II	4
Ap. M.	491	Airplane Stress Anal.	3	M. E.	631	Air & Mis. Prop.	3
			<u>7</u>				<u>7</u>

Design Option

Ap. M.	601	Adv. Mech. Matls.	3	M. E.	583	M. E. Lab. II	2
		Technical Elective**	3	M. E.	651	M. E. Design	3
			<u>6</u>			Technical Elective**	<u>3</u>
							<u>8</u>

Petroleum Production Option

M. E.	571	Petroleum Production	3	M. E.	583	M. E. Lab. II	2
Gl. Gg.	100	Gen. Geology	3	M. E.	671	Reservoir Engg.	3
		Technical Elective**	1			Technical Elective**	2
			<u>7</u>				<u>7</u>

Environmental Engineering Option†

Stat.	620	Statistical Methods I	3	M. E.	624	Environmental Engg. II	3
		Biological Sciences	4			Biological Sciences	4
			<u>7</u>				<u>7</u>
Total		.....	7	Total		.....	7

A program of advanced courses in the field of automatic controls, propulsion, machine design, thermodynamics, etc., may be substituted for the above option with the approval of the student's adviser and the department head.

† Students must take General Psychology as one of the Social Science electives. In this option Environmental Engineering I will be taken in the first semester of the senior year and Machine Design II will be taken in the second semester of the senior year.

* To be chosen from the approved list and need not be taken in the order listed in the curriculum.

** To be taken 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			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
		Humanities Elective*	3	Chem.	230	Chemistry II	3
Chem.	210	Chemistry I	5	Chem.	250	Chemistry II Lab.	2
Math.	220	Anal. Geom. & Calc. I	4	Math.	221	Anal. Geom. & Calc. II ..	4
Ph. Ed.	010	Physical Education	0	Phys.	310	Engg. Physics I	5
Spch.	105	Oral Comm. I	2			Air or Mil. Sci. 1B	1
		Air or Mil. Sci. 1A	1	Ph. Ed.	010	Physical Education	0
G. E.	110	Engg. Lectures	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

SOPHOMORE

Phys.	311	Engg. Physics II	5	Math.	240	Series & Diff. Equa.	4
Math.	222	Anal. Geom. & Calc. III ..	4	Ch. E.	211	Indus. Stoichiom.	4
G. E.	350	Engg. Materials Rec.	2	N. E.	450	Elements Nuclear Engg. ..	3
G. E.	351	Engg. Materials Lab.	1	Phys.	560	Atomic Physics	3
Ap. M.	305	Statics	3	M. E.	213	Graphical Comm. I	3
		Air or Mil. Sci. 2A	1			Air or Mil. Sci. 2B	1
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			16	Total			18

SUMMER

Econ.	110	Economics I	3	Ap. M.	412	Dynamics	3
Ap. M.	415	Mechanics of Matls.	3	Total			9

JUNIOR

N. E.	611	Radio. Appli. Engg.	3	N. E.	500	App. N. E. Anal.	3
Chem.	585	Phys. Chem. I Rec.	3	Chem.	595	Phys. Chem. II Rec.	3
E. E.	419	Elec. Cir. & Mach. Rec. .	4	E. E.	423	Elec. & Controls	3
		Social Science Elective*	3	E. E.	424	Elec. & Controls Lab.	1
		Option	5 or 4			Option	8
Engl.	090	English Proficiency	0	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0	Total			18
Total			18 or 17	Total			18

SENIOR

N. E.	670	Nuc. Reactor Tech. I	3	N. E.	691	Nuclear Reactor Tech. II ..	3
		Option	5 or 6	N. E.	695	Nuc. Reactor Tech. Lab. ..	2
		Tech. Elective**	3	N. E.	606	Nuclear Engg. Materials ..	3
		Humanities Elective*	3	Phys.	675	Nuclear Physics	3
		Social Science Elective*	3			Option	5
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			17 or 18	Total			16

Number of hours required for graduation, 148.

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** To be chosen with the advice and approval of the head of the department and the dean.

Option I**JUNIOR**

Ch. E.	420	Unit Operations I	3	Ch. E.	428	Unit Operations II Rec. .	3
Chem.	586	Phys. Chem. I Lab.	2	Ch. E.	422	Chem. Engg. Lab. I	2
				Ch. E.	492	Ch. E. Thermo. I	3
			<u>5</u>				<u>8</u>

SENIOR

Ch. E.	432	Chem. Engg. Lab. II	2	Ch. E.	442	Chem. Engg. Lab. III	2
Ch. E.	496	Ch. E. Thermo. II	3			Soc. Sci. or Hum. Elec.*	3
			<u>5</u>				<u>5</u>

Option II**JUNIOR**

M. E.	411	Engg. Thermo. I	4	M. E.	511	Engg. Thermo. II	2
				Ap. M.	471	Fluid Mechanics	3
						Soc. Sci. or Hum. Elec.*	3
			<u>4</u>				<u>8</u>

SENIOR

M. E.	575	Thermo. Systems Anal. ..	3	M. E.	533	Mech. Engg. Lab. I	2
M. E.	521	Heat Transfer	3			Mechanics Elect.**	3
			<u>6</u>				<u>5</u>

* Social Science and Humanities electives must be selected from the approved list and need not be taken in the order listed in the curriculum.

** To 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.	272	Introductory Accounting	5	B. A.	400	Administration	3
B. A.	305	Managerial Accounting ..	3	B. A.	431	Personnel Admin.	3
Econ.	110	Economics I	3	B. A.	440	Marketing	3
Econ.	120	Economics II	3	B. A.	405	Business Finance	3
B. A.	325	Business Law I	3	B. A.	602	Business and Society	3
B. A.	326	Business Law II	3	B. A.	600	Business Policy	3

Business Electives, including at least one of the following four courses offered by the Department of Economics:

Econ.	430	Money and Banking	(3)
Econ.	686	Business Fluctuations and Forecasting	(2)
Econ.	710	Intermediate Economic Analysis	(3)
Econ.	720	Income and Employment Theory	(3)

* Six to nine credit hours of these courses, 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

B. A.	400	Administration	3	Hist.	257	American Social History ..	3
B. A.	440	Marketing	3	Hist.	646	Europe 1815-1914	3
Econ.	120	Economics II	3	Hist.	648	Europe 1914-1945	3
Econ.	430	Money and Banking	3	Hist.	649	Europe Since 1945	3
Econ.	610	Public Finance	3	Hist.	663	Modern France	3
Econ.	620	Labor Economics	3	Hist.	669	Modern Germany	3
Econ.	636	Economic Systems	2	Hist.	684	The Russian Empire	3
Econ.	681	International Trade	3	Hist.	687	The Soviet Union	3
Econ.	686	Business Fluctuations and Forecasting	2	Hist.	695	European Economic History	3
Geog.	115	World Regional Geography	3	Hist.	708	Civil War and Reconstruction	3
Geog.	645	Political Geography	3				
P. Sci.	120	Modern Democracy	3	Hist.	711	The United States in the Twentieth Century	3
P. Sci.	220	American Government	3				
P. Sci.	320	State and Local Government	3	Hist.	712	Frontier America	3
P. Sci.	350	American Foreign Policy ..	3	Hist.	719	The South	3
P. Sci.	380	Introduction to Public Law	3	Hist.	721	The Great Plains	3
P. Sci.	450	Introduction to Public Administration	3	Hist.	740	History of American Working Class	3
P. Sci.	455	Constitutional Law	3	Hist.	745	American Immigration History	3
P. Sci.	600	American Political Ideas ..	3				
P. Sci.	610	Public Policy Toward Business	3	Hist.	748	History of American Foreign Policy	3
P. Sci.	615	City Government	3	Hist.	751	Colonial Hispanic America	3
P. Sci.	637	Public Organization and Management	2	Hist.	758	Latin American Nations ...	3
P. Sci.	640	International Relations ...	3	Psych.	110	General Psychology	3
P. Sci.	715	International Organization	3	Psych.	435	Social Psychology	3
P. Sci.	720	Government of Britain and the Commonwealth .	3	Psych.	465	Psychology of Art	3
P. Sci.	725	Governments of Continental Europe	3	Soc.	131	Introductory Social Science I	4
P. Sci.	740	Political Parties and Pressure Groups	3	Soc.	132	Introductory Social Science II	4
P. Sci.	780	Soviet System	3	Soc.	200	Introduction to Anthropology	3
Hist.	251	History of the United States to 1877	3	Soc.	220	Introduction to Sociology ..	3
Hist.	252	History of the United States Since 1877	3	Soc.	646	Sociology of the Family ...	3
Hist.	255	American Economic History	3	Soc.	656	Cultural Anthropology	3
				Soc.	658	Social Systems	3
				Soc.	700	Development of Social Thought	3

Humanities Electives

Arch.	200	Appreciation of Architecture	3	Hist.	606	History and Culture of Rome	3
Arch.	285	History of Painting and Sculpture	3	Hist.	631	The Renaissance	3
Arch.	290	Contemporary Art	2	Hist.	637	History of Science I	3
Engl.	143	Introduction to Humanities I	3	Hist.	638	History of Science II	3
Engl.	144	Introduction to Humanities II	3	Hist.	646	Revolutionary Europe, 1760-1815	3
Engl.	146	Introduction to Humanities III	3	Hist.	652	Tudor England	3
Engl.	147	Introduction to Humanities IV	3	Hist.	653	Stuart England	3
Engl.	230	Introduction to Fiction ...	2	Hist.	658	Victorian England	3
Engl.	251	English Literature I	3	Hist.	659	England in the 20th Century	3
Engl.	256	English Literature II	3	Hist.	691	Technology in War I	3
Engl.	270	American Literature I	3	Hist.	692	Technology in War II	3
Engl.	275	American Literature II ...	3	Hist.	745	American Intellectual History	3
Engl.	345	Introduction to Drama	3	Hist.	760	Far East	3
Engl.	350	Introduction to Shakespeare	3	Hist.	765	India and Southeast Asia .	3
Engl.	370	Books and Men I	3	Hist.	770	History of Religions	3
Engl.	375	Books and Men II	3	Hist.		Modern Language	6
Engl.	651	Shakespearean Drama	3	Music	250	Appreciation of Music	2
Hist.	111	History of Western Civilization I	3	Music	650	Music in History	3
Hist.	112	History of Western Civilization II	3	Phil.	150	Elementary Logic	3
Hist.	201	Ancient Mediterranean Civilizations	3	Phil.	165	Introduction to Philosophy	3
Hist.	202	Civilization of the Middle Ages	3	Phil.	175	Introduction to the Philosophy of Religion ..	3
Hist.	211	Asian Civilization I	3	Phil.	210	Oriental Philosophy	2
Hist.	212	Asian Civilization II	3	Phil.	221	Ethics	2
Hist.	221	History of England to 1660	3	Phil.	610	History of Philosophy I ...	3
Hist.	222	History of England from 1660	3	Phil.	620	History of Philosophy II ..	3
Hist.	603	History and Culture of Greece	3	Phil.	630	American Philosophy	3
				Phil.	545	Philosophy of Religion	3
				Phil.	680	Philosophy of Science	3
				Phil.	700	Social Philosophy	3
				Phil.	710	Political Philosophy	3
				Phil.	720	Aesthetics	3
				Phil.	740	Philosophy in Literature	3
				Phil.	760	Symbolic Logic	3

AGRICULTURAL ENGINEERINGGEORGE H. LARSON,* *Head of Department*

Professors Fairbanks, Hodges* and Larson;* Associate Professors Lipper* and Stevenson;* Assistant Professors Funk, Jacobs,* Manges and Reece; Instructors Mensch and Robertson; Emeritus: Professor Fenton*

For Curriculum, See Page 222

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 farm mechanics to those students who have completed a bachelor's degree in agriculture with the equivalent of a major in farm mechanics.

FOR UNDERGRADUATE CREDIT

- 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.
- 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.
- 399. Honors Seminar in Agricultural Engineering.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 440. Functional Requirements of Agricultural Structures.** (3) II. 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. 211 or 213.
- 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. 411.

- 466. Analysis of Agricultural Structures.** (3) I. 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.
- 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, Agron. 270.
- 500. Rural Electrification.** (3) I. 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. 423, Ap. M. 471, M. E. 411.
- 550. Agricultural Systems Engineering.** (2) 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.
- 605. Irrigation and Drainage.** (3) I. Design and operative problems involved in irrigation or drainage of agricultural land. Two hours rec. and three hours lab. a week. Pr.: Agron. 270, Ap. M. 471, Ag. E. 375.
- 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.
- 700. Agricultural Process Engineering.** (3) 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. 411.
- 710. Advanced Farm Power and Machinery.** (3) I. 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

- 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

- 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.
- 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.
- 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.
- 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 AND GRADUATE CREDIT

- 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.
- 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.
- 415. Agricultural Engineering Applications.** (2) I. 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.
- 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.
- 600. Advanced Farm Mechanics.** (3) S. For teachers of vocational agriculture and those concerned with teaching farm mechanics in high schools; advance 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.
- 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.
- 607. Electricity in Agriculture.** (3) I. 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.
- 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.
- 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.

APPLIED MECHANICS

PHILIP G. KIRMSER,* *Head of Department*

Professors Haft, Kirmsers,* McCormick* and Taylor;* Associate Professors Best* and Singleton;* Assistant Professors Crary, Creech, Kipp and Lindly; Instructors Ehlers and Knostman; Emeritus: Dean Seaton, Professor Scholer 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.

- 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.
- 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.
- 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.
- 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.
- 399. Honors Seminar in Applied Mechanics.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honor students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 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.
- 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.
- 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.
- 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. 411 or 400.

- 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.
- 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.
- 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.
- 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.
- 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.
- 615. Intermediate Dynamics.** (3) II. General vector principles of the dynamics of particles and rigid bodies; applications to orbital calculations, gyro dynamics and rocket performance; introduction to the energy methods of advanced dynamics. Three hours rec. a week. Pr.: Ap. M. 412, Math. 240 or equiv.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 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.
- 830. Thermoelasticity.** (3) I. Theory and analysis of thermal stresses in elastic and inelastic systems. Pr.: Ap. M. 821 or consent of instructor.
- 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.
- 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.
- 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.
- 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.
- 880. Advanced Fluid Mechanics.** (3) II. Principles of flow, irrotational motion, conformal mapping, viscous flow, fluid turbulence, boundary layers, lift and drag, transportation of sediment. Three hours rec. a week. Pr.: Ap. M. 471, Math. 621 or equiv., and preferably Ap. M. 821.

CHEMICAL ENGINEERING

WILLIAM H. HONSTEAD,* *Head of Department*

Professors Bates, Fan* and Honstead;* Associate Professor Kyle;* Assistant Professors Akins,* Hall* and Matthews;* Instructor Jerome*

For Curriculum, See Page 223

Chemical engineers design, build and operate plants which produce materials. Everything from aspirin to water, through fuels, fibers, foods, paint, petroleum, and plastics, results from the efforts of chemical engineers. Using every sort of condition from extremes of high pressure and temperature to cryogenic low temperatures and high vacuums, chemical

engineers are continually developing new materials for space vehicles, for textiles, for pharmaceuticals, and every other aspect of modern society. Every kind of engineering function, including research, development, design, construction, operation and technical sales, is performed by chemical engineers for these process industries.

The Chemical Engineering curriculum is designed to give students the necessary breadth of knowledge and the necessary scientific tools to perform any of these functions in any of the so-called process industries. The first two years are devoted largely to basic chemistry, physics and mathematics, and the essential communication skills. The last two years are spent in learning the application of these sciences through the study of unit operations, thermodynamics, and design. Enough 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.

Graduate Work:

The Master of Science and Doctor of Philosophy degrees are offered. Prerequisite to admission for work towards an advanced degree is the completion of an undergraduate curriculum in chemical engineering similar or equivalent to that offered here.

Research in heat transfer, fluidization, mass transfer, thermodynamics, reaction kinetics, process dynamics and process development is regularly under way. Laboratory space, equipment and instruments are available for this research. We also have 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

211. Industrial Stoichiometry. (4) I, II. Calculation of material and energy balances in industrial processes. Four hours rec. a week. Pr.: Chem. 230, 250 or 271.

399. Honors Seminar in Chemical Engineering. Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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.

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.

428. Unit Operations II. (3) I, II. Cont. of Unit Operations I. Three hours rec. a week. Pr.: Ch. E. 420.

432. Chemical Engineering Laboratory II. (2) I, II. Cont. of Chemical Engineering Laboratory I. Six hours lab. a week. Pr.: Ch. E. 422, 428.

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.

442. Chemical Engineering Laboratory III. (2) I, II. Cont. of Chemical Engineering Laboratory II. Six hours lab. a week. Pr.: Ch. E. 432.

480. Problems in Chemical Engineering. Credit arranged. I, II, S. An introduction to chemical engineering research. Pr.: Approval of department head.

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 or 232.

- 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.
- 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.
- 508. Chemical Process Dynamics.** (2) II. The dynamic analysis of processes and equipment in the chemical industry. Two hours rec. a week. Pr.: Ch. E. 428, 503; Math. 240 or equiv.
- 510. Chemical Engineering Design I.** (3) I. Inter-relationships 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.
- 516. Chemical Engineering Design II.** (3) II. Problems in designing processes, equipment, and plants for chemical and allied industries. Two hours rec. and three hours lab. a week. Pr.: Ch. E. 435, 496, 510.
- 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.
- 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.
- 630. Chemical Engineering Analysis I.** (3) I, II, S. Graphical methods and dimensional analysis applied to chemical engineering problems. Three hours rec. a week. Pr.: Ch. E. 435, 496.

FOR GRADUATE CREDIT

- 810. Research in Chemical Engineering.** Credit arranged. I, II, S. Original investigations in the fields of unit operations, unit processes, petroleum refining, and industrial utilization of Kansas raw materials. Work is usually correlated with the research projects of the engineering or agricultural experiment stations. Pr.: Approval of department head.
- 812. Chemical Engineering Analysis II.** (3) I, II, S. Mathematical and statistical methods applied to chemical engineering problems. Three hours rec. a week. Pr.: Graduate standing in chemical engineering.
- 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.
- 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.
- 825. Distillation.** (3) I, II, S. Advanced study of distillation. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 831. Humidification and Drying.** (3) I, II, S. Combined heat transfer and mass transfer of water and similar materials; humidification and dehumidification of air, cooling tower analysis and design; development of drying theory; design, analysis and control of industrial drying systems. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 835. Filtration and Mechanical Separation.** (3) I, II, S. Theory and practice of filtration, screening, flotation, air separation, centrifugation, and sedimentation. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 841. Evaporation and Crystallization.** (3) I, II, S. Design and analysis of evaporators; multiple effect and thermocompression evaporators, flash steam heat recovery, scaling, foaming, control of boiling point rise; analysis and design of crystallizers, fractional crystallization separa-

- tions, applications of the phase rule, solubility diagrams and enthalpy concentration diagrams. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 845. Absorption and Extraction.** (3) I, II, S. Advanced study of absorption and extraction. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 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.
- 860. Fluid Dynamics for Chemical Engineers.** (3) I, II, S. Advanced treatment of the theories of fluid motion and their application to chemical engineering problems. Three hours rec. a week. Pr.: Graduate standing in chemical engineering.
- 865. Advanced Process Design I.** (3) I, II, S. Advanced problems in the design and economic evaluation of plant equipment and processes for the chemical and allied industries. Three hours rec. a week. Pr.: Ch. E. 516 or equiv.
- 868. Advanced Process Design II.** (3) I, II, S. Cont. of Ch. E. 865. Use of new optimization techniques in the design of chemical and process plants and equipment. Three hours rec. a week. Pr.: Ch. E. 865.
- 870. Transfer Theory for Chemical Engineers.** (3) I, II, S. A fundamental treatment of the transfer of mass, heat, and momentum, with emphasis on the similarity among these operations. Three hours rec. a week. Pr.: Graduate standing in chemical engineering.
- 875. Graduate Seminar in Chemical Engineering.** (1) I, II. Discussion of current advances and research in chemical engineering and related fields. Papers presented by graduate students and the staff. One hour a week. Pr.: Graduate standing in chemical engineering.
- 880. Selected Topics in Chemical Engineering.** (3) I, II, S. An intensive study of current literature in such fields as chemical reactor design, mass transfer, fluid dynamics and thermodynamics. Three hours rec. a week. Pr.: Graduate standing in chemical engineering.

CIVIL ENGINEERING

JACK B. BLACKBURN,* *Head of Department*

Professors Blackburn, Kubitz,* McEntyre* and Morse;* Associate Professors Rosebraugh* and Smith;* Assistant Professors Funk, Hampton,* Robohn* and Snell;* Emeritus: Professors Conrad, Crawford and Frazier*

For Curriculum, See Page 224

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; Hydraulics; 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, Transportation, Photogrammetry, Photo Interpretation, Surveying and Mapping.

FOR UNDERGRADUATE CREDIT

- 213. Plane Surveying.** (3) I, II, S. 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.
- 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.
- 330. Structural Analysis I.** (4) I, II. Stresses and deflections in statically determinate beams, trusses and framed structures. Four hours rec. a week. Pr.: Ap. M. 415.
- 332. Structural Analysis II.** (3) I, II, S. Theory of statically indeterminate structures under static loads. Three hours rec. a week. Pr.: C. E. 330.
- 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.
- 399. Honors Seminar in Civil Engineering.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 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.
- 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.
- 441. Structural Engineering in Metals.** (4) I, II, S. Theoretical, experimental and practical bases for proportioning metal members and their connections. Design of steel structures. Two hours rec. and six hours lab. a week. Pr.: C. E. 332.
- 442. Structural Engineering in Concrete.** (4) 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 six hours lab. a week. Pr.: C. E. 332.
- 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.
- 461. Sanitary Engineering.** (3) I, II. Design, construction, and operation of water supply and sewerage systems. Two hours rec. and three hours lab. a week. Pr.: C. E. 356, Bact. 190.
- 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. 411, 422; Pr. or conc.: Ap. M. 421.
- 613. Land Surveying.** (3) I. On demand. Plane coordinate system; United States Public Land System. Legal aspects of property boundaries including a study of court cases. Three hours rec. a week. Pr.: Consent of instructor.
- 622. Soil Mechanics II.** (3) I. Review of identification, classification, and engineering properties of soils. Advanced study of theories of consolidation, lateral earth pressure, bearing capacity, stability of slopes, and

- groundwater flow. Two hours rec. and three hours lab. a week. Pr.: C. E. 422.
- 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.
- 632. Structural Analysis III.** (3) I. Application of matrix methods of analysis to complex structures. Selected topics in structural analysis. Three hours rec. a week. Pr.: C. E. 332.
- 633. Experimental Structural Analysis.** (3) II, 1965-66. 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.
- 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. 442.
- 644. Plastic Design of Steel Structures.** (2) 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. Two hours rec. a week. Pr.: C. E. 441.
- 648. Prestressed Concrete Design.** (2) II. The study of prestressing methods and their application to the design of concrete structures. Two hours rec. a week. Pr.: C. E. 442.
- 670. Geometric Design of Highways.** (3) I. 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.
- 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.
- 734. 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.
- 753. Hydraulics of Open Channels.** (3) I, 1964-65. Hydraulics of open flow structures. Variable flow and hydraulic jump. Design of open channels; intake, transition, measuring flume, and spillway cross sections; and culverts. Three hours rec. a week. Pr.: C. E. 452.
- 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. 461.
- 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, Ap. M. 421.
- 775. Traffic Engineering.** (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 approval of instructor.
- 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.

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.

790. Problems in Civil Engineering. Credit arranged. I, II, S. Pr.: Approval of instructor.

FOR GRADUATE CREDIT

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.

811. Advanced Photogrammetry. (3) II. On demand. Quantitative photogrammetry, including graphical and analytical space orientation; principles and methods of use of most recent photogrammetric plotting equipment. Three hours rec. a week. Pr.: C. E. 411.

815. Adjustment of Surveys. (3) II. On demand. Methods of adjusting surveys, with special attention to method of least squares. Three hours rec. a week. Pr.: Math. 240 or equiv., C. E. 214.

816. Geodesy. (2) I. On demand. Precise methods of surveying and leveling, with application of practical astronomy to such problems. Two hours rec. a week. Pr.: C. E. 214, Math. 240 or equiv.

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.

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.

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.

832. Structural Analysis IV. (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.

835. Structural Dynamics. (3) II, 1964-65. Analysis of structures subjected to dynamic loading. Three hours rec. a week. Pr.: C. E. 632, 734.

846. Analysis and Design of Folded Plate Structures. (2) I, 1965-66. 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. Two hours rec. a week. Pr.: C. E. 632, Ap. M. 601.

847. Practical Design of Shells. (2) I, 1964-65. The design of reinforced concrete shells of single and double curvature. Two hours rec. a week. Pr.: C. E. 832.

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.

855. Analysis and Design of Large Dams. (3) II, 1965-66. 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.

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.

ELECTRICAL ENGINEERING

WELLINGTON W. KOEPSSEL,* *Head of Department*

Professors Halijak, Hunt,* Kerchner,* Koepsel,* Murrish,* Sitz* and Ward;* Associate Professors Hayre* and Wirtz;* Assistant Professors Cottom* and Neuenswander; Instructors Bertnoll, Carlson, Dollar, Fowler, Hegler, Ho, Merrill, Wakabayashi and Weathers; Emeritus: Professors Jorgenson and Kloeffler*

For Curriculum, See Page 225

The object of the Curriculum in Electrical Engineering is to train the student for a future in electronics, electrical communication, and power. Graduate electrical engineers are engaged in research, development, application, sales, and business management.

The first and second years are devoted to general studies, with emphasis on mathematics and science. Technical training in the electrical field begins in the second year and extends through the junior and senior years, covering electric circuits, electronics, and electric machinery. The curriculum provides, in addition, elective work, giving the student opportunity for the selection of studies in cultural, social, and economic fields.

Graduate Work:

Graduate work leading to the degree Master of Science is offered in the fields of electronics, communication, and power. Work leading to the degree Doctor of Philosophy is offered in electronics. Graduate programs vary and are designed to meet the needs and interests of the individual.

The prerequisite to major graduate work in these fields is the completion of an undergraduate curriculum substantially equivalent to that required of students in this department.

Special laboratories are provided for research in theoretical and applied electronics, electronic computers, servomechanisms, electromagnetic waves, electrical communication, and other electrical engineering areas.

FOR UNDERGRADUATE CREDIT

395. Basic Electrical Engineering. (4) I, II, S. Fundamentals of electric, magnetic, and electrostatic circuits. Four hours rec. a week. Pr. or conc.: Phys. 311, Math. 222 or 232.

399. Honors Seminar in Electrical Engineering. Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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.

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.

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.

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.

411. Direct-Current Machinery. (3) I, II, S. Principles of operation and the characteristics of direct-current generators and motors. Three hours rec. a week. Pr.: Phys. 311; Pr. or conc.: E. E. 395.

- 414. Direct-Current Machinery Laboratory.** (1) I, II. Characteristics of direct-current machines. Three hours lab. a week. Pr. or conc.: E. E. 411.
- 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.
- 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.
- 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.
- 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.
- 426. Alternating-Current Circuits.** (5) I, II. A mathematical treatment of alternating-current phenomena in single and polyphase circuits. Four hours rec. and a three-hour calculating period a week. Pr.: E. E. 395; Pr. or conc.: Math. 240 or equiv.
- 430. Alternating-Current Machinery I.** (3) I, II, S. Principles of design, construction, and operation of transformers, alternating-current generators, and synchronous motors. Three hours rec. a week. Pr.: E. E. 426.
- 437. Alternating-Current Machinery Laboratory.** (1) I, II. Experiments illustrating the characteristics of alternating-current circuits and transformers. Three hours lab. a week. Pr. or conc.: E. E. 430.
- 439. Alternating-Current Machinery II.** (2) I, II. Cont. of E. E. 430, including parallel operation of alternators, converters, induction, and commutator alternating-current motors, rectifiers, and accessory apparatus. Two hours rec. a week. Pr.: E. E. 430.
- 442. Alternating-Current Machinery Laboratory.** (1) I, II. Cont. of E. E. 437, with experiments on machines listed in E. E. 439. Three hours lab. a week. Pr.: E. E. 437; Pr. or conc.: E. E. 439.
- 450. Circuit Analysis.** (3) I, II. Steady-state and transient analysis of circuits employing matrices, vector analysis, operational methods, and transforms. Three hours rec. a week. Pr. or conc.: E. E. 426, Math. 240 or equiv.
- 461. Electronics I.** (3) I, II, S. Fundamentals of electron devices, including semiconductors, vacuum tubes, rectifiers, and power supplies. Three hours rec. a week. Pr.: E. E. 403, or 419, or 426.
- 462. Electronics I Laboratory.** (1) I, II, S. Characteristics and parameters of electron devices, and performance of power supplies. Three hours lab. a week. Pr. or conc.: E. E. 461.
- 465. Electronics II.** (3) I, II, S. Analysis of untuned semiconductor and vacuum-tube electronic amplifiers. Three hours rec. a week. Pr.: E. E. 461, 539.
- 466. Electronics II Laboratory.** (1) I, II, S. Characteristics of untuned electronic amplifiers. Three hours lab. a week. Pr. or conc.: E. E. 465.
- 490. Electrical Measurements.** (2) I, II. Methods for electric and magnetic measurements; resistance, quantity, current, electromotive force, capacity, and inductance. Two hours rec. a week. Pr. or conc.: E. E. 426.
- 494. Electrical Measurements Laboratory.** (1) I, II. Measurements of resistance, current, electromotive force, capacity, inductance, watts, and energy. Three hours lab. a week. Pr. or conc.: E. E. 490.
- 539. Networks.** (3) I, II, S. Network theorems, infinite line, wave filters, equalizers, and impedance matching. Three hours rec. a week. Pr.: E. E. 426, 450.
- 541. Networks Laboratory.** (1) I, II. Communication circuits and equipment. Three hours lab. a week. Pr. or conc.: E. E. 539.

- 550. Electromagnetic Waves.** (3) I, II. Principles of guided and free electromagnetic wave propagation, including generation, radiation, and reception. Three hours rec. a week. Pr.: E. E. 450.
- 554. Electromagnetic Waves Laboratory.** (1) I, II. Experiments on the generation, propagation, radiation, and reception of electromagnetic waves. Three hours lab. a week. Pr. or conc.: E. E. 550.
- 576. Electrical Engineering Summary.** (2) I, II. An integration of the theory and applications of electrical engineering, with special emphasis on engineering economics. Two hours rec. a week. Pr.: Senior standing.
- 605. Electronics III.** (4) I, II. Radio-frequency amplifiers and oscillators, modulation, demodulation, limiters, clippers, multi-vibrators, transistors, and other fundamental electronic circuits. Four hours rec. a week. Pr.: E. E. 465, 466.
- 606. Electronics III Laboratory.** (1) I, II. Experiments on E. E. 605. Three hours lab. a week. Pr. or conc.: E. E. 605.
- 610. Problems in Electrical Engineering.** Credit arranged. I, II, S.
- 620. Analog Computation.** (3) II. Use of analog computers; solution of linear and nonlinear algebraic and differential equations—scaling problems into machine units. Two hours rec. and three hours lab. a week. Pr.: Math. 240 or equiv., Phys. 211 or 311, E. E. 450 or consent of instructor.
- 630. Transistor Circuitry.** (3) II. A study of transistor circuits. Three hours rec. a week. Pr. or conc.: E. E. 605.
- 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. 465.
- 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. 426.
- 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. 465.
- 670. Servomechanisms.** (3) I, II. Theory of closed servo-loops, including a study of dynamics and stability using the Laplace transform. Three hours rec. a week. Pr.: Math. 240 or equiv., E. E. 465, 450 or consent of instructor.
- 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. 430.
- 750. Digital Techniques.** (3) II. Combinational and sequential circuits, counters, adders, accumulators, memory devices, digital differential analyzer, and programming of computers. Three hours rec. a week. Pr.: E. E. 465.

FOR GRADUATE CREDIT

- 805. Advanced Feedback Control Systems.** (3) II. Design by pole-zero methods, sensitivity factors, analysis of control systems with delays, samplers, and essential nonlinearities, and approximation of linear and nonlinear systems on a digital computer. Three hours rec. a week. Pr.: E. E. 670.
- 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. 465.
- 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.: Math. 222 or 232.

- 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. 605, Math. 240 or equiv.
- 831. Modulation Theory.** (3) II, 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. 605, Math. 240 or equiv.
- 835. Network Synthesis.** (3) I. Methods of synthesizing networks to yield specified characteristics. Three hours rec. a week. Pr.: E. E. 539.
- 855. Advanced Electromagnetic Theory I.** (3) I. Mathematical development of electromagnetic wave theory. Three hours rec. a week. Pr.: E. E. 554.
- 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.
- 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.
- 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.
- 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. 539.
- 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. 650, 835; Pr. or conc.: E. E. 815.
- 880. Advanced Electrical Theory.** Credit arranged. I, II. Pr.: E. E. 465.

GENERAL ENGINEERING

PAUL E. RUSSELL, *Dean*

- 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.
- 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.
- 200. Kansas State Engineer Journalism.** (1) I, II. Editorial and business staff work on the Kansas State Engineer. Jr.: Junior classification and consent of dean.
- 350. Engineering Materials.** (2) I, II. Engineering requirements of materials; arrangements of atoms in materials; metallic and ceramic

phases and their properties; polymers; multiphase equilibrium and nonequilibrium relationships; modification of properties through changes in microstructure; stability under service stresses, thermal behavior in service; corrosion; behavior in electromagnetic fields; effect of radiation on materials. Two hours rec. a week. Pr.: Chem. 230; Pr. or conc.: Phys. 310.

351. Engineering Materials Laboratory. (1) I, II. Laboratory experiments supplementing G. E. 350. Pr. or conc.: G. E. 350.

INDUSTRIAL ENGINEERING

GEORGE F. SCHRADER,* *Head of Department*

Professors Daasch, Hostetter,* Schrader* and Smaltz;* Associate Professors Clifton,* Elias* and Wallack;* Assistant Professors Byers, Dietrich, Hansen, Pauli, Smethers and Woodard; Instructor Nelson; Emeritus: Professors Carlson and Darby*

For Curriculum, See Page 226

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

- 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 forming processes; joining; welding and heat treatment. One hour rec. and three hours lab. a week.
- 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.
- 399. Honors Seminar in Industrial Engineering.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE CREDIT, INDUSTRIAL ENGINEERING MAJORS, OR
GRADUATE CREDIT, NON-MAJORS

- 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.
- 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.: I. E. 451.
- 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, Stat. 410.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 571. Industrial Operations Research and Analysis.** (3) II. Objectives and methods of industrial engineering research and experimentation; evaluating alternatives in decision making; optimal allocation of resources. Three hours rec. a week. Pr.: I. E. 511.
- 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

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 711. Advanced Production and Inventory.** (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.
- 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.
- 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.
- 762. Advanced Metallurgy.** Credit arranged. II. Studies in specialized phases and current concepts of metallurgy. Pr.: G. E. 350, 351.
- 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.

- 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. 571.
- 781. Problems in Industrial Engineering.** Credit arranged. I, II, S. Pr.: Senior or graduate standing in industrial engineering.

FOR GRADUATE CREDIT

- 851. Human Engineering.** (3) II. Environmental factors affecting work; evaluation of performance in man-machine systems; current research in human engineering. Two hours rec. and three hours lab. a week. Pr.: I. E. 552, Psych. 625.
- 871. Industrial Queuing Processes.** (3) II. Introduction to the queuing 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.
- 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.
- 876. Quantitative Techniques in Industrial Engineering.** (3) I, II, S. Max. total: nine credit hours. 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.: I. E. 571, Stat. 410.
- 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.
- 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

- 203. Gas and Electric Welding.** (1) I, II. Theory and practice of gas welding and electric welding; inspection methods; testing. Three hours lab. a week.
- 212. Woodworking.** (2) I, II. Max. total: six credit hours. Students may enroll in the following divisions: (1) Woodworking I. (2) Woodworking II. Pr.: Woodworking I. (3) Wood Turning. Pr.: Woodworking I. Six hours lab. a week.
- 250. Sheet Metal.** (2) II. Developments, using of templets, soldering, folding, wiring, flanging, seaming, rolling, and other operations. Six hours lab. a week.
- 312. Finishing.** (2) II. Materials, processes, and application methods for wood and metal finishes. Six hours lab. a week. Pr.: I. E. 212-(1).
- 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.
- 354. Appliance Servicing.** (4) II. Principles of operation, trouble analysis, servicing, and repair of utility appliances. Two hours rec. and six hours lab. a week. Pr.: Phys. 210 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 414. Methods of Teaching Industrial Arts.** (3) I. (See School of Education, College of Arts and Sciences.) One hour rec. and six hours lab. a week. Pr. or conc.: Educ. 201 or approval of instructor.
- 422. Highway Safety and Driver Education.** (5) II, S. Meets Kansas certification requirements for teaching driver education in secondary schools. Three hours rec. and six hours lab. a week. Pr.: Senior standing, valid driver's license.

- 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.
- 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).
- 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

- 812. Problems in Industrial Arts.** Credit arranged. I, II, S. Pr.: Approval of instructor.
- 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 School of Education.

MECHANICAL ENGINEERING

RALPH G. NEVINS,* *Head of Department*

Professors Brainard, Daasch, Duncan,* Durland,* Flinner,* Nevins,* Tripp,* Wood; Associate Professors Appl.* Bowyer,* Crank,* Lindholm,* Messenheimer, Rohles;* Assistant Professors Gowdy, Michaels, Miller, Neely; Instructors Annis,* Ball, Berns, Byers, Gorton, Kent, Sieh, Sprague*

For Curriculum, See Page 227

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

- 211. Engineering Graphics I.** (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.
- 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.
- 215. Descriptive Geometry.** (2) I, II. Problems involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; practical applications of the principles involved; emphasis on developing the student's ability to visualize drawings in the third angle. Six hours lab. a week. Pr.: College credit in Engineering Drawing.
- 216. Engineering Graphics II.** (2) I, II. Geometry of engineering graphics relating particularly to lines and planes, non-coplanar lines, intersections and development of surfaces and solids; perspective; problems for developing conceptual ability and for training in concentration and imagination. Six hours lab. a week. Pr.: M. E. 211.
- 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.
- 310. Engineering Graphics III.** (2) I, II. Fundamentals of dimensioning; pictorial and orthographic working drawings and sketches, including details and assemblies, using the principles and standards of geometric control; creative and functional design; A. S. A. Standard conventions and specifications; threads and fasteners; sketching of exploded views; charts and diagrams. Six hours lab. a week. Pr.: M. E. 215 or 216.
- 399. Honors Seminar in Mechanical Engineering.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 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.
- 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.
- 411. Engineering Thermodynamics I.** (4) I, II, S. Laws of the conversion of heat energy into mechanical energy; properties of fluids; gases and vapors; flow and non-flow processes; power-generating cycles. Four hours rec. a week. Pr.: Math. 222 or 232, Phys. 310.
- 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, M. E. 310.
- 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.

- 475. Graphics of Engineering Formulas.** (2) II. Simple empirical equations; diagramming of formulas; nomographic or alignment charts; special slide rules. Two hours rec. a week. Pr.: Senior standing.
- 511. Engineering Thermodynamics II.** (2) I, II. Extension of Engineering Thermodynamics I to include gas mixtures, availability, equilibrium and introduction to kinetic theory. Two hours rec. a week. Pr.: M. E. 411.
- 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.
- 524. 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.
- 528. Aerodynamics I.** (4) I. 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.
- 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. 411.
- 533. Mechanical Engineering Laboratory I.** (2) I, II, S. Theory and application of mechanical engineering measurements. Six hours lab. a week. Pr.: M. E. 411; Pr. or conc.: E. E. 424.
- 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. Engineering Economics.** (3) I, II. Economic analysis of principles as applied in engineering. Three hours rec. a week. Pr.: Econ. 110, M. E. 411.
- 565. Principles of Industrial Instrumentation.** (2) I. Instrumentation applicable to mechanical engineering fields. Two hours rec. a week. Pr.: E. E. 423, 424.
- 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.
- 575. Thermodynamic Systems Analysis.** (3) I, II, S. Thermodynamic analysis of energy conversion; economic principles used in design. Three hours rec. a week. Pr.: M. E. 411, 560; Pr. or conc.: M. E. 521.
- 580. Professional Development.** (1) I, II. The social and professional aspect of engineering. One hour rec. a week. Pr.: Senior standing.
- 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. 533, 575.
- 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. 411 (Not open to graduate students majoring in mechanical engineering).

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 620. Internal Combustion Engines.** (3) II. Analysis of cycles, design and performance characteristics. Three hours rec. a week. Pr.: M. E. 511.

- 624. 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.
- 628. Aerodynamics II.** (4) II. Compressibility phenomena, power requirements, airplane performance; stability and control. Three hours rec. and three hours lab. a week. Pr.: M. E. 528.
- 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. 511, Ap. M. 471, Math. 240 or equiv.
- 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.
- 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. 575, 551.
- 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.
- 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.
- 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.
- 666. Aeronautical Engineering Design.** (2) I. Design problems related to aircraft, missiles, and space vehicles. Six hours lab. a week. Pr.: M. E. 628, 631, 521.
- 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.
- 675. Problems in Mechanical Engineering.** Credit arranged. I, II, S. Pr.: Approval of department head.
- 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. 511, Ap. M. 471, Math. 240 or equiv.
- 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. 511, Ap. M. 471.
- 725. Combustion.** (3) I. Dynamics and thermodynamics of combustion processes; solid, liquid, and gaseous fuels. Three hours rec. a week. Pr.: M. E. 521.
- 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.

- 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.
- 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 nonlinear forms. Three hours rec. a week. Pr.: M. E. 656.
- 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

- 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.
- 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.
- 814. Laboratory Investigations in Machine Design.** Credit arranged. I, II, S. Pr.: Basic undergraduate courses in machine design and approval of department head.
- 816. Advanced Topics in Mechanical Engineering.** (Var.) I, II, S. A course reserved for study of current topics in mechanical engineering. Topics announced when offered. Pr.: Consent of instructor.
- 818. Advanced Thermodynamics II.** (3) II. Cont. of Advanced Thermodynamics I. Three hours rec. a week. Pr.: M. E. 711.
- 822. Advanced Air Conditioning.** (3) I. Advanced psychrometric analysis; physiological factors; biotechnology and heat transfer. Two hours rec. a week. Pr.: M. E. 524.
- 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.
- 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.
- 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.
- 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 or 837.
- 837. Convection-Radiation Heat Transfer.** (3) II. Energy and momentum equations in convective heat transfer, laminar and turbulent thermal boundary layers, steady and non-steady convection problems, theories of thermal radiation. Three hours rec. a week. Pr.: M. E. 521.
- 838. Boundary Layer Theory.** (3) II. Development of Navier-Stokes equations, laminar boundary layers, transition to turbulence, turbulent boundary layers, introduction to homogeneous turbulence. Three hours rec. a week. Pr.: M. E. 471.
- 840. Research Methodology.** (2) I. Principles and techniques of engineering research. Two hours rec. a week.
- 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.

- 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.
- 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 uncertainty and random processes; adaptive control processes; successive approximation. Three hours rec. a week. Pr.: M. E. 731, 732.
- 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 Mikhail;* Associate Professors Bailie,* Mingle* and Smith;* Assistant Professors Clack,* Faw* and Meyer; Instructors Baran, Eckhoff, Hightower and Kaiser*

For Curriculum, See Page 229

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, 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, 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.

Nuclear engineering courses may be selected as a minor in Ph. D. programs in major fields of mechanics, physics, and electrical, chemical and mechanical engineering.

Laboratory facilities include a graphite-moderated subcritical reactor, a water-moderated subcritical reactor, a 256-channel analyzer with pulse height, multiscaler and pulse neutron plug-in logic units with a digital recorder, 3 PACE electronic analog computers, a neutron howitzer, counting rooms, and radiochemistry laboratories. A new nuclear labora-

tory building housing a hundred thousand watt TRIGA Mark II reactor, with a pulsing capability to two hundred and fifty million watts, together with a pulsed neutron source, a pressurized heat transfer loop, a fuel-processing laboratory and other expanding facilities has been recently added to the department. A 160-acre shielding facility including a 5,000-square-foot concrete test field, full-scale concrete shielding structure with basement, and pumped source equipment for large Co^{60} sources has been recently acquired by the department for the study of specialized radiation shielding problems.

FOR UNDERGRADUATE CREDIT

- 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.
- 399. Honors Seminar in Nuclear Engineering.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 410. Introduction to Nuclear Engineering.** (3) 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.
- 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.
- 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.
- 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. 500 and Chem. 595.
- 607. Radiation Effects on Materials.** (3) I. Theories and concepts of the known effects of radiation on the physical, metallurgical, mechanical, corrosion and electrical properties of metals, alloys, inorganic dielectrics, semiconductors, organic and polymeric materials. Emphasis is placed on materials for nuclear reactor components, including fuel elements, moderators, coolants and shielding materials. Three hours rec. a week. Pr.: N. E. 606.
- 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. 450.
- 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.
- 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 conditions, and reactor heat transfer. Three hours rec. a week. Pr.: N. E. 450.

- 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.
- 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.
- 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.
- 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. 691, Ch. E. 428.
- 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. 705.
- 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.

FOR GRADUATE CREDIT

- 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.
- 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.
- 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, 830.
- 830. Nuclear Reactor Instrumentation.** (3) I. Automatic control components for reactors, their application and design. Three hours rec. a week. Pr.: N. E. 691, Phys. 675.
- 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.
- 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.
- 851. Nuclear Engineering Laboratory.** (2) I, S. Approach to criticality, reactor period determination, rod worth measurements, void coefficients, reactor simulation, reactor operation, power calibration, multi-channel counting, pulse neutron operation and measurements. Six hours lab. a week. Pr. or conc.: N. E. 705.
- 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.
- 890. Nuclear Engineering Colloquium.** (1) I, II. Presentation and discussion of progress reports on research, special problems, and out-

standing publications in nuclear engineering and related fields. Pr.: Graduate standing in nuclear engineering.

- 895. Nuclear Systems Design.** (3) I. 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.
- 897. Controlled Thermonuclear Reactions.** (3) I. Thermonuclear reactions, controlled fission approaches, plasma heating, pinch effects, plasma stability effects, and confinements of plasmas. Three hours rec. a week. Pr.: N. E. 705.

Engineering Experiment Station

PAUL E. RUSSELL, *Dean*
LELAND S. HOBSON, *Director*

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 research work carried on by the Engineering Experiment Station has three important objectives. First, this research is an important source of new knowledge that benefits industry and engineering knowledge in Kansas and throughout the nation. The second objective is that it gives our students an opportunity to work in important fields of research. The third objective is to provide additional financial support to assist in the continual improvement and growth of the engineering faculty. 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 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 in the University who work with engineering staff members on joint projects.

The major portion of research support in the College of Engineering is from various agencies of the federal government for special research projects.

Among the most significant fields of research now under way are:

Environmental studies including those of flow and heat transfer characteristics which affect the design of equipment for heating and air conditioning;

Radiation shielding studies, including both research and institutes for top-level scientists throughout the world;

Work in optimization of stagewise processes which has led to the development of new techniques promising to revolutionize the solution of complex problems involving scheduling and utilization of resources in business, industry, and the military;

Studies of radiation effects on materials, including development of new materials for the space effort for future application in industry;

Development of a gravity model for forecasting urban traffic and the study of the use of digital computers for scheduling public transportation;

Studies of the characteristics of fluidized beds, of primary significance to the petroleum and chemical industries;

Industrial applications of radioactive isotopes;

Vibrational characteristics of sandwich materials;

Experimental stress analysis;

Fundamental research in applied mathematics; and

Study of the scattering of electromagnetic waves as a means of determining the surface roughness of planets.

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 upon 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.

CENTER FOR COMMUNITY PLANNING SERVICES

PROFESSOR DONALD D. WHITE

The Center for Community Planning Services, a joint function of the Division of Engineering and Industrial Extension and the College of Architecture and Design at Kansas State University, has as its goal increased public understanding of community and regional planning. This work is carried out through public meetings and short courses. Workshops held to explain how Kansas communities can participate in urban planning and assistance grants have resulted in the application by a number of cities for such assistance. These grants, administered through the Planning Division of the Kansas Department of Economic Development, have resulted in studies leading to comprehensive city planning for a number of Kansas communities.

The Planning Center assembles materials that are applicable to Kansas and, under the sponsorship of a local community group, conducts meetings to familiarize community leaders with techniques, goals, and the process of planning. In each of six two-hour sessions, various techniques of planning are discussed, including the details of various state and Federal programs of assistance to cities. Continuing interest is evidenced in these short courses as a vital form of public education for communities entering into a planning program.

The Center, in cooperation with the University of Kansas, is responsible for the programs presented at the annual Kansas Planning Conference which has been held for the past ten years.

The Planning Center also continues to serve planning commissions, chambers of commerce, and other public groups that have problems related to the acceptance and understanding of community planning. Topics for recent meetings have varied from the problems of rural zoning to the need for planning for basic utilities for community growth.

The College of Home Economics

DORETTA SCHLAPHOFF HOFFMAN,* *Dean*

RUTH HOEFLIN,* *Associate Dean*

MARGARET E. RAFFINGTON, *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. For today's women, the degree educates them for the ideal dual role—combination of happy marriage and a fascinating career. The degree gives them an adventuresome spirit to tackle home and family problems in new ways. Such experiences in the home enhance a woman's professional growth in the field of home economics.

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 five 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.

Programs of study leading to the degree Bachelor of Science can be planned within the six 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

Teaching Home Economics in High School, Vocational Plan
Teaching Home Economics in High School, Non-vocational Plan
Home Economics Extension Work
Interior Decoration
Crafts
Teaching Art in High School
Costume Design
Clothing Retailing
Clothing and Textile Research
Nursery School Teaching
Family and Child Development with Community Services
Homemaking
Family Economics and Finance
Household Equipment, Housing, and Home Management
Foods and Nutrition Research
Foods and Nutrition in Business
Radio and Television

2. Curriculum in Home Economics with Liberal Arts

3. Curriculum in Dietetics and Institutional Management

4. Curriculum in Restaurant Management

5. Curriculum in Home Economics and Journalism

6. Curriculum in Home Economics and Nursing

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 decorator, 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, dietitian, restaurant manager, nurse, or research technician. The course re-

quirements 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 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 six departments in the College of Home Economics: Art, Clothing and Textiles, Family and Child Development, Foods and Nutrition, Family Economics, and Institutional Management. Courses in Home Economics Education are offered by the School 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. For example, some students arrange for double majors, to prepare for teaching and extension work; for clothing retailing and teaching; or for foods and nutrition and teaching.

Electives may be used to build strong combinations with other fields of interest.

FRESHMAN

FIRST SEMESTER			SECOND SEMESTER				
	Course	Sem. Hrs.		Course	Sem. Hrs.		
Chem.	110	General Chemistry	5 or	Chem.	190	El. Org. Chemistry	3
Phys.	101	Man's Phys. World I	4	Chem.	191	El. Org. Chem. Lab. ..	2 or
Engl.	100	Engl. Comp. I	3	Phys.	102	Man's Phys. World II	4
Art	100	Elementary Design I	2	Engl.	120	Engl. Comp. II	3
F. C. Dev.	250	Human Relations	2	Psych.	110	Gen. Psychology	3
C. & T.	131	Socio-economics of Clothing	2	F. & N.	110	Foods I	5
Gn. H. E.	110	Intro. to H. E.	1	Ph. Ed.		Physical Education	0
Ph. Ed.		Physical Education	0				
Total			14 or 15	Total			15 or 16

SOPHOMORE

Bot.	121	Biology I†*	4	Bot.	122	Biology II†*	4
Spch.	105	Oral Comm. I	2	Art	220	Costume Design I	2
F. Ec.	200	Family Finance	2	C. & T.	260	Textiles	3 or
F. & N.	131	Intro. to Nutrition	2	C. & T.	210	Pattern Study	3
		Elective or option	6			Elective or option	7
Total			16	Total			16

JUNIOR

		Elective in Soc. Sci.	4			Elective in Soc. Sci.	4
Art	240	Interior Decoration I	2	F. C. Dev.	375	Family Health	2 or
F. Ec.	320	The House	3	F. C. Dev.	350	Family Relationships	2
		Elective—Humanities or Social Science	3			Elective—Humanities or Social Science	3
Gn. H. E.	030	Elective or option	3			Elective or option	6 or 7
		H. E. Lect.	0				
Engl.	090	English Proficiency	0				
Total			15	Total			16

SENIOR

		Elective in Human.	4			Elective in Human.	4
		Elective or option..	11 or 12			Elective or option..	11 or 12
Gn. H. E.	030	H. E. Lect.	0				
Total			15 or 16	Total			15 or 16

Number of hours required for graduation, 124.

† Or substitute, such as Zoology, Physiology.

* Courses in general studies, or approved substitutions, may come in any undergraduate year.

Graduate nurses, who are graduates of approved schools of nursing, may be allowed 30 hours of credit toward the degree Bachelor of Science in Home Economics. In the 94 hours of work remaining for the degree, at Kansas State University, candidates must include requirements, Curriculum in Home Economics with Options.

Option in Home Economics Education—Vocational Plan

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.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>	
Educ.	202	Educ. Psychology I	3	C. & T.	310	
Educ.	400	Educ. Psychology II	3	C. & T.	610	
Educ.	201	Prin. of Sec. Educ.	3	F. C. Dev.	320	
Educ.	550	Meth. of Tehg. H. E.	3	F. C. Dev.	350	
Educ.	477	Tehg. Part. in Sec. Sch. .	5	F. C. Dev.	Course at the 400 level	
Educ.	750	Curriculum in H. E.	3		or above	
Phys.	115	Household Physics	4	F. Ec.	665	
C. & T.	210	Pattern Study and		F. Ec.	565	
		Garment Construction .	3	F. & N.	240	
					Foods II	
Option Requirements					45
Electives					6
Curriculum Requirements					73
	(Take Chem. 110 and 190, 191; F. C. Dev. 375; C. & T. 260; F. & N. 401 in place of F. & N. 131.)					
	(Take Econ. 110, Soc. 220 or 200, and Hist., P. Sci. and Phil. 220; Zool. 205 and Bact. 220 or Zool. 425 in place of Bot. 121 and 122.)					
	(Omit: F. C. Dev. 250 and electives in humanities or social science, 6 hours.)					
Total					124

Option in Home Economics Education—Non-vocational

The option includes courses needed for certification to teach home economics in high schools maintaining non-vocational departments. Students have opportunity to earn credits sufficient for certification in a second subject matter teaching field.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>	
Educ.	202	Educ. Psychology I	3	Educ.	750	
Educ.	400	Educ. Psychology II	3	F. C. Dev.	320	
Educ.	201	Prin. of Sec. Educ.	3	F. C. Dev.	660	
Educ.	550	Meth. of Tehg. H. E.	3	F. Ec.	665	
Educ.	477	Tehg. Part. in Sec. Sch. .	5		Elective in H. E.	
Option Requirements	.....					37—37
Electives, 7 hours of which must be in humanities or social science	.....					26—24
Curriculum Requirements	.....					61—63
	(Take Econ. 110, Soc. 220 or 200, and Hist., P. Sci. and Phil. 220; Zool. 205 and Bact. 220 or Zool. 425 in place of Bot. 121 and 122.)					
	(Omit if desired: Art 240; C. & T. 260; F. C. Dev. 250, 350, 375; F. Ec. 200, 320.)					
Total	.....					124—124

Option in Home Economics Education—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 State Leader, Extension Home Economics, advises with the student who selects this option.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>	
Educ.	202	Educ. Psychology I	3	F. C. Dev.	320	
Educ.	605	Exten. Organ. & Policies .	3	F. C. Dev.	350	
Educ.	752	Meth. of Exten. Tehg. ..	3	F. C. Dev.	Course at the 400 level	
Phys.	115	Household Physics	4		or above	
Art	245	Cont. Homes	3 or	F. Ec.	665	
Art	260	Design in the Crafts I ...	2	F. Ec.	565	
C. & T.	210	Pattern Study and		F. Ec.	600	
		Garment Construction .	3	F. & N.	240	
					Foods II	
Option Requirements					36—37
Electives, 6 hours of which must be in humanities or social science					13—12
Curriculum Requirements					75—75
	(Take Chem. 110, 190 and 191; F. C. Dev. 375; C. & T. 260; take F. & N. 401 in place of 131.)					
	(Take Zool. 205 and Bact. 220 in place of Bot. 121 and 122; take Soc. 220, Econ. 110, and P. Sci. 220.)					
Total					124—124

Option in Interior Decoration (Art)

This option is designed for students who wish preparation for careers as interior decorators.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
Art	190 Drawing I	2	Art	390 Drawing II	2
Art	200 Elementary Design II	2	Art	640 Interior Decoration III ..	3
Art	260 Design in the Crafts I	2	Art	645 Historic Furn. Design	3
Art	265 Ceramics I	2	Art	690 Survey of Art I	3
Art	290 Lettering	2	Art	695 Survey of Art II	3
Art	300 Intermediate Design	2	Art	740 Historic Fabric Design .	3
Art	340 Interior Decoration II	3			
Option Requirements					32—32
Electives, 6 hours of which must be in humanities or social science					21—19
Curriculum Requirements					71—73
Total					124—124

Option in Crafts (Art)

Students prepare to become teachers, occupational therapists or designer craftsmen working in business and industry or as free-lance artists.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
Art	190 Drawing I	2	Art	365 Weaving I	2
Art	200 Elementary Design II	2	Art	390 Drawing II	2
Art	260 Design in the Crafts I	2	Art	560 Metal Crafts & Jewelry .	2
Art	265 Ceramics I	2	Art	660 Silversmithing	2
Art	290 Lettering	2	Art	665 Ceramics II	2
Art	300 Intermediate Design	2	Art	690 Survey of Art I	3
Art	360 Design in the Crafts II .	2	Art	695 Survey of Art II	3
Option Requirements					30—30
Electives, 6 hours of which must be in humanities or social science					23—21
Curriculum Requirements					71—73
Total					124—124

Option in Teaching Art in High School (Art)

This option includes courses in crafts, design, drawing, and appreciation of art and meets the requirements for Kansas certification to teach art at the secondary school level.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
Art	190 Drawing I	2	Art	695 Survey of Art II	3
Art	200 Elementary Design II	2	Art	787 Problems in Tchg. Art ..	2
Art	260 Design in the Crafts I	2	Educ.	202 Educ. Psychology I	3
Art	265 Ceramics I	2	Educ.	400 Educ. Psychology II	3
Art	290 Lettering	2	Educ.	201 Prin. of Sec. Educ.	3
Art	300 Intermediate Design	2	Educ.	446 Meth. of Tchg. in the	
Art	365 Weaving I	2		Sec. School	3
Art	390 Drawing II	2	Educ.	447 Tchg. Partic. in the	
Art	560 Metal Crafts & Jewelry .	2		Sec. School	3
Art	600 Advanced Design	2	Educ.	610 Educ. Sociology	3
Art	690 Survey of Art I	3			
Option Requirements					48—48
Electives					5—3
Curriculum Requirements					71—73
(Omit: Electives in humanities and/or social science, 6 hours.)					
Total					124—124

Option in Costume Design (Art, 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.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
Art	190 Drawing I	2	C. & T.	210 Pattern Study and	
Art	315 Costume Illustration	3		Garment Construction .	3
Art	320 Costume Design II	3	C. & T.	610 Flat Pattern Designing ..	3
Art	390 Drawing II	2	C. & T.	615 Designing by Draping	3
Art	620 Costume Design III	3	C. & T.	730 History of Costume	3
Art	740 Historic Fabric Design .	3			
Option Requirements					28—28
Electives, 6 hours of which must be in humanities or social science					25—23
Curriculum Requirements (Take C. & T. 260)					71—73
Total					124—124

Option in Clothing Retailing (C. & T.)

Courses prepare students for a career in retailing in department stores and specialty shops. Elective may include courses in radio and television in addition to those satisfying other interests of the student.

<i>Course</i>	<i>Sem. Hrs.</i>	<i>Course</i>	<i>Sem. Hrs.</i>
B. A. 170 Principles of Acctg.	3	C. & T. 210 Pattern Study and	
B. A. 400 Administration	3	Garment Construction . . .	3
B. A. 440 Marketing	3	Art 395 Window Display	3
B. A. 540 Retailing	3	C. & T. 230 Fashion Merchandising . .	3
Engl. 200 Engl. Comp. III	3 or	C. & T. 630 Clothing Economics	3
Engl. 451 Mod. Engl. Grammar	3	C. & T. 650 Intermediate Textiles	3
Psych. 515 Personnel Psychology ..	3 or	C. & T. 730 History of Costume	3
Psych. 505 Consumer Psychology	3		
Option Requirements			36—36
Electives, 6 hours of which must be in humanities or social science			16—14
Curriculum Requirements			72—74
(Take Econ. 110 and Soc. 220; take C. & T. 260.)			
Total			124—124

Option in Clothing and Textiles 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.

<i>Course</i>	<i>Sem. Hrs.</i>	<i>Course</i>	<i>Sem. Hrs.</i>
Chem. 230 Chemistry II	3	Stat. 320 Elements of Statistics	3
Chem. 250 Chemistry II Lab.	2	C. & T. 630 Clothing Economics	3
Chem. 300 General Quan. Analysis ..	4	C. & T. 650 Intermediate Textiles	3
Math. 100 College Algebra	3	C. & T. 655 Advanced Textiles	3
Phys. 115 Household Physics	4 or	C. & T. 260 Textiles	3
Phys. 211 General Physics I	4		
Option Requirements			31—31
Electives, 6 hours of which must be in humanities or social science			22—21
Curriculum Requirements			71—72
(Take Chem. 210 in place of Chem. 110; take Chem. 190, 191; take C. & T. 210.)			
Total			124—124

Option in Nursery School Teaching (F. C. Dev.)

This option is for the student who wishes to become a nursery school teacher, a teacher of exceptional children, or a teaching assistant in college.

<i>Course</i>	<i>Sem. Hrs.</i>	<i>Course</i>	<i>Sem. Hrs.</i>
F. C. Dev. 320 The Preschool Child	3	F. C. Dev. 615 Nursery School Procedure	3
F. C. Dev. 350 Family Relationships	2	F. C. Dev. 630 Devel. & Guid. of Youth . .	3
F. C. Dev. 605 Child Development	3	F. C. Dev. 660 The Family	3
F. C. Dev. 635 Creative Experiences		F. Ec. 665 Home Management	2
Preschool Child	3	Approved courses in	
		Soc., Psych., Comm. ..	6
Option Requirements			28—28
Electives, 6 hours of which must be in humanities or social science			25—23
Curriculum Requirements			71—73
(Take F. C. Dev. 375.)			
Total			124—124

Option in Family and Child Development with Community Services (F. C. Dev.)

This option appeals to students who are interested in family life programs, social welfare in community agencies, or youth leadership in organized groups.

<i>Course</i>	<i>Sem. Hrs.</i>	<i>Course</i>	<i>Sem. Hrs.</i>
F. C. Dev. 320 The Preschool Child	3	F. Ec. 600 Families in Amer. Econ.	3
F. C. Dev. 350 Family Relationships	2	F. Ec. 665 Home Management	2
F. C. Dev. 605 Child Development	3	Approved courses in	
F. C. Dev. 630 Devel. & Guid. of Youth ..	3	Soc., Psych., Comm. ..	9
F. C. Dev. 660 The Family	3		
Other Requirements			28—28
Electives, 6 hours of which must be in humanities or social science			25—23
Curriculum Requirements			71—73
(Take F. C. Dev. 375.)			
Total			124—124

Option in Homemaking (F. Ec.)

This option provides students with a broad liberal education along with home economics courses for home and family living. Electives permit preparation for employment when carefully selected.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
Art	345	Home Furnishings	2	F. Ec.	600
F. C. Dev.	320	The Preschool Child	3	F. Ec.	605
F. C. Dev.	350	Family Relationships	2	F. Ec.	665
F. Ec.	340	Household Equipment	2	F. Ec.	565
					Home Management Lab. . .
					2
Option Requirements					19—19
Electives, 6 hours of which must be in humanities or social science					36—33
Curriculum Requirements					69—72
(Substitute Econ. 110, Soc. 220. Take Phys. 101 and 102, F. C. Dev. 375.)					
Total					124—124

Option in Family Economics and Finance (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.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
B. A.	170	Principles of Acctg.	3	Stat.	320
Econ.	120	Economics II	3	F. C. Dev.	320
Econ.	430	Money and Banking	3	F. Ec.	600
Psych.	435	Social Psychology	3 or	F. Ec.	605
Soc.	655	Cultural Anthropology	3	F. Ec.	665
Math.	110	General Algebra	5	F. Ec.	565
				F. Ec.	705
					Finan. Prob. of Families
					2
Option Requirements					35—35
Electives, 6 hours of which must be in humanities or social science					20—17
Curriculum Requirements					69—72
(Take Econ. 110, Phys. 101 and 102, F. C. Dev. 350.)					
Total					124—124

Option in Household Equipment, Housing, and Home Management (F. Ec.)

The required courses are basic for all three areas, with electives allowed for further specialization: in **equipment** for those training to become equipment demonstrators; in **housing** for those interested in house planning, kitchen designing, or research; and in **home management** for those interested 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 in work simplification and home management, and for such positions as adviser in home management houses, or as home management specialist in Extension.

<i>Course</i>		<i>Sem. Hrs.</i>	<i>Course</i>		<i>Sem. Hrs.</i>
Art	345	Home Furnishings	2	F. Ec.	640
F. C. Dev.	320	The Preschool Child	3	F. Ec.	660
F. Ec.	340	Household Equipment	2	F. Ec.	665
F. Ec.	600	Families in Amer. Econ. 3		F. Ec.	565
F. Ec.	605	Consumers and the Mkt. 3		F. & N.	240
F. Ec.	620	Housing Requirements		Phys.	115
		of Families	2		Household Physics
					4
Option Requirements					31—31
Electives, 6 hours of which must be in humanities or social science					19—22
Curriculum Requirements					74—71
(Take Econ. 110, Chem. 110, 190 and 191, F. C. Dev. 375.)					
Total					124—124

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.

	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>		
Bact.	220	General Microbiology	4	F. & N.	240	Foods II	3
Chem.	230	Chemistry II	3	F. & N.	250	Dietetics	3
Chem.	250	Chemistry II Lab.	2	F. & N.	605	Experimental Cookery	3
Chem.	300	General Quan. Analysis	4	F. & N.	680	Seminar in Foods and Nutrition	2
Biochem.	420	General Biochemistry	5				
Math.	100	College Algebra	3	F. & N.	706	Advanced Nutrition I	3
Phys.	115	Household Physics	4				
Option Requirements						39	
Electives						9	
Curriculum Requirements						76	
(Take Chem. 210 in place of 110; take Chem. 350, 351 in place of Chem. 190, 191; Zool. 205 and 425 in place of Bot. 121 and 122; Econ. 110, Soc. 220, and 2 hours social science electives; modern languages, 6 hours, in place of 6 hours electives in social science or humanities.)							
(Omit Psych. 110.)							
Total						124	

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.

	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>		
A. H.	280	Meat Selec. & Util.		F. & N.	240	Foods II	3
		H. E.	2	F. & N.	250	Dietetics	3
Journ.	306	Reporting I	2	F. & N.	408	Food. Purchas. & Mngt.	3
Journ.	310	Reporting Laboratory	1	F. & N.	410	Prin. of Food Dem.	2
Phys.	115	Household Physics	4	F. & N.	605	Experimental Cookery	3
Spch.	150	Radio-TV Speech I	2	F. & N.	680	Sem. in F. and Nutr.	2
F. Ec.	340	Household Equipment	2	Ins. M.	200	Quantity Food Prep.	2
F. Ec.	665	Home Management	2				
F. Ec.	565	Home Management Lab.	2				
Option Requirements						35	
Electives, 5 hours of which must be in humanities or social science						15	
Curriculum Requirements						74	
(Take Chem. 210, 350, 351; Zool. 205 and Bact. 220 in place of Bot. 121 and 122. Take Econ. 110, Soc. 220, and P. Sci. 110 or 220.)							
Total						124	

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.

	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>		
Spch.	150	Radio-TV Speech I	2	Spch.	326	Intro. to Television	2 or
Spch.	160	Survey of Broadcasting	2	Psych.	436	Social Psychology	3
Spch.	225	Radio-TV Continuity	3	Spch.	745	Broadcasting of Women's Programs	3
Spch.	390	Radio-TV Prod. I	3	Approved courses in Radio-TV			6
Approved courses in H. E.						12	
Option Requirements						33-34	
Electives, 6-8 hours of which must be in social science or humanities						20-17	
Curriculum Requirements						71-73	
Total						124-124	

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.

FRESHMAN

FIRST SEMESTER			SECOND SEMESTER				
	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>		
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Gn. H. E.	110	Intro. to H. E.	1	C. & T.	131	Socio-econom. of Clothing	2
		Electives in humanities ..	4			Elective in humanities ..	4
		Elective*	7			Elective*	6
Ph. Ed.		Physical Education	0	Ph. Ed.		Physical Education	0
Total			15	Total			15

SOPHOMORE

		Elective in Soc. Sci.	4			Elective in Soc. Sci.	4
Spch.	105	Oral Comm. I	2	F. & N.	131	Intro. to Nutrition	2
Art	100	Elementary Design I	2			Elective*	9
		Elective*	7				
Total			15	Total			15

JUNIOR

Phys.	101	Man's Phys. World I	4	Phys.	102	Man's Phys. World II ...	4
F. Ec.	320	The House	3	F. Ec.	600	Families in Amer. Econ.	3
		Elective*	9	F. C. Dev.	350	Family Relationships ...	2
Gn. H. E.	030	H. E. Lect.	0			Elective*	7
Engl.	090	English Proficiency	0				
Total			16	Total			16

SENIOR

Bot.	121	Biology I	4	Bot.	122	Biology II	4
		Elective*	12			Elective*	12
Gn. H. E.	030	H. E. Lect.	0				
Total			16	Total			16

Number of hours required for graduation, 124.

Courses in General Studies, or approved substitutions, may come in any undergraduate year.

* Use of elective credit:

Liberal Arts (24 hours) as follows:

Three hours of elective credit in economics, sociology, anthropology, or government.

Nine hours of elective credit in literature or history (6 hours) and philosophy, mathematics, or logic (3 hours).

Twelve hours of elective credit to be concentrated in one of the following: modern language, social science, natural science, or humanities.

Home Economics (18 hours) in one of the following areas of concentration:

A. Art: Cost. Des. I or Des. in Crafts I (2), Int. Dec. I (2), Survey of Art I or II (3), other courses** (11).

B. Clothing and Textiles: Textiles (3), courses in clothing design, construction, and other courses** (15).

C. Family and Child Development: The Preschool Child (3), Child Development (3), The Family (3), Dev. and Guid. of Youth (3), other courses** (6).

D. Family Economics: Fam. Fin. (2), Cons. & the Mkt. (3), Home Mngt. (2), Hshld. Equip. (2), other courses** (9).

E. General: Foods I (5), Home Mngt. (2), Home Mngt. Lab. (2), The Preschool Child (3), other courses** (6).

** To be chosen in consultation with faculty adviser.

Curriculum in Dietetics and Institutional Management

B. S. in Home Economics

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.

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Chem.	110	General Chemistry	5	Chem.	190	El. Org. Chem.	3
Engl.	100	Engl. Comp. I	3	Chem.	191	El. Org. Chem. Lab.	2
F. C. Dev.	250	Human Relations	2 or	Engl.	120	Engl. Comp. II	3
F. C. Dev.	350	Family Relations	2	Psych.	110	Gen. Psychology	3
F. & N.	110	Foods I	5	Art	100	Elementary Design I	2
Gn. H. E.	110	Intro. to H. E.	1	C. & T.	131	Socio-econom. of Cloth. ..	2
Ph. Ed.		Physical Education	0	F. & N.	131	Intro. to Nutrition	2
				Ph. Ed.		Physical Education	0
Total			16	Total			17

SOPHOMORE

Spch.	105	Oral Comm. I	2	A. H.	280	Meat Sel. & Util. II. E. ..	2
Zool.	205	Gen. Zoology	4	Econ.	110	Economics I	3
Art	220	Costume Design I	2 or	Zool.	425	Human Physiology	4
Art	240	Interior Decoration I	2	Ins. M.	200	Quan. Food Prep.	2
F. & N.	240	Foods II	3			Elec. in Humanities	4
		Elec. in Humanities	4				
Total			15	Total			15

JUNIOR

Soc.	220	Intro. to Sociology	3	B. A.	430	Personnel Adm.	3 or
Phys.	115	Household Physics	4	Psych.	515	Personnel Psychology	3
Ins. M.	600	Food Prod. Mngt.	3	Biochem.	420	Gen. Biochemistry	5
Ins. M.	620	Inst. Food Purch.	3	F. & N.	250	Dietetics	3
		Elective	2	Ins. M.	630	Inst. Equipment	3
Gn. H. E.	030	H. E. Lect.	0			Elective	2
Engl.	090	English Proficiency	0				
Total			15	Total			16

SENIOR

Bact.	220	Gen. Microbiology	4	F. C. Dev.	320	The Preschool Child	3
Educ.	551	Meth. of Tehg. for		F. & N.	711	Diet Therapy	2
		Diet. Students	3	Ins. M.	640	Org. and Mngt. of	
F. & N.	706	Advanced Nutrition I	3			Food Services	3
F. & N.	605	Experimental Cookery	3	Ins. M.	645	Org. and Mngt. of	
Gn. H. E.	030	II. E. Lect.	0			Food Services Lab.	2
		Elective	2			Elective	5
Total			15	Total			15

Number of hours required for graduation, 124.

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.

FRESHMAN

FIRST SEMESTER			SECOND SEMESTER		
	Course	Sem. Hrs.		Course	Sem. Hrs.
Chem.	110 General Chemistry	5	Chem.	190 El. Org. Chem.	3
Engl.	100 Engl. Comp. I	3	Chem.	191 El. Org. Chem. Lab.	2
Psych.	110 Gen. Psychology	3	Engl.	120 Engl. Comp. II	3
Soc.	220 Intro. to Sociology	3	Spch.	105 Oral Comm. I	2
Ph. Ed.	Physical Education	0	F. & N.	110 Foods I	5
Gn. H. E.	030 H. E. Lect.	0	Ph. Ed.	Physical Education	0
	Air or Mil. Sci.	1		Air or Mil. Sci.	1
Total	.....	15	Total	.....	16

SOPHOMORE

Econ.	110 Economics I	3	Art	100 Elementary Design I	2
Bot.	121 Biology I	4	Bot.	122 Biology II	4
F. & N.	240 Foods II	3	F. & N.	131 Intro. to Nutrition	2
	Elec. in Humanities	4		Elec. in Humanities	4
	Air or Mil. Sci.	1	Ins. M.	200 Quan. Food Prep.	2
Total	.....	15	Total	.....	15

JUNIOR

B. A.	272 Introductory Acctg.	5	B. A.	305 Managerial Acctg.	3
C. & T.	260 Textiles	3 or	B. A.	430 Personnel Admin.	3
F. C. Dev.	350 Family Relations	2 or	Bact.	200 Public Health Bact.	3
Art	240 Interior Decoration I	2	Ins. M.	640 Org. and Mngt. of Food Services	3
A. II.	280 Meat. Sel. & Util. II. E.	2	Ins. M.	645 Org. and Mngt. of Food Services Lab.	2
Ins. M.	600 Food Prod. Mngt.	3		Elective	2
Ins. M.	620 Inst. Food Purch.	3	Total	.....	16
Engl.	090 English Proficiency	0			
Total	.....	15 or 16			

SENIOR

B. A.	325 Business Law I	3	Ins. M.	630 Inst. Equipment	3
B. A.	400 Administration	3	B. A.	350 Small Bus. Operation	3
Ins. M.	650 Commercial Food Mngt. . .	3	Psych.	505 Consumer Psychology	3
	Elective	6 or 7		Elective	6
Total	.....	15 or 16	Total	.....	15

Number of hours required for graduation, 124.

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.

FRESHMAN

FIRST SEMESTER			SECOND SEMESTER		
	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>
Chem.	110 General Chemistry	5 or	Chem.	190 El. Org. Chem.	3
Phys.	101 Man's Phys. World I	4	Chem.	191 El. Org. Chem. Lab.	2 or
Engl.	100 Engl. Comp. I	3	Phys.	102 Man's Phys. World II	4
Art	100 Elementary Design I	2	Engl.	120 Engl. Comp. II	3
F. & N.	110 Foods I	5	Spch.	105 Oral Comm. I	2
Gn. H. E.	110 Intro. to H. E.	1	Art	220 Costume Design I	2
Pb. Ed.	Physical Education	0	C. & T.	131 Socio-econom. of Clothing	2
			F. Ec.	200 Family Finance	2
			Journ.	050 Tech. Journ. Lect.	0
			Ph. Ed.	Physical Education	0
Total		15 or 16	Total		15 or 16

SOPHOMORE

Bot.	121 Biology I*	4	Bot.	122 Biology II	4
	Electives in Soc. Sci.	4		Electives in Soc. Sci.	4
F. & N.	131 Intro. to Nutrition	2	C. & T.	260 Textiles	3 or
Journ.	306 Reporting I	2	C. & T.	210 Pattern Study	3
Journ.	310 Reporting Lab.	1	Journ.	316 Reporting II	3
	Elective	2 or 3		Elective	1 or 2
			Journ.	050 Tech. Journ. Lect.	0
Total		15 or 16	Total		15 or 16

JUNIOR

F. C. Dev.	350 Family Relationships ..	2 or	F. C. Dev.	350 Family Relationships ..	2 or
F. C. Dev.	320 The Preschool Child	3	F. C. Dev.	375 Family Health	2
F. Ec.	320 The House	3 or	Art	240 Interior Decoration I	2
F. Ec.	605 Consumers & the Mkt.	3	Journ.	330 Editing	2
Journ.	630 Publ. Infor. Methods ..	2 or		Elec. in Humanities	4
Spch.	225 Radio-TV Continuity	3 or		Electives	5 or 6
Spch.	745 Broadcast. W. Programs	3	Journ.	050 Tech. Journ. Lect.	0
	Elec. in Humanities	4			
	Electives	4 or 5			
Gn. H. E.	030 H. E. Lect.	0			
Engl.	090 English Proficiency	0			
Total		16 or 17	Total		15 or 16

SENIOR

Journ.	320 Prin. of Advertising	3	Journ.	615 Magazine Article Writ. ..	2
Journ.	610 The Home Page	3	Journ.	620 Inter. of Cont. Affairs ..	3
Journ.	660 Journ. in a Free Society .	3		Electives	10
	Electives	6 or 7	Journ.	050 Tech. Journ. Lect.	0
Gn. H. E.	030 H. E. Lect.	0			
Total		15 or 16	Total		15

Number of hours required for graduation, 124.

Electives chosen with approval of adviser will be distributed as follows: Approximately 50 percent to social studies, journalism, and English; approximately 50 percent to courses in home economics and related areas.

Curriculum in Home Economics and Nursing

B. S. in Home Economics

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 24 months.*

FRESHMAN

FIRST SEMESTER			SECOND SEMESTER		
	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>
Chem.	110 General Chemistry	5	Biochem.	120 Introd. Org. and Bio. Chem.	5
Engl.	100 Engl. Comp. I	3	Engl.	120 Engl. Comp. II	3
F. C. Dev.	250 Human Relations	2	Psych.	110 Gen. Psychology	3
F. & N.	110 Foods I	5	Art	100 Elementary Design I	3
Gn. H. E.	110 Intro. to H. E.	1	C. & T.	131 Socio-economics of Clothing	2
Ph. Ed.	Physical Education	0	Spch.	105 Oral Comm. I	2
			Ph. Ed.	Physical Education	0
Total			Total		
16			17		

SUMMER SESSION

Soc.	220 Intro. to Sociology	3
Engl.	143 Humanities I	3
	Elective in H. E.	2
Total		8

SOPHOMORE

Zool.	210 Gen. Zoology	4	Bact.	220 Gen. Microbiology	4
Engl.	144 Humanities II	3	Elective in Humanities	.....	2
F. C. Dev.	320 The Preschool Child	3	C. & T.	260 Textiles	3
F. Ec.	200 Family Finance	2	F. C. Dev.	350 Family Relationships	2
F. & N.	131 Intro. to Nutrition	2	Elective in H. E.	.....	5
	Elective in H. E.	3	Engl.	090 English Proficiency	0
Total			Total		
17			16		

JUNIOR AND SENIOR

Summer (in residence at Kansas State University with dual enrollment in the Department of Nursing, University of Kansas School of Medicine, and Kansas State University).

Educ.	Educ. Psychology	3
Zool.	240 Hum. Anat. and Physiol.	5
Total		8

A student qualifies for a Bachelor of Science Degree in Home Economics from Kansas State University on completion of 15 months of professional training in the Department of Nursing. After completion of the entire prescribed program in nursing, the student qualifies for the degree Bachelor of Science in Nursing, conferred by the University of Kansas School of Medicine.

* Entrance requirements to the Department of Nursing are: (1) University grades that average C or more. (2) Scores that are acceptable to the Department of Nursing on the battery of orientation tests administered when the student first enrolls at Kansas State University. (3) Application for admission to the Department of Nursing Education must be made by May 15 of the freshman year.

ART

JOHN HANNAH,* *Acting Head of Department*

Professor Barfoot, Associate Professors Garzio* and Hannah;* Assistant Professors Craigie,* Geiger* and Hill;* Instructors Newby, O'Shea and Vogt; Emeritus: Associate Professors Harris, Kedzie and Morris*

Concentration in art is designed to provide a background for home-making or other professional work.

Four options leading to a Bachelor of Science degree are provided for students interested in art: (1) interior decoration, (2) crafts, (3) costume design, and (4) art education. The Master of Arts degree is offered in costume design, interior decoration, art education, and crafts.

Major work leading to the Master of Science degree is offered in art in the areas of advanced design, costume design, interior decoration, teaching art, and crafts.

Prerequisite to graduate work in these areas is the completion of an undergraduate curriculum substantially equivalent, insofar as art courses are concerned, to that required of undergraduate students majoring in this department. In the areas of costume design and interior decoration, commercial experience is desirable.

FOR UNDERGRADUATE CREDIT

- 100. Elementary Design I.** (2) I, II, S. Introduction and practice of the principles of design. Application of these principles to daily living and the visual arts. One hour rec. and three hours lab. a week.
- 170. Art for Elementary Schools.** (3) I, II, S. Art methods, materials, and philosophy of children's art at different grade levels.
- 190. Drawing I.** (2) I, II, and alt. S. Fundamentals of freehand drawing. A variety of media and approaches to drawing are used.
- 200. Elementary Design II.** (2) I, II, S. Theory of design and color continued and a practical application of it made to functional items in the home. Pr.: Art 100.
- 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.
- 240. Interior Decoration I.** (2) I, II, and alt. S. Designing of interiors for homes of today. One hour rec. and three hours lab. a week. Pr.: Art 100.
- 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.
- 260. Design in the Crafts I.** (2) I, II, S. Leatherwork, wood carving, and enameling, with emphasis on contemporary design. Pr.: Art 100 or consent of instructor.
- 265. Ceramics I.** (2) I, II, S. Creative design of pottery, formation, firing, and decoration. Pr.: Art 100 or consent of instructor.
- 270. Crafts for Elementary Schools.** (3) I, II, S. Crafts design, methods and materials for different grade levels in the elementary schools. Not to be substituted for Design in the Crafts I or II. Pr.: Art 170.
- 290. Lettering.** (2) I. Creative design in the field of lettering in relation to historic and modern forms. Pr.: Art 100.
- 300. Intermediate Design.** (2) II. Theory of color and design. Special emphasis on abstractions and non-subjective motifs and their influence in contemporary design. Pr.: Art 200.
- 315. Costume Illustration.** (3) II. The current fashion figure, use of swipe files, fashion layout, and rendering techniques for reproduction. Pr.: Art 190, 220, or consent of instructor.
- 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, 220.

- 325. Fashion Life Sketching.** (2) II. The professional fashion approach to the live model; various media; fashion posture, drapery, silhouettes. Pr.: Art 190.
- 340. Interior Decoration II.** (3) I. The design of interiors. Scale drawings in elevation and perspective. Pr.: Art 240.
- 345. Home Furnishings.** (2) I. Refinishing, restyling, upholstering and/or slipcovering furniture; also designing and making draperies and lamp shades. Pr.: Art 240.
- 360. Design in the Crafts II.** (2) I, S. Further experience in the basic principles and techniques of crafts. Pr.: Art 100 and junior standing.
- 365. Weaving I.** (2) I, II, S. Principles of design, color, and texture applied to textile construction. Pr.: Art 100 or consent of instructor.
- 390. Drawing II.** (2) II. Cont. of Drawing I with creative work in water-color, casein, and oil. Pr.: Art 190.
- 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 190, 290, or consent of instructor.
- 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

- 490. Drawing III.** (2) II, S. Creative work in a variety of media. Individual needs of student given special attention. Pr.: Art 390.
- 560. Metalcrafts and Jewelry.** (2) I, S. Designing, raising, and stretching of hollowware in copper; design and execution of contemporary jewelry in precious metals including setting of semi-precious and precious stones. Pr.: Art 100 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. Advanced Design.** (2) II, S. Special emphasis on art structure; designs for textiles using modern commercial repeats. Pr.: Art 300.
- 620. Costume Design III.** (3) II alt. years. A cont. of Costume Design II. Factors in fashion trend and acceptance; commercial designing for the market. Pr.: Art 320 or consent of instructor.
- 640. Interior Decoration III.** (3) II and alt. S. Creative design of furnishings. Introduction to markets and selling. Decorator-client relationships. Qualifications of the professional decorator. Pr.: Art 340.
- 645. Historic Furniture Design.** (3) II, S. Design expressed in furniture in each of the great art periods. Pr.: Art 100.
- 660. Silversmithing.** (2) S. Advanced design and work in metal; design of flatware, hollowware and decorative silver. Pr.: Art 560 or consent of instructor.
- 665. Ceramics II.** (2) I, II, S. Advanced work in pottery design including experimentation with clay bodies, glazes, and proficiency in using the potter's wheel. Also ceramic sculpture. Pr.: Art 265 or consent of instructor.
- 690. Survey of Art I.** (3) I, S. The culture of various peoples and their homes as shown by their use of color, line, and form in architecture and sculpture and the minor arts. Pr.: Art 100.
- 695. Survey of Art II.** (3) II, S. The culture of various peoples as expressed in historic paintings. Pr.: Art 690.
- 740. Historic Fabric Design.** (3) I, S. Design employed in fabrics in each of the great art periods. Pr.: Art 100, C. & T. 260.
- 780. Problems in Design.** Credit arranged. I, II, S. Problems in design planned to meet the particular needs of the student. Pr.: Ten credit hours in art or consent of instructor and senior standing.
- 782. Problems in Interior Decoration.** Credit arranged. I, II, S. Problems planned with the student to meet particular needs. Pr.: Art 640 or consent of instructor.

785. Problems in Costume Design. Credit arranged. I, II, S. Problems planned with the student to meet particular needs. Pr.: Art 320 or consent of instructor.

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.

FOR GRADUATE CREDIT

980. Research in Art. Credit arranged. I, II, S. Research which may form the basis for the master's thesis in areas such as costume design, interior decoration, crafts, advanced design, and teaching art. Pr.: Graduate standing.

CLOTHING AND TEXTILES

JESSIE A. WARDEN,* *Head of Department*

Professors Latzke and Warden;* Associate Professors Bornemeier,* Cormany,* Howe* and Lienkaemper;* Instructor Drake; Emeritus: Associate Professor Hess*

The Department of Clothing and Textiles offers opportunities for study in textiles, socio-economics of clothing, clothing construction, and history of dress. Three options leading to a Bachelor of Science degree are provided for students interested in clothing: (1) retailing, (2) costume design, and (3) textiles research. Major work leading to the degree Master of Science is offered in clothing economics, applied dress design, history of costume, and textiles.

Facilities for study include well-equipped laboratories and instruments for the chemical and physical analysis of fibers and fabrics, an extensive library, and a well-trained staff actively engaged in research.

FOR UNDERGRADUATE CREDIT

131. Socio-economics of Clothing. (2) I, II. Clothing needs and practices of individuals and social groups; wardrobe planning and buying procedures.

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.

230. Fashion Merchandising I. (3) I. Factors which influence the merchandising of fashion goods. Pr.: C. & T. 131.

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. 102.

310. Tailoring. (3) I, II, and alt. S. Tailoring techniques; construction of a coat or suit based on a commercial pattern using the "dressmaker method." Six hours lab. a week. Pr.: C. & T. 210 or consent of instructor.

399. Honors Seminar in Clothing and Textiles. (1) II. Selected topics in clothing and textiles. 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

410. Demonstrating Construction Processes. (3) I and alt. S. Clothing standards, demonstration techniques, and use of new equipment and processes. For student preparing for teaching and extension work. Two hours rec. and two hours lab. a week. Pr.: Six credit hours clothing construction and junior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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 and Art 220, C. & T. 260 recommended.

- 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.
- 630. Clothing Economics.** (3) II, S. The organization of textile industries and markets; consumer problems in relation to market conditions. Pr.: Econ. 110.
- 635. Fashion Merchandising II.** (3) II. The processes involved in planning and controlling the operation of fashion departments. Pr.: C. & T. 230 and Marketing 440 or consent of instructor.
- 650. Intermediate Textiles.** (3) I, S. Current developments in textiles. Two hours rec. and two hours lab. a week. Pr.: C. & T. 260.
- 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.
- 680. Clothing and Textiles Seminar.** Credit arranged. I, 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.
- 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.
- 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.
- 750. Experimental Textiles.** Credit arranged. I, II, S. Pr.: C. & T. 655.
- 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.

FOR GRADUATE CREDIT

- 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.
- 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.
- 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 head of department.
- 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.

FAMILY AND CHILD DEVELOPMENT

MARJORIE STITH,* *Head of Department*

*Professor Kell; * Associate Professors McCord* and Stith; * Assistant Professor Holland; Instructors Davis and Kitterman; Emeritus: Professor Williams and Associate Professor Aldous*

This department offers opportunities for study of the child and his family, with a nursery school as a child development laboratory. For the student interested in homemaking, the 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) nursery school teaching and (2) community services. For the student interested in professional opportunities such as nursery school teaching,

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, the department offers work toward the degree Master of Science.

The facilities for advanced study include an excellent library with standard references and current research. A research room with one-way mirrors and intercommunication system provides opportunities for students to observe individuals or groups in an experimental setting. Through the cooperation of the community, opportunity is afforded for study of children and families.

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

- 250. Human Relations.** (2) Effects of family interaction on present social relationships. Introductory; for beginning students.
- 320. The Preschool Child.** (3) I, II, S. Introduction to principles of development and guidance of the preschool child in the home. Observation of and experience with children in nursery school. Two hours rec. and two hours lab. a week. Pr.: Sophomore standing or consent of department head.
- 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.
- 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.
- 399. Honors Seminar in Family and Child Development.** (1) II. Selected topics in family and child development. 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

- 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

- 605. Child Development.** (3) I, S. Professional approach to the development of preschool children; application of principles in nursery school. Pr.: F. C. Dev. 320.
- 615. Nursery School Procedures.** (3) II. Supervised participation in the nursery school, with opportunity for planning and directing the program. Consideration of administration. Six hours lab. and one hour conference. Pr.: F. C. Dev. 605.
- 630. Development and Guidance of Youth.** (3) I, II, S. 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.
- 635. Creative Experiences for the Preschool Child.** (3) II. 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. 320.
- 650. Developmental Experiences with Children and Parents.** Credit arranged. S. Utilizing varied opportunities for study of social interaction of children and their families in specific situations. Laboratory experience: day-care center; field work with parents and children. Pr.: F. C. Dev. 320 and consent of instructor.
- 655. Parent Education.** (2) II. Principles in child development and family relationships applied to professional group and individual work with parents. Pr.: F. C. Dev. 605 or 660.

- 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.
- 665. 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. 660 or consent of department head.
- 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 equiv.
- 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

- 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 Psych. 844, 820, F. C. Dev. 660 or consent of instructor.
- 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 head of department.
- 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*

This department prepares students for professional work in the areas of housing, household equipment, home management, consumer education, family finance, and family economics. Opportunity is also provided to combine training for homemaking with training for employment outside the home.

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. The three undergraduate options are: (1) Homemaking, (2) Family Economics and Family Finance, and (3) Housing, Household Equipment, and Home Management. Laboratories especially designed for teaching equipment and housing courses provide students with up-to-date facilities and equipment.

Work leading to the degree Master of Science is offered by this department. Graduate students can prepare to become advisers in home management houses, 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, and 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

- 160. Homemaking for Moderns.** (3) I, II. Improvements in home living made possible through application of basic principles of home econom-

ics. Efficient use of time, energy, money, and equipment in relation to goals of family living. Credit will not apply toward a degree in home economics.

- 200. Family Finance.** (2) I, II, S. Financial problems involved in the effective management of the family's resources.
- 300. Family Economics.** (3) I, II, S. Economic forces affecting families, and management by families of their economic resources. Pr.: Econ. 110 or equiv.
- 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.
- 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. Pr.: F. & N. 110.
- 399. Honors Seminar in Family Economics.** (1) I. Selected topics in family economics. 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

- 565. Home Management Laboratory.** (2) I, II, S. Residence in home management houses for one-half semester, or equivalent experience with consent of department. Arrangements must be made in advance of registration for enrollment. Pr.: F. Ec. 665 or conc. enrollment.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 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.
- 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.
- 620. Housing Requirements of Families.** (2) I, S. Housing requirements of families as influenced by their interests, activities, and socio-economic 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.
- 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.
- 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.
- 665. Home Management.** (2) I, II, S. Study of the use of family's resources toward maximum achievement of family's goals. Pr.: Junior standing.
- 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.
- 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.
- 710. Resources for Consumer Education.** (3 or 2) S. Survey and evaluation of the subject matter content of consumer education books, pamphlets and audio-visuals. Pr.: Educ. 550 or 752 or degree in social science.
- 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.
- 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

- 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. 600, 665; Econ. 110, Soc. 220, or consent of instructor. May be taken more than once with consent of head of department.
- 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

GWENDOLYN TINKLIN,* *Acting Head of Department*

Professors Goertz, Harrison* and Tinklin;* Associate Professors Alsop,* Browning* and Hunsader;* Assistant Professors Mullen* and Newell; Instructors Lambert and Wortham; Emeritus: Professor Ascham and Associate Professor McMillan*

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

- 110. Foods I.** (5) I, II. Principles of food preparation and food economics: experience in food preparation and meal service; one required meat demonstration during the semester. Three hours rec. and six hours lab. a week.
- 131. Introduction to Nutrition.** (2) I, II, S. Scope of nutrition and its relationship to the individual and society.
- 205. Meal Planning, Preparation, and Service.** (3) I. Selecting of foods and planning, preparing, and serving of meals; emphasis on organiza-

tion and management of time, money, and energy. Not open to students having credit in F. and N. 110. Two hours rec. and three hours lab. a week. Pr.: Two hours credit in food preparation.

240. Foods II. (3) I, II. Chemical and physical properties of food related to preparation and preservation. One hour rec. and six hours lab. a week. Pr.: Chem. 190, 191 or 350, 351, or Phys. 102, F. & N. 110 or 205.

250. Dietetics. (3) I, II. Principles of normal nutrition and practice in planning, adjusting, and preparing dietaries for specific individuals; energy, protein, mineral, and vitamin computation. Two hours rec. and three hours lab. a week. Pr.: F. & N. 131, Bot. 122 or Zool. 425, Chem. 190, 191 or 350, 351, or Phys. 102.

399. Honors Seminar in Foods and Nutrition. (1) II. Selected topics in foods and nutrition. May be taken more than once for credit: Pr.: For students in the honors program only.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

401. Principles of Nutrition. (3) I, II, S. Functions of various nutrients and their interrelationship in the body. Not open to foods and nutrition majors. Two hours rec. and three hours lab. a week. Pr.: F. & N. 240; Chem. 190, 191 or 350, 351; and Bot. 122 or Zool. 205.

405. Advances in Foods. (2 or 3) S. Recent developments in research related to foods. Pr.: Eight hours in foods and consent of head of department.

406. Advances in Nutrition. (2 or 3) S. Recent developments in research related to nutrition. Pr.: Five hours in organic chemistry, five hours in nutrition, or consent of head of department.

408. Food Purchasing and Management. (3) I, S. Purchasing and preparation of quality and nutritious food, and consideration of federal and state food laws. Six hours rec. and lab. a week. Pr.: F. & N. 240, Chem. 190, 191 or 350, 351, and Econ. 110.

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. 240 and senior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

605. Experimental Cookery. (3) I, II, S. Fundamental principles of food quality evaluation and development of an independent research problem. Pr.: F. & N. 240, Chem. 190, 191, or 350, 351.

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 head of department.

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. 250.

711. Diet Therapy. (2) II. Planning and preparation of special diets, and food requirements in pathological conditions. Four hours rec. and lab. a week. Pr.: F. & N. 706.

770. Advanced Foods I. (3) I. 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. 240.

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

- 801. Advanced Nutrition II.** (3) II, S. Current knowledge of metabolic functions of food in the human organism. Pr.: F. & N. 706.
- 807. Advanced Foods II.** (3) II. 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.
- 808. Research Techniques in Nutrition.** (3) I. Fundamental techniques relating to energy, protein, mineral, and vitamin metabolism. One hour rec. and six hours lab. a week. Pr.: F. & N. 801.
- 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.
- 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;* Assistant Professor Raffington; Emeritus: Professors Justin and Kramer; Assistant Professor Barnes*

FOR UNDERGRADUATE CREDIT

- 030. Home Economics Lectures.** I. Required for two semesters for juniors and seniors in all curriculums except Home Economics and Nursing and Restaurant Management. Students meet for vocational guidance, for consideration of professional opportunities and for special programs.
- 110. Introduction to Home Economics.** (1) I. Scope, progress and trends in home economics.

FOR GRADUATE CREDIT

- 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 School of Education. A student's program of graduate study includes 10 to 20 hours of courses in several departments or areas of home economics and 10 to 20 hours of courses in home economics education and related subjects, selected and apportioned according to her needs. A master's thesis or report is also 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 School of Education. The Education courses are 550 Methods of Teaching Home Economics, 750 Curriculum in Home Economics, 751 Methods in Adult Homemaking Classes, 752 Extension Teaching Methods, 827 Or-

ganization and Presentation of Home Economics, 829 Supervision in Home Economics, 837 Seminar in Home Economics Education, and 838 Research in Organization and Presentation of Home Economics—see page 208. 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's Office.

INSTITUTIONAL MANAGEMENT

GRACE M. SHUGART,* *Head of Department*

*Professor Shugart; * Associate Professors Edelblute,* Riggs and Zeigler; * Assistant Professor Hemphill; * Instructor 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 curriculums are offered: one in Dietetics and Institutional Management, leading to a Degree of Bachelor of Science in Home Economics, and one leading to the degree Bachelor of Science in Restaurant 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

200. Quantity Food Preparation. (2) II, S. Principles of quantity food preparation and service. Six hours lab. a week. Pr.: F. & N. 240.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

440. School Food Service. (3) I. Consideration given to problems of the school lunch and special meals, including the organization, administration, purchase of food and equipment, food costs, and menu planning. Two hours rec. and three hours lab. a week. Not open to students with credit in Ins. M. 200. Pr.: F. & N. 110.

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.: Quantity food preparation or consent of head of department.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Food Production Management. (3) I. Management of food production in institutions, including quality control, recipe standardization, portion and cost control, menu planning and work simplification. Campus food service units used as laboratories. One hour rec. and six hours lab. a week. Pr.: Ins. M. 200.

620. Institutional Food Purchasing. (2 or 3) I, S. Principles and methods of purchasing food in quantity. Selection of foods, specifications, storage procedures. Three hours rec. a week. Pr.: Ins. M. 200.

630. Institutional Equipment. (2 or 3) II, S. Selection, arrangement, installation and care of various types of equipment for institutional food service departments. Three hours rec. a week. Pr.: Ins. M. 200.

- 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. 600 or consent of instructor.
- 645. Organization and Management of Food Services Laboratory.** (2 to 5) II. Supervised experience in food service management in campus food services. Three hours lab. a week for each hour of credit. Pr.: Ins. M. 600 or consent of instructor.
- 650. Commercial Food Management.** (3) I. Management of commercial food services, with emphasis on merchandising, cost control, and the physical plant. Supervised experience in specialized operation. Two hours rec. and three hours lab. a week. Pr.: Ins. M. 640.
- 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, 645, or equiv.; consent of instructor.

FOR GRADUATE CREDIT

- 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. 600 or equiv. and consent of head of department.
- 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.
- 980. Research in Institutional Management.** Credit arranged. I, II, S. Pr.: Consent of instructor.

The College of Veterinary Medicine

ELDEN E. LEASURE,* *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, and second preference to applicants from states having no standard college of veterinary medicine. 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 30.

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 68 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 7:00 to 10:00 Monday, Wednesday, and Thursday evenings.

Fees for Veterinary Medical Students

Assessments

Per semester (16 weeks or more if enrolled in more than 6 hours)

	<i>Kansas residents or staff members</i>	<i>Non-residents</i>
1. Incidental	\$ 95.00	\$260.00
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	\$132.00	\$297.00

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, third-year students are encouraged to accept summer internships with practicing veterinarians, federal and state regulatory forces.

See the Graduate School section for the program leading to the M. S. and Ph. D. degrees.

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.

FIRST YEAR

FIRST SEMESTER			SECOND SEMESTER		
	Course	Sem. Hrs.		Course	Sem. Hrs.
Bact.	310 Vet. Microbiology	3	Bact.	340 Path. Bact. and	
Anat.	625 Anatomy I	7		Virology	4
Path.	600 Histology I	3	Anat.	635 Anatomy II	6
Chem.	420 G. Bio. Chemistry	5	Path.	602 Histology II	3
Engl.	090 English Proficiency	0	Physi.	635 Comp. Physiol. I	4
Gn. V. M.	140 Vet. Orientation	R			
Total		18	Total		17

SECOND YEAR

Bact.	370 Vet. Immunology	3	Physi.	650 Comp. Physiol. III	3
Physi.	645 Comp. Physiol. II	4	Path.	603 Pathology I	5
A. H.	240 Livestock Feeding	3	Physi.	675 Pharmacology II	3
Zool.	625 Ani. Parasitology	3	Path.	700 Ap. Vet. Parasit.	3
Physi.	670 Pharmacology I	4	Surg.	665 Therapeutics	3
Total		17	Total		17

THIRD YEAR

Path.	620 Pathology II	4	Path.	630 Pathology III	3
Path.	675 Clinical Path. Lec.	1	Surg.	615 Lrg. Ani. Surg. I	2
Gn. V. M.	690 Vet. Toxicology	3	Surg.	670 Sm. Ani. Surg.	2
Surg.	605 Princ. of Surgery	3	Surg.	680 Obst. and Breed. Dis.	5
Surg.	700 Clinics I	1	Surg.	710 Clinics II	1
Surg.	630 Diagnosis	2	Anat.	650 Topographic Anat.	1
Surg.	650 Dis. of Lrg. Ani. I	4	Surg.	660 Dis. of Lrg. Ani. II	4
Gn. V. M.	101 Jr.-Sr. Conf.	0	Gn. V. M.	110 Jr.-Sr. Conf.	0
Total		18	Total		18

FOURTH YEAR

Surg.	645 Radiology and Clinical Techniques	1	Surg.	770 Inf. Dis. of Lrg. Ani.	5
B. A.	101 Fundamentals of Business for Professional People	2	Path.	757 Poultry Hyg. and Dis.	3
Path.	751 Food Hygiene and Pub. Health I	3	Path.	753 Food Hygiene and Pub. Health II	4
Path.	740 Pathology IV	3	Surg.	730 Clinics IV	4
Surg.	625 Lrg. Ani. Surg. II	4	Surg.	680 Dis. of Sm. Ani.	2
Surg.	720 Clinics III	4	Path.	795 Necropsy and Clinical Path. Lab. II	0
Path.	785 Necropsy and Clinical Path. Lab. I	0	Gn. V. M.	130 Jr.-Sr. Conf.	0
Gn. V. M.	600 Vet. Ethics and Official Lvstk. Regulations	1			
Gn. V. M.	120 Jr.-Sr. Conf.	0			
Total		18	Total		18

Number of hours required for graduation: Pre-veterinary, 68; professional, 141; total, 209.

Extracurricular Electives

FIRST OR SECOND SEMESTER

Anat.	700	Special Anatomy	1 to 4 semester hours
Anat.	801	Avian Anatomy	2 to 4 semester hours
Anat.	810	Bovine Anatomy	2 to 4 semester hours
Anat.	820	Canine Anatomy	2 to 4 semester hours
Anat.	830	Anatomy of Lab. Animals	2 to 4 semester hours
Anat.	840	Reproductive Organ Anatomy	1 semester hour
Anat.	850	Anatomical Techniques	1 to 2 semester hours
Anat.	860	Microscopic Anatomy	1 to 4 semester hours
Anat.	870	Veterinary Mycology	1 to 4 semester hours
Path.	645	Veterinary Hematology	3 semester hours
Path.	690	Research in Anatomy	3 semester hours
Path.	710	Special Histology	3 semester hours
Path.	760	Pathological Technic and Diagnosis I	2 to 5 semester hours
Path.	770	Pathological Technic and Diagnosis II	2 to 5 semester hours
Path.	775	Advanced Food Hygiene	3 semester hours
Path.	780	Principles and Techniques of Research in Medical Investigation	4 semester hours
Path.	800	Pathology of the Diseases of Laboratory Animals	5 semester hours
Path.	802	Research in Pathology	1 to 6 semester hours
Path.	805	Pathology of Neoplasms	1 to 6 semester hours
Path.	810	Problems in Pathology	1 to 6 semester hours
Path.	815	Reproductive Organ Pathology	1 to 4 semester hours
Path.	820	Advanced Clinical Pathology	1 to 4 semester hours
Path.	825	Pathology of Body Fluids	4 semester hours
Path.	830	Pathology Seminar	1 semester hour
Path.	835	Veterinary Epidemiology	2 semester hours
Physi.	135	Principles of Animal Disease Control	3 semester hours
Physi.	665	Physiologic Constituents of Body Fluids	2 semester hours
Physi.	700	Physiology and Pharmacology of the Hormones	3 semester hours
Physi.	803	Seminar	1 semester hour
Physi.	815	Histophysiology of Nutritional Deficiencies	3 semester hours
Physi.	820	Research in Physiology	1 to 6 semester hours
Physi.	824	Physiology of Reproduction	3 semester hours
Physi.	825	Advanced Physiology	3 to 5 semester hours
Surg.	400	Diseases of Wildlife	3 semester hours
Surg.	740	Extra Clinics	1 semester hour
Surg.	801	Research in Surgery	1 to 6 semester hours
Surg.	810	Research in Medicine	1 to 6 semester hours
Surg.	820	Breeding Diseases	1 to 5 semester hours
Surg.	825	Systemic Medicine I	3 semester hours
Surg.	827	Systemic Medicine II	3 semester hours
Surg.	830	Surgical Techniques	1 to 6 semester hours

ANATOMY

D. M. TROTTER,* *Head of Department*

*Professor Trotter; * Associate Professor Cummings; Instructors Adrian and Hartke; Emeriti: Professors Burt* and 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

- 625. 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.: First-year standing in veterinary medicine. Staff.
- 635. Anatomy II.** (6) 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.
- 650. Topographic Anatomy.** (1) II. Dissections and demonstrations of regions of diagnostic and surgical importance of the domestic animals. Three hours lab. a week. Pr.: Third-year standing in veterinary medicine. Staff.
- 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

- 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.: Physi. 635 or consent of staff.
- 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.: Physi. 635 or consent of staff.
- 820. Canine Anatomy.** (2 to 4) I, II, S. Pr.: Physi. 635 or consent of staff.
- 830. Anatomy of Laboratory Animals.** (2 to 4) I of even numbered years and each S. Pr.: Physi. 635 or consent of staff.
- 840. Reproductive Organ Anatomy.** (1) II of even numbered years and each S. Pr.: Physi. 635 or consent of staff.
- 850. Anatomical Techniques.** (1 to 2) I of odd numbered years and each S. Pr.: Physi. 635 or consent of staff.
- 860. Microscopic Anatomy.** (1 to 4) II of odd numbered years and each S. Pr.: Physi. 635 or consent of staff.
- 870. Research in Anatomy.** (1 to 4) I, II, S. For graduate students in the field of anatomy.

PATHOLOGY

E. H. COLES, *Head of Department*

Professors Kitselman and West;* Associate Professors Burroughs,* Coles,* Folse,* Kelley,* Mebus,* Piper* and Weide;* Assistant Professors Anthony* and Nelson; Instructors Hibbs, Milleret and Mussman**

The Department of Pathology presents courses in histology, pathology, parasitology, and food hygiene and public health in the Veterinary Medicine curriculum. Instruction is by lecture, recitation, laboratory work, and demonstrations with visual-aid equipment. Practical necropsy experience is gained each afternoon in both mammalian and poultry pathology. Instruction in clinical pathology is required of fourth-year students each afternoon. Specimens from various species of domestic animals are collected for routine laboratory procedures including blood counts, blood chemistry, urinalysis, parasitology, and bacteriology.

Major work leading to the degree of Master of Science is offered in Pathology and the Doctor of Philosophy degree is offered in Veterinary Medicine (Pathology). Graduate training is offered in the areas of General Pathology, Clinical Pathology and Histopathology. Course work included at the graduate level includes pathological technic and diagnosis, advanced courses in clinical pathology and other areas of specialization including research.

Prerequisite to major work in this field is the completion of a four-year curriculum in veterinary medicine.

The facilities of the department for advanced work include a well-equipped clinical pathology laboratory, animal isolation units, a histology preparation laboratory, virus research laboratories, a diagnostic laboratory and lecture rooms. Fresh and preserved specimens for gross and microscopic studies are available as well as the opportunity for experimental work with animals in studying infectious diseases.

COURSES IN HISTOLOGY

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. Histology I.** (3) I. Origin, development, structure, and appearance of the various cells and tissues of the animal body. Particular attention is paid to the relationships between structure and function and to the fundamental similarities and differences of cells and tissues. One hour rec. and six hours lab. a week. Pr.: First-year standing in veterinary medicine.
- 602. Histology II.** (3) II. Origin, development, structure, and microscopic appearance of the various organs and systems of the animal. Particular emphasis is laid on the correlation of tissue distribution and regional function. One hour rec. and six hours lab. a week. Pr.: Path. 600.
- 710. Special Histology.** (3) I, II, S. Fundamental histological technics studied by means of problems. Nine hours lab. a week. Pr.: Path. 602.

COURSES IN PATHOLOGY

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 603. Pathology I.** (5) II. General pathology deals with the etiology, course, and termination of disease. Three hours rec. and six hours lab. a week. Pr.: Physi. 635, Path. 602, Chem. 420.
- 620. Pathology II.** (4) I. Special pathology, study of specific pathological processes occurring in the various organs of the body. Three hours rec. and three hours lab. a week. Pr.: Path. 603.
- 630. Pathology III.** (3) II. The pathology of infectious diseases. Two hours rec. and three hours lab. a week. Pr.: Path. 620.
- 645. Veterinary Mycology.** (3) I, S (even years). Detailed study of the etiology of cutaneous, subcutaneous and systemic fungus infections of animals, using histopathological examinations and culture studies. Two hours rec. and three hours lab. a week. Pr.: Bact. 310, Path. 630.
- 675. Clinical Pathology.** (1) I. The application of various laboratory test procedures to the diagnosis of animal diseases. Interpretation of data obtained and the practical application in the diagnosis of disease. One hour lec. a week. Pr.: Path. 603, Bact. 270.
- 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.
- 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.
- 740. Pathology IV.** (3) I. The epidemiology and differential diagnosis of infectious diseases. Three hours rec. and demonstration a week. Pr.: Path. 630.
- 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 examination of food-producing animals. Three hours rec. a week. Pr.: Path. 620, 630.
- 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 micro-organisms 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.
- 757. Poultry Hygiene and Diseases.** (3) II. The prevention, diagnosis, and treatment of poultry diseases. Three hours rec. a week. Pr.: Path. 740.
- 760, 770. Pathological Technic and Diagnosis I and II.** (2 to 5) I, II, S. Pathological technic, collecting, fixing, embedding in paraffin, and sectioning of tissues; methods of preserving gross specimens; practice in necropsy and laboratory diagnosis. Pr.: For I, Path, 603; for II, Path. 740, 760.
- 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, and meat and dairy products. Two hours lec. and three hours lab. a week. Pr.: Path. 753.
- 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.
- 785. Necropsy and Clinical Pathology Lab. I.** I. Credit in Clinics III. The necropsy and laboratory techniques applied to the diagnosis of animal diseases. Pathological examinations will include autopsies, biopsies, hematological, bacteriological, chemical, and parasitological diagnosis. Pr.: Surg. 700, 710, Path. 675. Open only to fourth-year students in veterinary medicine and graduate students.
- 795. Necropsy and Clinical Pathology Lab. II.** II. Credit in Clinics IV. Pr.: Surg. 700, 710, Path. 675, 785. Open only to fourth-year students in veterinary medicine and graduate students.

FOR GRADUATE CREDIT

- 800. Pathology of the Diseases of Laboratory Animals.** (5) I, S. The gross pathology and histopathology of the disease affecting the more common laboratory animals. Pr.: Path. 740 or consent of staff.
- 802. Research in Pathology.** (1 to 6) I, II, S. Individual research in the pathology of an animal disease problem. Pr.: Path. 740, 760. This work may form the basis for the master's thesis.
- 805. Pathology of Neoplasms.** (1 to 6) I, S. The study of the causation, histogenesis, and behavior of neoplasms. Pr.: D. V. M. degree or consent of staff.
- 810. Problems in Pathology.** (1 to 6) I, II, S. Work is offered in poultry diseases, parasitology, clinical pathology, food hygiene, public health, and pathology. Pr.: Path. 630, Physi. 645.
- 815. Reproductive Organ Pathology.** (1 to 4) I, II, S. Gross and histopathological studies of the reproductive organs, with special reference to the bovine. Pr.: Path. 740, Surg. 680.
- 820. Advanced Clinical Pathology.** (1 to 4) I, II, S. Further studies and application of the more detailed laboratory procedures and tests in hematologic, parasitologic, serologic, bacteriologic, chemic, and pathologic diagnosis. Pr.: Path. 760.
- 825. Pathology of Body Fluids.** (4) II, S. A detailed study of the alterations of the components of body fluids occurring in disease processes and interpretation of these changes. Three hours rec. and three hours lab. a week. Pr.: Path. 820 and consent of staff.
- 830. Pathology Seminar.** (1) I, II, S. Pr.: Consult department head.
- 835. Veterinary Epidemiology.** (2) I, S (odd years). The scope and objectives of epidemiologic principles relative to infectious and non-infectious diseases transmissible from animals to man, and the application of these principles by the use of case investigations. Two hours lec. a week. Pr.: Path. 740, 753.

PHYSIOLOGYG. K. L. UNDERBJERG, *Head of Department**Professor Underbjerg; Instructors Frey, Swanson and Upson; Dean Leasure**

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, pharmacology, and physiology and pharmacology of the hormones to veterinary and graduate students. An introductory course in anatomy and physiology is presented for agricultural and/or other students. 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. Demonstrations using radioactive isotopes are employed also.

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 Medicine (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.

Laboratories are available for the employment of radioactive isotopes using tracer technique for investigation in physiology and nutrition. There are ample facilities for housing large and small laboratory animals.

In addition to the Farrell Library the reference libraries in the department and the College of Veterinary Medicine are well supplied with material pertaining to physiology, nutrition, and related fields of medicine.

FOR UNDERGRADUATE CREDIT

131. Anatomy and Physiology. (3) I. Physiology of the domestic animal on digestion, absorption, metabolism, and excretion, sufficient anatomy to give a thorough understanding of the correlation between the two subjects and of the physiologic relations existing among the various organs of the body. Two hours rec. and three hours lab. a week. Adapted to students majoring in agriculture and other fields.

FOR UNDERGRADUATE AND GRADUATE CREDIT

635. Comparative Physiology I. (4) II. Physiology of the domestic animal; the blood, heart, and blood vessels, the ductless glands and internal secretions, respiration, digestion, and absorption. The laboratory exercises consist of a practical application of the knowledge derived in the classroom. Laboratory directions furnished the student. Three hours rec. and three hours lab. a week. Pr.: For veterinary students, Anat. 625, Chem. 350, 420; for others, an approved course in organic chemistry.

645. Comparative Physiology II. (4) I. The function of the urinary system and skin, fluid balance, metabolism, temperature regulation, muscular and nervous system, growth, and selected physiological experiments. Three hours rec. and three hours lab. a week. Pr.: Same as for Phys. 635.

- 650. Comparative Physiology III.** (3) II. This course deals with the nutrition, nutritional deficiencies, and nutritional requirements of farm animals; growth of animals; the autonomic nervous system as related to endocrine function; and endocrinology, with special emphasis on reproduction, milk secretion, water and mineral balances of farm animals. Three hours rec. a week. Pr.: Physi. 645.
- 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.
- 670. Pharmacology I.** (4) I. The sources, the action and fate of drugs in the animal body. Three hours rec. and one to three hours lab. a week. Pr.: Physi. 635.
- 675. Pharmacology II.** (3) II. The application of pharmacodynamic actions of drugs in animals. Two hours rec. and three hours lab. a week. Pr.: Physi. 670.
- 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

- 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.
- 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.
- 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.
- 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.
- 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 Frick and Mosier; Associate Professor Noordsy; Assistant Professors Catlin, Christensen, Larsen, Oehme, Guffy and Kirkbride; Instructors Carnahan and Rhoades; Emeritus: Professor Frank

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, cats, etc. Members of the clinical staff, accompanied by students, operate four ambulatory cars and 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.

Third- and fourth-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, fourth-year students are required to serve a two-week internship in the veterinary hospital during which time they are responsible for the various management phases of a modern hospital.

Major work leading to the degree of 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 work in surgery or medicine.

COURSES IN SURGERY

FOR UNDERGRADUATE CREDIT

135. Principles of Animals 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. per credit. Pr.: A. H. 101 or equiv., Physi. 131, and sophomore standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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.: Third-year standing in veterinary medicine.

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.

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.

670. Small Animal Surgery. (2) II. Description and application of practical surgery on small animals, including anesthesia. Two hours rec. a week. Pr.: Third- or fourth-year standing in veterinary medicine.

FOR GRADUATE CREDIT

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.

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

680. Obstetrics and Breeding Diseases. (5) II. Physiology of reproduction; principles of normal and abnormal parturition; special attention given to handling of reduced fertility. Five hours rec. a week. Pr.: Third-year standing in veterinary medicine.

FOR GRADUATE CREDIT

820. Breeding Diseases. (1 to 5) I, II, S. 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

- 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.
- 700-710. Clinics I and II.** (1) I, II, respectively. All species of domestic animals are treated at clinic. Students assist in the restraint of animals, in bandaging, in compounding prescriptions, and in preparing antiseptics and other medicinal agents. Six hours lab. a week. Pr.: Third- or fourth-year standing in veterinary medicine.
- 720-730. Clinics III and IV.** (4) I, II, respectively. Diagnosis and treatment of hospital patients, including keeping clinical records, administering medicines, changing dressings on surgical wounds, X-ray technic, etc.; assisting clinicians in out-clinic work. Twelve hours lab. a week. Pr.: Fourth-year standing in veterinary medicine.
- 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 MATERIA MEDICA

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 665. Therapeutics.** (3) II. History of therapeutics and types of therapy, including biological, thermal, chemotherapeutic, antibiotic, fluid, hormones and vitamins. Three hours rec. a week. Pr.: Physi. 670.

COURSES IN MEDICINE

- 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.
- 630. Diagnosis.** (2) I. Differential diagnostic methods employed for the detection of disease. Two hours rec. a week. Pr.: Third-year standing in veterinary medicine.
- 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, third- or fourth-year standing in veterinary medicine.
- 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.
- 770. Infectious Diseases of Large Animals.** (5) II. Five hours rec. a week. Pr.: Surg. 660, fourth-year standing in veterinary medicine.

FOR GRADUATE CREDIT

- 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. Offered especially for graduates in veterinary medicine.
- 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.
- 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

- 101, 110, 120, 130. Junior-Senior Conference.** Required. 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.: Third- or fourth-year standing in veterinary medicine.
- 140. Veterinary Orientation.** Required. I. Lectures on introduction to veterinary medicine. One hour lec. a week. Pr.: First-year standing in veterinary medicine.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.: Fourth-year standing in veterinary medicine.
- 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 Extension

GLENN H. BECK, *Dean*

HAROLD E. JONES,* *Director*

PAUL W. GRIFFITH,* *Associate Director*

WILBER E. RINGLER,* *Assistant Director*

ROBERT A. BOHANNON,* *Assistant to Director*

M. E. STARK, *Administrative Assistant*

The Division of 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.

Extension education is made available to the people through two program areas within the Division of Extension; namely, the Cooperative Agricultural Extension and Continuing Education.

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 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 Extension Division 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 Extension. They become, in effect, assistant instructors without pay. Extension agents extend information through the newspaper, 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 conference 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 eight departments, described as follows:

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 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 and Shankland; Assistant Professors Graham, Parris, Tennant and Unruh; Instructors Dierking 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 extension service counties, 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 Burull and Hill; Instructors Kuehn, Norris, Springer and Titus

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 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, *Acting State Leader*

AGRICULTURAL ECONOMICS

JOHN A. NORDIN, *Head of Department*

NORMAN V. WHITEHAIR, *Assistant Head of Department*

Professors Coolidge, Nordin and Whitehair; Assistant Professors McReynolds, Overley, Schlender, Thomas and Treat; Instructors Bartlett, Frederick, Greene, Gronewoller, Guy, Hageman, Hamilton, Jacobs, McClelland, Means, Mullen, Parker, Pretzer, Smerchek and Trayer

AGRONOMY

FLOYD W. SMITH, *Acting Head of Department*

FRANK G. BIEBERLY, *Section Leader*

Professors Bieberly, Cleavinger, Lind and Smith; Assistant Professors Edelblute, Harper and Wright; Instructor Wilkins

ANIMAL HUSBANDRY

RUFUS F. COX, *Head of Department*

WENDELL A. MOYER, *Section Leader*

Professors Cox and Moyer; Assistant Professors McAdams and Zoellner; Instructor Westmeyer

DAIRY SCIENCE

CHARLES L. NORTON, *Head of Department*

Professor Norton; Associate Professor Bonewitz; Instructor Call

ENTOMOLOGY

HERBERT C. KNUTSON, *Head of Department*

Professor Knutson; Associate Professor Gates; Assistant Professor Halazon

HORTICULTURE AND LANDSCAPE ARCHITECTURE

ROBERT P. EALY, *Head of Department*

HAROLD G. GALLAHER, *Section Leader*

Professors Amstein and Ealy; Associate Professors Gallaher and Roberts; Assistant Professors Basham, Kepler and Parks; Instructors Atchison, Biswell, Gould, Grey, Shreve, Slusher and Strickler

PLANT PATHOLOGY

STUART M. PADY, *Head of Department*

Professor Pady; Associate Professor King; Instructor Willis

POULTRY SCIENCE

THOMAS B. AVERY, *Head of Department*

Professor Avery; Assistant Professor Adams

VETERINARY MEDICINERALPH L. KITCHELL, *Dean**Professor Kitchell; Associate Professor Osburn*

These departments 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. The department has charge of the scheduling of judges for county and local fairs.

EXTENSION PROJECTS

The agricultural specialists of the Division conduct extension schools during the winter months. A portion of this time is devoted to cooperative demonstration work in agriculture, home economics, and 4-H club work. During the remainder of the year, they conduct extension programs in soil management and crop production, plant pathology, horticulture, animal husbandry, dairying, veterinary medicine, poultry science, entomology, farm management, farm forestry, soil conservation, landscape gardening, and wildlife management. This phase of the work of the extension specialists is supplemented by cooperative demonstration work. In much of the cooperative work, each specialist has 10 or more cooperators in each county. These men and women work under the direction of the specialists and the county extension agents. They keep records of the work, and demonstration meetings are held at their farms or homes.

The extension specialist takes to the farm and the farm home the results of research work of the Agricultural Experiment Station and the United States Department of Agriculture in a practical, effective, and usable form. He brings back reports of the progress of demonstration work in the field. Likewise he often comes in contact with agricultural problems requiring the attention of research workers.

ENGINEERING EXTENSIONJOHN M. FERGUSON, *Head of Department**Professors Ferguson, Stover; Associate Professors Herpich, Wendling; Assistant Professors Fitzgerald, Miles, Schindler, Selby, Smythe and True*

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 Professors Trieb and Wilkowske; Assistant Professors Banks, Jackson, McDonald and Walker

FLOUR AND FEED MILLING INDUSTRIES

JOHN A. SHELLENBERGER, *Head of Department*

ROBERT W. SCHOEFF, *Section Leader*

Professors Schoeff and Shellenberger; Instructor Stevens

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

MAE BAIRD, *Head of Department*

Professors Baird and Koenig; Associate Professors Ellithorpe, Johnson, Self and Wiggins; Assistant Professors Anderson, Atkinson, Briggs, Brill, Dickinson, Hawes, Hobble, Miller, Pass, Starkey and Urich; Instructors Jones and Neufeld; Emeritus: Professors Allen, Myers and Smurthwaite

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 county 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, 1962, all 105 Kansas counties had appropriations for Home Economics Extension Work, with 116 home economics agent positions.

BOYS' AND GIRLS' CLUB WORK

ROGER E. REGNIER, *Head of Department*

Professors Buset and Regnier; Associate Professor Hanna; Assistant Professors Apel, Bates, Egestone, Honstead and Tomkinson; 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 1,300 clubs with 32,000 club members located in every county of the state.

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 21 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, 107 Kansas 4-H Club members have lived for periods of up to six months with farm families in 43 foreign countries around the world. Two hundred thirteen youth from 54 foreign countries have lived in 563 Kansas host family homes. Kansas has sent and received more "IFYE's" than any other state.

COMMUNITY AND PUBLIC AFFAIRS

WILBER E. RINGLER, *Acting State Leader*

AGRICULTURAL ECONOMICS

JOHN A. NORDIN, *Head of Department*

NORMAN V. WHITEHAIR, *Assistant Head of Department*

Professors Nordin, Ringler and Whitehair; Associate Professor Bevins; Assistant Professors Frazier and Ross; Instructors Cram and Knox

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*

Professors Norby and Trent; Associate Professors Hagans and King; Assistant Professors Blankenhagen, Cox, Dicken, Dodrill, Hoss, McGaugh, Sughrue and Wells; Emeritus: Professors Laird, Blecha 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-three counties have club agent positions. There are 17 assistant and associate agent positions, making a total of 260 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.

CONTINUING EDUCATION

ROMAN J. VERHAALLEN, *Head of Department*

*Professor Verhaalen; * Associate Professor Kitchens; Assistant Professors Booton, Davison, Ferguson, Miller and Mordy; Instructors Bryson, Gorton, McCullick, Pletcher, Sherman and Williamson; Emeritus: Professors Billings and Pattison*

The Department of Continuing Education provides opportunities for continuous learning to the people of Kansas, wherever they may be. It is concerned with extending, wherever practicable, credit and non-credit offerings in a wide variety of university subject matter fields. It offers educational opportunities for professional training in many areas, for fulfilling citizenship responsibilities, and for the development of appreciation and skills appropriate to the layman in science and in the arts. It also provides consultant service in the areas of group discussion, community improvement, and program planning.

OFFICE OF COMMUNITY-SPECIAL SERVICES

The Office of Community-Special Services has responsibility for offering a variety of adult education services to the people of Kansas. At the present time the following kinds of services are available to individuals, groups, communities, schools, and other organizations:

1. consultation and assistance on community organization and community improvement problems, and on adult education programs concerned with the liberal arts or public affairs,
2. leadership training, including workshops, institutes, and program planning aids for groups and organizations concerned with community improvement and adult education programming,
3. speakers on many topics from all departments of the University,
4. cultural improvement through programs such as the Kansas Rural-Urban Art Program, Music Education, World Affairs, and
5. specialized services cooperatively financed or financed by contract and grants such as RE Job Training and Safety, Civil Defense Course Writing, Civil Defense Seminars and Instructor Training.

OFFICE OF CONFERENCES AND SHORT COURSES

The Office of Conferences and Short Courses is responsible for the conduct of the Department'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 conferences 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) be financially self-supporting; and (4) have University or other facilities available. 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 academic discipline department.

Fees. Registration fees for conferences will vary to correspond with the total direct cost of the activity.

Refunds. (a) One hundred percent refund if cancellation of registration is received by official notification at least 48 hours prior to the time of the scheduled event. (b) No refund for cancellations received later than 48 hours before the time of the scheduled event.

EVENING COLLEGE AND OFFICE OF EXTENSION CLASSES

Evening College and Extension Classes are organized for groups of adults who wish to continue their education by the study of vocational, avocational, or cultural subjects. Through extension, many are raising the level of their professional training, qualifying for professional certification, or pursuing programs of in-service improvement.

Evening College. The Evening College offers on-campus credit courses for adults. Such courses carry residence credit.

Extension Classes. Extension classes are off-campus credit courses offered for adults.

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 of Continuing Education at Kansas State University, Manhattan, for the scheduling of the class.

Thirty semester hours of the work required for a bachelor's degree in the College of Arts and Sciences may be obtained by the completion of extension and/or correspondence courses. Extension credit in curricula offered by other schools at Kansas State University is limited only by the general requirement that 30 semester hours be taken in residence, 20 of which must be taken in the last 30 hours of the degree work.

Six semester hours of the work required for a master's degree in the College of Arts and Sciences may be obtained by the completion of extension courses.

Fee policy. (a) Fees for college credit courses, per semester hour, are:

Undergraduate resident	\$10.00
Undergraduate non-resident	\$14.00
Graduate resident	\$14.00
Graduate non-resident	\$18.00

(b) Fees for non-credit adult education courses are variable.

Refund policy. (a) The refund policy for credit Evening College and Extension Classes is:

1. 75 percent refund if application for refund is made before the second class meeting.
2. 50 percent refund if application for refund is made after the second class meeting and before one-third of the scheduled class meetings have expired.
3. No refund after one-third of the scheduled class meetings.

(b) Non-credit class fees are non-refundable unless, subsequent to acceptance of the fees, the service at the option of the College is not provided.

Extension Course Offerings. In addition to many courses listed by the academic discipline departments of the University, the Department of Continuing Education may offer the following courses on an extension class or Evening College 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 (CAC 300, Actg. 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 curricula 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 curricula 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 curricula 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 curricula 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 curricula in Architecture and Art and Painting.

CAR 14. Sculpture II. (2) Cont. of CAR 13.

OFFICE OF HOME STUDY

Supervised home study is individual tutoring by mail. A student is offered the opportunity of continuing his education at his own convenience and in his own home. The teaching is personal and individual.

A home study course consists of a series of lessons in which the student is usually assigned readings, studies, problems, and investigations, together with a list of questions based on a text and directions for a written report. When necessary, the home study syllabus supplements the text with additional subject material or analysis provided by the instructor.

Unless otherwise indicated in the syllabus, a college credit course contains eight assignments for each hour of credit (e.g., a three-hour course consists of twenty-four assignments). A one-half unit high school course has 20 assignments.

The questions accompanying each assignment are intended to help the student to a better understanding of the subject. After careful study of the assignment, the student is expected to answer the questions carefully and concisely in a written report which he is to mail to the Department of Continuing Education. The instructor reads the student's paper carefully and critically, marks it, and then returns it to the student with such comments, suggestions, and advice as may be necessary.

Time Allowance. The amount of time a student will need to spend on a home study course will depend on his ability, the extent and kind of his prior preparation, and the extent to which he concentrates on the work. In general, he can expect to spend on any course approximately the same amount of time he would need to spend on the equivalent course in residence.

While there is considerable difference between courses and between students, the average amount of time needed for each assignment in a college credit course is about five to seven hours, and in a high school credit course about four to five hours.

All new home study enrollments remain active for a period of 18 months from the date of enrollment. If a student has not completed his work within the prescribed time, his enrollment will be terminated.

Although a student may complete a course in considerably less than 18 months, he may not submit more than five assignments in one week. This means, then, that the student cannot complete a three-hour college credit course in less than five weeks, a high school credit course or a two-hour college credit course in less than four weeks, or a one-hour college credit course in less than two weeks.

College Credit. Credits earned from college courses taken through this department can be applied toward an undergraduate degree at Kan-

sas State University or other institutions in place of comparable courses offered in residence. However, any student who desires to use home study credit for a degree should consult the dean of his college to be sure that he is eligible and that the subject will satisfy degree requirements in his curriculum.

No more than 30 semester hours of credit earned by home study or extension classes may be applied toward a B. A. or B. S. degree in the School of Liberal Arts at Kansas State University.

Kansas State University and most other universities do not grant graduate credit for home study courses.

High School Credit and Diplomas. This department does not grant high school diplomas. If a student is interested in receiving credit toward a diploma by taking high school home study courses, he should make the necessary arrangements with the principal of the high school from which he plans to receive his diploma. It is advisable for the student to make such arrangements before he registers for any courses.

Teaching Certificates. This department does not issue teaching certificates; however, all the college credit courses offered by the Department of Continuing Education can be applied to teaching certificates within the requirements and limitations established by the State Department of Public Instruction. A student working toward a certificate should consult his superintendent of schools or the Director of Certification, State Department of Public Instruction, Topeka, for certification requirements.

Admission. Acceptance of an enrollment for a course offered by this department does not constitute official admission to Kansas State University. Students who are interested in study in residence should write directly to the Director of Admissions, Kansas State University.

Enrollment. Since home study instruction continues throughout the year, enrollment may take place at any time. To enroll, the student should send his application (which can be secured upon request from this department), together with the appropriate fees, to Home Study, Department of Continuing Education, Kansas State University. No transcripts of previous high school or college work are required.

When his application has been approved, the student will receive the syllabus for his course, together with instructions for preparing and submitting assignments.

Students are encouraged to enroll in only one course at a time. No more than two courses may be taken simultaneously unless the student shows that he has sufficient time to devote to his studies.

A student who is currently in residence at Kansas State University must have a permit from the dean of his college in order to enroll or submit lessons in a home study course.

A resident student at Kansas State University who enrolls or submits lessons in a home study course without his dean's written permission cannot receive credit for that course.

Fees.

A. For residents of Kansas:

- 1. College courses \$10.00 per credit hour
- 2. High school courses \$15.00 per ½ unit course

B. For non-residents:

- 1. College courses \$12.00 per credit hour
- 2. High school courses \$17.00 per ½ unit course

C. Refund or transfer of fees:

- 1. 75 percent of the enrollment fee will be refunded or transferred to another course for the same student if application for refund or transfer is received within three weeks after the date of enrollment and before any of the assignments have been submitted by the student.
- 2. 50 percent of the enrollment fee will be refunded or transferred to another course for the same student if application for refund or transfer is received within six months from the date of enrollment and before one-third of the assignments have been submitted by the student.

3. No refund or transfer will be made if application for withdrawal is received after six months have passed from the date of enrollment, or after one-third of the assignments have been submitted by the student.

Students are required to pay postage for lessons and letters sent to the department. Except in special cases (e.g., overseas air mail) the department assumes all other postage costs.

Textbooks. The department makes available to each student a list of books used in his courses, their prices, and the publishers of these texts. He may purchase the required textbooks from a local book store, directly from the publishers, or from the University Book Store, a private firm in Manhattan, Kansas.

Examinations. All credit courses require final examinations. The examination may be taken any Saturday morning in the offices of the Department of Continuing Education in Manhattan. College students living at a distance from Manhattan may take their final examinations at any of the other four state colleges, or at any of 23 special examination centers located throughout the state on specified dates. Further details with respect to examination centers and dates for examinations will be provided upon enrollment.

A college student who is working toward a degree at a school other than one of the five Kansas state colleges may take his examination under the supervision of his dean or other appropriate official of his college.

High school examinations are to be taken under the supervision of the principal of the high school where credit is to be accepted, or at the offices of Continuing Education in Manhattan.

A graduating senior who wishes to apply credit for a home study course toward his degree or diploma must complete his course and take his final examination at least three weeks before the date of his graduation. Any other student who wishes to have his grade recorded in the Registrar's office by a specific date must complete his course and take his final examination at least three weeks before that date.

Grades. The final grade which a student receives on completion of a home study course is based on both the quality of his written assignments and his final examination. The relative importance of the assignments and the final examination varies slightly from course to course and depends on the individual instructor. In general, the final examination counts very heavily—at least two-thirds—and a student who fails the final examination cannot receive a passing grade in the course.

Certificates and Transcripts. Upon successful completion of any college credit course, the student receives a certificate. This certificate is not an official transcript. A student desiring an official transcript of the college credits which he has earned by home study should write directly to the Registrar, Kansas State University.

Upon successful completion of any high school credit course, the student will receive a certificate, and the principal of the high school the student designates will receive a duplicate copy for his records.

Veterans. A veteran may enroll in home study courses under Public Law 550 during any period when he is not registered in a residence program; that is, residence and correspondence study cannot be pursued concurrently under Public Law 550. (A veteran who elects to pay his own fee may, of course, enroll in a home study course on the same basis and under the same regulations as any non-veteran student.)

Public Law 550 provides for reimbursement for home study fees, but does not provide any subsistence allowance for veterans enrolled in home study courses. A veteran desiring to enroll in a home study course should first seek information from and make application with the Veterans Service Office, Anderson Hall, Kansas State University, or his district Veterans Administration office.

United States Armed Forces Institute (USAFI). Kansas State University has a contract with the United States Government to furnish home study instruction to men and women in the armed services under the

USAFI plan. For further information servicemen should see the education officer of their unit or write to the United States Armed Forces Institute, Madison 3, Wisconsin.

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 AND LANDSCAPE ARCHITECTURE

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 Arts and Sciences

ECONOMICS AND SOCIOLOGY

110. Economics I. (3) Introductory study of the fundamental principles of production, distribution, and consumption of goods.

120. Economics II. (3) Cont. of Economics I. Pr.: Ec. So. 110 (Economics I).

180. Rural Sociology. (3) Social and cultural life of rural people; study of new problems in rural life and analysis of old problems as they are related to the developing ones.

220. Introduction to Sociology. (3) A study of the development and functioning of human groups; social and cultural patterns and processes. Pr.: Sophomore standing.

SCHOOL OF EDUCATION

202. Educational Psychology I. (3) 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 (General Psychology).

- 400. Educational Psychology II.** (3) The learning process, with special emphasis on the school environment, the teacher, and the evaluation of school learning. Pr.: Educ. 202 (Educational Psychology I) and junior standing.
- 474. Methods of Teaching in the Elementary School.** (3) Fundamentals of teaching all subjects commonly taught in the elementary grades; lesson planning and teaching procedures. Pr.: Educ. 200 (Principles of Elementary Education) and conc. enrollment in Educ. 475 (Teaching Participation in the Elementary School).
- 476. Methods of Teaching in the Secondary School.** (3) General principles of teaching applied to high school instruction; selection and organization of materials; methods and techniques; individual adaptation; organization and management of classroom. Pr.: Educ. 400 (Educational Psychology II) and senior standing.
- 610. Educational Sociology.** (3) 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 play-groups, and the various youth-serving agencies with the school. Pr.: Senior standing.
- CP 4. History of Education.** (3) History of education in the United States; study of political, economic and social forces influencing development of schools, private and denominational, as well as public.
- CP 5. Classroom Management.** (2) Practical helps for good classroom organization; records and reports; school atmosphere, motives and incentives; class routine and lesson planning in rural and urban schools; conduct of recitation. School laws which are of interest to teachers are included.
- CP 7. Educational Administration.** (3) Practices, procedures, and problems in administration and organization in elementary and in junior and senior high schools; frequent practical applications for school problems.
- CP 19. Essentials of Reading.** (3) To help elementary school teachers develop pupils' reading skills and pleasures; to stimulate interest and independent reading; to use diagnostic tests and remedial methods.

ENGLISH

- 100. Written Communications I.** (3) Basic freshman English composition and reading course; fundamentals of composition and rhetoric; analysis of thought, content, and style; practice in composition.
- 120. Written Communications II.** (3) Cont. of practice in composition; types of reasoning; emphasis on an investigative theme. Pr.: Engl. 100 (Written Communications I).
- 205. Business Letter Writing.** (3) Writing of adjustment, collection, credit and sales letters; principles of effective commercial writing. Pr.: Engl. 120 (Written Communications II).
- 251. English Literature I.** (3) From the early Britons through the end of the 17th century. Pr.: Engl. 120 (Written Communications II).
- 256. English Literature II.** (3) Through the 18th, 19th and 20th centuries. Pr.: Engl. 120 (Written Communications II).
- 270. American Literature I.** (3) Through Colonial, Revolutionary, and Romantic periods to the Civil War. Pr.: Engl. 120 (Written Communications II).
- 275. American Literature II.** (3) From Whitman to the present. Pr.: Engl. 120 (Written Communications II).
- CEN 370. Books and Men I.** (2) Introduction to great world classics from present to past. Pr.: Engl. 120 (Written Communications II).
- CEN 375A. Books and Men IIA.** (2) Cont. of CEN 370. Pr.: Engl. 120 (Written Communications II).

- 470. Literature for Children.** (3) Selecting, reading, and evaluating literature for children of various grades and ages, planned especially to meet the needs of mothers and of teachers of rural and grade schools. Pr.: Engl. 120 (Written Communications II).
- 475. Literature for Adolescents.** (3) Selecting, reading, and evaluating books for adolescents. For teachers in the junior and senior high schools and students of guidance for adolescents. Pr.: Junior standing.
- 775. Creative Writing.** (3) The writing of fiction, with special emphasis on the student's own practical writing problems of story construction, technique, and revision. Pr.: Permission of the instructor. (For permission to enroll, send a sample of your writing with your enrollment card.)

GEOLOGY AND GEOGRAPHY

- 100. General Geology.** (3) Structural and dynamic features of the earth; the rock-forming minerals; the rocks and their decay; a short history of the earth.
- 115. World Regional Geography.** (3) An introduction to the fundamentals of geography through an examination of the physical, cultural, and economic features of the world's major regions.
- C 207. Introductory Physical Geography.** (4) A study of the geographic factors of our physical environment: map fundamentals, climatic factors, land forms, natural vegetation, soils and water, and mineral resources. (The equivalent resident course includes one hour of laboratory.)

HISTORY

- C 115. Civilization I.** (3) Civilization of the world to 1650, with emphasis on Western civilization.
- C 130. Civilization II.** (3) Civilization of the world since 1650, with emphasis on Western civilization.
- C 165. United States Before 1865.** (3) A study of the beginnings of our country, its settlement, and its development to the end of the War between the States.
- C 170. United States Since 1865.** (3) The significant forces, movements, and personalities in the development of American life since 1865.
- C 165 and C 170 are the equivalent of the resident survey courses in United States history which are broken at 1877.
- 719. The South.** (3) Major trends and themes in the history of the American South. Pr.: Hist. C 165 or 251.
- 758. Latin American Nations.** (3) Economic, political, social, and cultural development in Latin American republics. Pr.: Three hours of American history or World history.

LIBRARY SERVICE

- CLS 1. Book Selection in the Public Library.** (3) Basic principles of selection; standard aids and book-reviewing publications; writing and evaluating book reviews and annotations. Pr.: Junior standing.
- CLS 2. Book Selection in the School Library.** (3) Basic principles of selection of books in relation to the reading ability and interests of elementary and secondary school students, and in relation to the school curriculum. Pr.: Junior standing.
- CLS 4. Reference.** (3) The scope of reference works; primary and essential reference tools in all fields; reference books in relation to other library materials; the reference worker and the library user. Pr.: Junior standing.
- CLS 5. School Library Administration.** (2) Methods of developing the library as an integral part of the school; organizing the library, public relations, personnel, and routine involved in the acquisition, care, and circulation of materials. Pr.: Junior standing.

Also applicable toward a high school librarian's certificate in the State of Kansas: Engl. 475, Literature for Adolescents.

MATHEMATICS

- CM 1. Solid Geometry.** (0) Pr.: Plane geometry and one unit of high school algebra.
- 100. College Algebra.** (3) Pr.: Plane geometry and one and one-half units of high school algebra.
- 150. Plane Trigonometry.** (3) Pr.: Plane geometry and one and one-half units of high school algebra.
- 220. Analytic Geometry and Calculus.** (4) Analytic geometry; differential and integral calculus of polynomials. Pr.: Math. 100 (College Algebra) and Math. 150 (Plane Trigonometry) or two years of high school algebra and one semester of trigonometry.

PHILOSOPHY

- 165. Introduction to Philosophy.** (3) A survey of the major problems of philosophy; consideration of their tentative solutions and implications for one's philosophy of life.

PHYSICAL EDUCATION

- CPE 1. Personal Hygiene.** (2) Course to meet the state requirements for certification of grade school teachers. No exact equivalent in residence; but in combination with Physical Education CPE 2 is equiv. to Ph. Ed. 356 (Personal and Community Health).
- CPE 2. Community Health.** (1) Course supplementing Physical Education CPE 1. No exact equivalent in residence; but in combination with Physical Education CPE 1 is equiv. to Ph. Ed. 356 (Personal and Community Health).
- CPE 3. Playground Activities.** (2) Organization and administration of playground activities; games suitable for different ages.
- CPE 4. Problems in Playground Activities.** (1) A written report on a subject or problem related to the student's interests. Pr.: CPE 3 or equiv. Together, CPE 3 and CPE 4 are equiv. to Ph. Ed. 380.

PHYSICS

- 135. Descriptive Meteorology.** (3) Atmospheric phenomena, meteorological instruments and their understanding from physical concepts. Application of meteorological knowledge to agriculture, engineering, and other aspects of everyday life.

POLITICAL SCIENCE

- CHC 1. Community Civics.** (2) Study and problems of local, county, and state governments.
- 220. American Government.** (3) National and state government, with emphasis upon Constitutional principles and basic structure.

PSYCHOLOGY

- 110. General Psychology.** (3) The study of human behavior: methods, findings, principles.
- 415. Psychology of Childhood and Adolescence.** (3) Learning to understand the behavior of children and adolescents through study of the development of structures, capacities, interests, and personalities; practical problems applied to successive phases of development. Pr.: Psych. 110 (General Psychology) and sophomore standing.

College of Commerce

BUSINESS ADMINISTRATION

- CBA 270. Accounting I.** (3) An introduction to accounting principles, financial statements, special journals, controlling accounts, and basic accounting for partnerships and corporations.
- CBA 271. Accounting II.** (3) A study of accounting principles and methods as applied to assets, liabilities, a voucher system, manufacturing operations, financial statement ratios, and miscellaneous items. Pr.: CBA 270 (Accounting I).

The combination of CBA 270 and CBA 271 is the equivalent of the resident course BA 272 (Introductory Accounting).

- 325. Business Law I.** (3) A study of law related to practical business problems. Coverage includes contracts, bailments, agency, partnership, corporations, and negotiable instruments.
- 325. Business Law II.** (3) Cont. of Business Law I.
- 350. Small Business Operation.** (3) Opportunities in business ownership; principles governing the starting of a small enterprise; importance, status, problems, and management of small business. Pr.: Ec. So. 110 (Economics I).
- 361. Cost Accounting.** (3) 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 (Principles of Accounting) or B. A. 272 (Introductory Accounting) or CBA 270 and CBA 271 (Accounting I and II).
- 371. Intermediate Accounting.** (3) Application of accounting principles to corporations: working papers; statement analysis; and basic accounting theory. Pr.: B. A. 272 (Introductory Accounting) or CBA 270 and CBA 271 (Accounting I and II).
- 431. Personnel Management.** (3) 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.: Ec. So. 110 (Economics I).
- 440. Marketing.** (3) 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.: Ec. So. 110 (Economics I).

College of Engineering

APPLIED MECHANICS

- 305. Statics.** (3) Composition and resolution of forces; equilibrium of force systems; application of the general laws of statics to engineering problems, including a study of friction and force analyses of simple structures, loaded cables, and machine elements; centers of gravity; moments of inertia. Pr.: Phys. 310 (Engineering Physics I); pr. or conc.: Math. 222 (Analytic Geometry and Calculus III) or Math. 232 (Calculus II).

ELECTRICAL ENGINEERING

- 395. Basic Electrical Engineering.** (4) Fundamentals of electric, magnetic, and electrostatic currents. Pr. or conc.: Phys. 311 (Engineering Physics II); Math. 222 (Analytic Geometry and Calculus III) or Math. 232 (Calculus II).

INDUSTRIAL ENGINEERING

- 339. Metals and Alloys.** (2) Structures and properties of engineering alloys; physical changes occurring during heat treatment and fabrication of metals. Pr.: Chem. 230 (Chemistry II).

MECHANICAL ENGINEERING

- CME 210. Engineering Drawing.** (2) The selection and use of drawing instruments; construction of geometrical figures; lettering; orthographic projections and sections; pictorial methods of representation.
- 211. Engineering Graphics I.** (2) Engineering lettering; use of drawing instruments; geometrical construction; sketching; theory of projections of points, lines, and planes; orthographic projections of solids on conventional projection planes and auxiliary planes; conventional sections; fundamentals of dimensioning, pictorial representations. Pr.: Plane geometry.

215. Descriptive Geometry. (2) Problems involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; practical applications of the principles involved; emphasis on developing the student's ability to visualize drawings in the third angle. Pr.: CME 210 (Engineering Drawing).

216. Engineering Graphics II. (2) Geometry of engineering graphics relating particularly to lines and planes, non-coplanar lines, intersections and development of surfaces and solids; perspective; problems for developing conceptual ability and for training in concentration and imagination. Pr.: M. E. 211 (Engineering Graphics I).

CME 220. Machine Drawing I. (2) Conventional representation; working drawings; dimensioning; reproduction of drawing; checking for errors; arrangement of title and notes; sheet and metal drafting; single perspective. Pr. or conc.: M. E. 215 (Descriptive Geometry).

CME 210 (Engineering Drawing) and CME 220 (Machine Drawing I) may not be used to fulfill engineering degree requirements at Kansas State University.

CME 230. Mechanism. (3) A careful study of the fundamental elements of machinery with reference to the transmission of motion and force, and to their forms and arrangements in actual machines. Pr.: Math. 150 (Plane Trigonometry) and M. E. 215 (Descriptive Geometry).

College of Home Economics

FAMILY AND CHILD DEVELOPMENT

630. 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).

High School Credit Courses. These courses are offered as an aid to those who may be temporarily out of high school, who may not find the courses which they desire offered locally, or who wish to earn high school credit during vacation periods. The courses will be especially advantageous to prospective college students who have entrance deficiencies.

The credits issued by this department are recognized by colleges and universities and by the State Board of Education in Kansas.

The attempt has been made to have each home study course parallel the comparable course offered by the accredited high schools of the state.

Each course carries a $\frac{1}{2}$ unit of high school credit.

AGRICULTURE

	<i>Unit H. S. credit</i>
PCA 1. Elementary Agriculture I	$\frac{1}{2}$
PCA 2. Elementary Agriculture II	$\frac{1}{2}$

COMMERCE

PCM 7. Bookkeeping I	$\frac{1}{2}$
PCM 8. Bookkeeping II	$\frac{1}{2}$

DRAWING

PCD 3. Shop Mechanical Drawing I	$\frac{1}{2}$
PCD 4. Shop Mechanical Drawing II	$\frac{1}{2}$

ENGLISH

PCE 1C. Grammar and Composition (first semester, first year)	$\frac{1}{2}$
PCE 2L. Literature (second semester, first year)	$\frac{1}{2}$
PCE 3C. Composition (first semester, second year)	$\frac{1}{2}$
PCE 4L. Literature (second semester, second year)	$\frac{1}{2}$
PCE 5C. Composition (first semester, third year)	$\frac{1}{2}$
PCE 6L. Literature (second semester, third year)	$\frac{1}{2}$
PCE 7C. Composition (first semester, fourth year)	$\frac{1}{2}$
PCE 8L. Literature and Composition (second semester, fourth year)	$\frac{1}{2}$

HISTORY AND CIVICS

PCH 5.	American History I	1/2
PCH 6.	American History II	1/2
PCH 7.	Community Civics	1/2
PCH 8.	Constitution of the United States	1/2
PCH 9.	World History I (not open to students who have had Ancient History)	1/2
PCH 10.	World History II	1/2

MATHEMATICS

PCM 1.	Algebra I (first semester, first year)	1/2
PCM 2.	Algebra II (second semester, first year)	1/2
PCM 3.	Algebra III (second-year course)	1/2
PCM 4.	Plane Geometry I	1/2
PCM 5.	Plane Geometry II	1/2
PCM 6.	Solid Geometry	1/2

SCIENCE

PCS 1a.	Physical Geography	1/2
PCS 4.	Physiology	1/2
PCS 5a.	General Science I	1/2
PCS 5b.	General Science II	1/2

SOCIAL SCIENCE

PCS 1b.	Geography of Nations	1/2
PCC 2.	Elementary Economics	1/2
PCC 3.	Elementary Sociology	1/2
PCC 4.	Elementary Psychology	1/2

Non-credit Courses. All the home study courses of this department are available to the student on a non-credit basis regardless of his previous academic experience. Should it seem to this department that he lacks sufficient background for the particular course in which he is interested, he will be so informed. The department 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 cooperative 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 textbooks.
- 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 establishments and operation of day care centers, cooperative nursery groups, play groups, or nursery schools. 24 assignments. \$25.00, exclusive of textbooks.
- 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 textbooks.

GENERAL SERVICES

For further information about the offerings of the Department of Continuing Education write to the Head, Department of Continuing Education, Division of Extension, 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 of Development (1964). B. A., 1958, Kansas State University.
- 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 (1916-1947, 1957).
- BEATTY, DANIEL D., Business Manager; Professor of Business Administration (1956, 1959). A. B., 1947, Hope College; M. B. A., 1948, University of Michigan.
- *BEVAN, WILLIAM, Vice-President for Academic Affairs (1959, 1963). A. B., 1942, Franklin and Marshall College; M. A., 1943, Ph. D., 1947, Duke University.
- BLACK, ELLYN MARIE, Instructor, University Library (1957, 1958). B. S., 1938, Kansas State Teachers College of Emporia.
- BLACKBURN, RICHARD D., Director, Kansas State Union (1963). B. S., 1950, Kansas Wesleyan University; M. S., 1956, University of Colorado.
- BROOKOVER, WILLIAM HARRISON, Residence Hall Director; Instructor (1962). B. S., 1950, B. S., 1951, Kansas State University; M. S., 1958, Kansas State Teachers College, Emporia.
- 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, Assistant Professor, Emeritus, University Library (1927, 1955). A. B., 1912, Eureka College; B. L. S., 1924, University of Illinois.
- CIRCLE, DUNCAN, Instructor; Assistant to the Dean, Office of Admissions and Records (1963). B. S., 1952, M. S., 1957, Kansas State University.
- *DANSKIN, DAVID G., Director, Counseling Center; Associate Professor of Psychology (1959). 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.
- DERBY, GRACE EMILY, Professor, Emeritus, University Library (1911, 1950). A. B., 1905, Western College for Women.
- DEWEESE, PAUL F., Director of Sports Information; Assistant Professor of Technical Journalism (1948, 1953). B. S., 1947, Kansas State University.
- DODGE, THEODORE O., Assistant Professor; Director, Budget Office (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.
- *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.
- FORD, KENNEY LEE, Associate Alumni Secretary (1928). B. S., 1924, M. S., 1932, Kansas State University.
- FOSTER, JAMES M., Assistant Director for Research; Instructor, Counseling Center (1964). B. S., 1956, M. S., 1957, Kansas State Teachers College, Pittsburg.
- FRIESEN, WALTER S., Assistant Professor, Counseling Center; Counselor; Instructor in Psychology (1961). A. B., 1953, Tabor College; M. S., 1957, Kansas State Teachers College; Ed. D., 1963, Colorado State College.
- *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., Professor; Administrator of Physical Plant (1923, 1959). B. S., 1923, University of Nebraska; M. S., 1929, Kansas State University.
- GOERTZEN, ERNEST JACOB, Assistant Professor, University Library (1957, 1962). A. B., 1947, Bethel College; M. S. in L. S., 1957, University of Illinois.
- HEERMANCE, THEODORE W., Assistant Dean of Students, Assistant Professor (1964). B. A., 1934, Yale University; M. S., 1946, University of Minnesota.
- HESS, H. DEAN, Executive Alumni Secretary (1961). B. S., 1950, Kansas State University.
- HEYWOOD, KENNETH M., Director of Development (1956). B. S., 1938, Kansas State University; M. A., 1949, University of Wyoming.
- *HOWE, HAROLD, Dean of Graduate School Emeritus; Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1935, 1945). B. S., 1922, Kansas State University; M. S., 1923, University of Maryland; Ph. D., 1937, University of Wisconsin; LL. D., 1950, St. Benedict's College.
- 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 Professor, Counseling Center; Counselor; Assistant Professor of Psychology (1954). A. B., 1949, Wheaton College; M. S., 1953, Kansas State University; Ed. D., 1963, University of Maryland.
- KENNEDY, HAROLD W., Director, Aids and Awards Office (1961). B. S., 1949, Colorado State University; M. S., 1962, Kansas State University.

*Graduate faculty.

- KERR, WENDELL ROBERT. Veterans Service Officer and Assistant to Director of Housing; Assistant Professor of Education (1947, 1957). B. S., 1947, M. S., 1957, Kansas State University.
- *KRAUS, JOE W., Professor, Director of Libraries (1962). A. B., 1938, Culver-Stockton College; B. S. in L. S., 1939, M. A., 1941, Ph. D., 1960, University of Illinois.
- LACY, JR., BURRITT S., Consulting Psychiatrist, Student Health Center (1964). B. A., 1941, Harvard University; M. D., 1944, Cornell University.
- LAFENE, BENJAMIN WILLIAM, 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, Assistant Director of Placement (1962). 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.
- MATHEWS, JAMES C., Instructor, University Library (1958). B. S., 1952, Kansas State College of Pittsburg; M. S. in L. S., 1956, Kansas State Teachers College of Emporia.
- MAY, WILLIAM D., Instructor, University Library (1962). B. S. A., 1951, University of Arkansas; B. D., 1958, Southern Baptist Theological Seminary, Texas; Th. M., 1961, Southern Baptist Theological Seminary, Kentucky; M. A. in L. S., 1962, Indiana University.
- MCCAIN, JAMES ALLEN, President (1950). A. B., 1926, LL. D., 1951, Wofford College; M. A., 1929, Duke University; Ed. D., 1946, Stanford University.
- MILBOURN, MAX W., Assistant to the President; Associate Professor of Journalism (1949, 1957). A. B., 1938, University of Wichita.
- OWSLEY, CAROL LEE, Instructor, University Library (1942, 1947). B. S., 1932, M. S., 1947, Kansas State University.
- *PARKER, S. THOMAS, Director of Computing Center; Professor of Mathematics (1947, 1951). B. A., 1931, M. A., 1933, 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.
- FERRY, 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; Director, Placement Center; Associate Professor (1953). B. S., 1947, M. S., 1950, Kansas State University; Ph. D., 1953, University of Wisconsin.
- PRUSOK, RALPH E., Associate Dean of Students, Men's Affairs; Assistant Professor; Assistant Dean of Students (1963). A. B., 1952, Union College; M. A., 1960, Ph. D., 1964, State University of Iowa.
- *PUGSLEY, ALBERT LEROY, Vice President; Professor of Structural Engineering (1943, 1963). B. S. in C. E., 1930, Sc. D., 1961, South Dakota State College; M. Arch., 1934, Harvard University; LL. D., 1960, Kansas Wesleyan University. Professional Engineer. Registered Architect.
- PYLE, CALVIN A., Assistant Professor, Student Health Center (1963). B. A., 1929, Pacific Union College; M. D., 1943, Loma Linda University.
- RICHTER, EDWARD A., Instructor, University Library (1960). B. S., 1951, South Dakota State College; M. L. S., 1955, University of Minnesota.
- 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.
- ROCHIAT, CARL ROBERT, Director of News Bureau; Associate Professor of Journalism (1953, 1954). B. S., 1940, Kansas State University; M. S., 1948, University of Illinois.
- 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.
- SCHMIDT, ALICE ANN, Instructor, University Library (1959). B. A., 1955, College of Emporia; M. S. in L. S., 1959, Western Reserve University.
- SHONYO, ELWYN S., Physician, Student Health Center (1962). B. S., 1933, Kansas State University; M. D., 1937, University of Chicago and Rush Medical College; M. S., 1948, Mayo Foundation, University of Minnesota.
- SIDHU, KARAMJIT S., Instructor, University Library (1962, 1963). A. B., 1957, Khalsa College; M. S., 1962, Kansas State University; M. S. in L. S., 1963, Kansas State Teachers College, Emporia.
- SIGG, ROBERT J., Instructor; Assistant to the Dean, Office of Admissions and Records (1959). B. S., 1953, M. S., 1958, Kansas State University.

*Graduate faculty.

- *SINNETT, E. ROBERT, Assistant Director, Counseling Center; Counselor; Associate Professor of Psychology (1962). A. B., 1948, University of Iowa; M. A., 1950, University of Michigan; Ph. D., 1953, University of Michigan.
- SMITH, ROBERT C., Instructor, University Library (1962). B. S., 1952, Kansas State Teachers College, Emporia; M. A., 1960, University of Denver.
- SMITH, WALTER D., Assistant Director, Kansas State Union (1957). B. A., 1950, Kansas Wesleyan University.
- SPERRY, ROBERT E., Instructor, University Library (1963). A. B., 1954, University of Florida; M. A., 1957, M. S. in L. S., 1961, Florida State University.
- STEHLEY, DONALD R., Field Alumni Secretary (1961). B. S., 1950, Kansas State University.
- SWAIM, ROLAND Q., Assistant Professor; Director, Placement Center (1957, 1962). B. S., 1939, Kansas State Teachers College, Emporia; M. S., 1950, Kansas State University; Ed. D., 1962, University of Kansas.
- *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.
- THOMPSON, WILMA M., Residence Hall Director; Instructor (1960). B. S., 1960, Colorado State College.
- *THROCKMORTON, RAY IAMS, Dean and Director, Emeritus, Agriculture (1911, 1952). B. S., 1911, Pennsylvania State University; M. S., 1922, Kansas State University.
- TOWNSEND, ROBERT B., Assistant Professor, University Library (1964). B. S., 1951, University of Illinois; M. S. in L. S., 1962, University of Illinois.
- *TREMMELE, WILLIAM C., Director, Student Religious Activities; Associate Professor of Philosophy (1956, 1959). A. B., 1940, Denver University; Th. M., 1945, Th. D., 1950, Hiff School of Theology.
- 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.
- *WEBER, ARTHUR D., Vice President Emeritus; Director of International Activities (1924, 1963). B. S., 1922, M. S., 1926, Kansas State University; Ph. D., 1940, D. Sc., 1950, Purdue University.
- *WHAN, FOREST L., Professor; Director of Summer School and Institutional Research (1953, 1960). B. S., 1928, Kansas State University; M. A., 1931, University of Illinois; Ph. D., 1938, State University of Iowa.
- WILLIAMS, JANE P., Instructor, University Library (1960). A. B., 1949, Westminster College; M. A., 1954, George Peabody College.

College of Agriculture

- ABMEYER, ERWIN, Assistant Professor of Horticulture; Assistant Pomologist, Northeast Kansas Experiment Fields (1934, 1935). B. S., 1933, Kansas State University.
- *ACKER, DUANE C., Director of Resident Instruction, Agriculture; Associate Dean of Agriculture (1962). B. S., 1952, M. S., 1953, Iowa State University; Ph. D., 1957, Oklahoma 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.
- *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.
- *ANDERSON, LAUREL E., Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1953, 1958). B. S., 1947, M. S., 1953, Ph. D., 1956, University of Minnesota.
- 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.
- *AVERY, THOMAS B., Professor; Head of Department of Poultry Science; Poultry Scientist in charge, Agr. Exp. Sta. (1937, 1954). B. S., 1934, M. S., 1939, Kansas State University.
- AXELTON, MILBURNE 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 Science; Dairy Nutritionist, Agr. Exp. Sta. (1949, 1958). B. S., 1944, Allahabad University (India); M. S., 1946, Ph. D., 1949, Iowa State University.

*Graduate faculty.

- *BASSETTE, RICHARD, Associate Professor of Dairy 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., Dean of Agriculture (1936, 1961). 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.
- *BOHANNON, ROBERT A., Associate Professor; Assistant to the Dean of Agriculture (1951, 1961). B. S., 1949, Michigan State University; M. S., 1951, Kansas State University; Ph. D., 1957, University of Illinois.
- *BOREN, FRED W., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1957). B. S., 1946, A & M College of Texas; M. S., 1950, Kansas State University.
- BOWERS, SIDNEY A., Soil Scientist, U. S. D. A., Agricultural Research Service (1958). B. S., 1955, Brigham Young University; M. S., 1958, Kansas 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.
- 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, Michigan 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.
- BURKHARDT, CHRISTIAN C., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1951, 1955). B. S., 1950, M. S., 1951, Kansas State University.
- *CALL, LELAND E., Dean and Director, Emeritus (1907, 1946). B. S., 1906, M. S., 1912, Ohio State University.
- *CAMPBELL, RONALD W., Professor of Horticulture; Pomologist, Agr. Exp. Sta. (1946, 1961). 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., Associate Professor of Horticulture; Associate Floriculturist, Agr. Exp. Sta. (1953, 1958). B. S., 1949, University of Maryland; M. S., 1950, Ph. D., 1953, Michigan State University.
- *CASADY, ALFRED L., Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1949, 1962). B. S., 1948, M. S., 1949, Ph. D., 1962, Kansas State University.
- CLAPP, ALFRED L., Professor of Agronomy, Emeritus (1915, 1961). B. S., 1914, M. S., 1934, Kansas State University.
- *CLAYDON, THOMAS J., Associate Professor of Dairy Science; Associate Dairy Scientist, Agr. Exp. Sta. (1946). 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.
- CONGROVE, JAMES E., Instructor in Agronomy; Assistant Agronomist, North Central Kansas Experiment Field (1964). B. S., 1962, Kansas 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.
- *COX, RUFUS F., Professor, Head of Department of Animal Husbandry; Animal Husbandman in charge, Agr. Exp. Sta. (1930, 1950). B. S., 1923, Oklahoma State University; M. S., 1925, Iowa State University; Ph. D., 1941, Cornell University.
- *CRAIG, JAMES V., Professor of 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.
- DAVIDSON, FLOYD E., Professor of Agronomy; Agronomist, Newton Experiment Field (1934, 1952). B. S., 1933, M. S., 1941, Kansas State University.
- *DAVIS, CHARLES D., Professor of Agronomy, Emeritus (1921, 1949). B. S., 1921, M. S., 1926, Kansas State University.

- DePEW, LESTER J., Assistant Professor of Entomology; Assistant Entomologist (P. O. Garden City) (1954, 1959). B. S., 1949, Colorado A & M; M. S., 1954, University of Minnesota.
- DERTING, CLAUDE W., Instructor in Horticulture; Assistant Ornamental Horticulturist, Agr. Exp. Sta. (1962). B. S., 1960, Berea College; M. S., 1962, Clemson College.
- *DEYOE, CHARLES W., Associate Professor of Flour and Feed Milling Industries; 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., Assistant Professor of Plant Pathology; Nematologist, Agr. Exp. Sta. (1961). A. S., 1953, Arkansas Polytechnic College; B. S. A., 1953, 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.
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- *STICKLER, FRED C., Associate Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1954, 1958). B. S., 1953, Iowa State University; M. S., 1955, Kansas State University; Ph. D., 1958, Iowa State University.
- STINSON, T. BRUCE, Assistant Professor; Superintendent in charge, Tribune Branch Agr. Exp. Sta. (1924, 1952). B. S., 1924, Kansas State University.
- STUTEVILLE, DONALD L., Assistant Professor of Plant Pathology; 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.
- THOMPSON, CARLYLE A., Assistant Professor; Assistant in Soils, Fort Hays Branch Agr. Exp. Sta. (1964). B. S., 1958, M. S., 1959, Kansas State University.
- *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.
- 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 Flour and Feed Milling Industries; Agr. Exp. Sta. (1961). B. S., 1942, M. S., 1951, Kansas State University.
- *WARD, GEORGE M., Associate Professor of Dairy Science; Associate Dairy Scientist, Agr. Exp. Sta. (1955). B. S., 1941, University of Vermont; M. S., 1947, Rutgers University; Ph. D., 1950, Michigan State University.
- *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). B. S., 1942, M. S. 1951, Texas A & 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.
- WILKINS, HOWARD D., Instructor in Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1954). B. S., 1953, M. S., 1954, Kansas State University.
- WILLIAMS, GRADY F., Associate Professor; Associate Dairy Husbandman, Mound Valley Agr. Exp. Sta. (1959, 1963). B. S., 1949, M. S., 1957, Ph. D., 1960, Oklahoma State University.
- WILLIS, WILLIAM WAYNE, Assistant Professor of Horticulture, Emeritus (1944, 1961). A. B., 1912, College of Emporia.
- *WILSON, C. PEAIRS, Associate Dean of Agriculture; Director, Agr. Exp. Sta. (1938, 1956, 1962). B. S., 1938, M. S., 1940, Kansas State University; Ph. D., 1958, University of California.
- WINZER, JACK W., Instructor in Horticulture; Southeast Kansas Experiment Field (1963). B. S., 1957, M. S., 1959, Texas A & M College.
- WITHEE, LAURESTON VAN, Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1953, 1963). 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.

College of Architecture and Design

- BECKMAN, MORRIS HENRY, Associate Professor of Architecture (1948, 1956). B. S., 1937, Illinois Institute of Technology. Registered Architect in Illinois, 1938, in Arizona, 1948, in Kansas, 1949; Professional Engineer in Illinois, 1947.
- *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.
- COOL, VINCENT JUNIOR, Assistant Professor of Architecture (1957). B. S., 1951, Kansas State University. Registered Architect, 1952.
- *DEIBLER, GERALD WILLIAM, Assistant Professor of Drawing and Painting (1956, 1963). B. S., 1951, University of Nebraska; M. F. A., 1955, University of Colorado.
- *DEINES, VERNON PHILLIP, Assistant Professor of Architecture (1957, 1963). B. S., 1952, M. R. P., 1961, Kansas State University. 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; Head, Department of Horticulture; Horticulturist and Landscape Architect in charge, Agr. Exp. Sta. (1961). B. S., 1941, Oklahoma State University; M. S., 1946, Kansas State University; Ph. D., 1955, Louisiana State University.
- *FISCHER, EMIL CARL, Professor; Dean, College of Architecture and Design; Architect, Engg. Exp. Sta. (1955, 1963). A. B., 1929, Columbia College; B. S., 1932, M. S., 1933, Columbia University. Registered Architect, 1955.
- *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.
- *KRIDER, ALDEN, Professor of Architecture (1949, 1962). B. S., 1933, M. S., 1955, Kansas State University. Registered Architect in Missouri, 1945, in Kansas, 1949.
- *LARMER, OSCAR VANCE, Associate Professor of Drawing and Painting (1950, 1964). B. F. A., 1949, University of Kansas; M. F. A., 1955, Wichita University.
- LAY, K. EDWARD, Instructor in Architecture (1963). B. Arch., 1956, Pennsylvania State University. Registered Architect in Pennsylvania, 1961.
- McGRAW, EUGENE THOMAS, Assistant Professor of Architecture (1958, 1964). B. Arch., 1957, Oklahoma State University; M. R. P., 1963, Kansas State University.
- *MILLER, HAROLD JAMES, Assistant Professor of Architecture (1959, 1960). B. S., 1952, B. Arch., 1952, Kansas State University; M. Arch., 1960, University of Illinois. Registered Architect, 1952, Professional Engineer, 1952.
- MORSE, RICHARD HUGH, Instructor in Architecture and Assistant to the Dean (1964). B. S., 1951, Kansas State University. Registered Architect, 1954.
- *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.
- *SMITH, HERRICK, Assistant Professor of Landscape Architecture (1963). B. S., 1958, M. S., 1959, Cornell University; M. L. A., 1961, University of Georgia.
- THORSON, INGOLF EUGENE, Associate Professor of Architectural Engineering (1948, 1952). B. S., 1940, University of Washington. Professional Engineer in Washington, 1947.
- *TOMASCH, ELMER JOHN, Associate Professor of Drawing and Painting (1947, 1959). B. S., 1935, Western Reserve University; M. S., 1956, Kansas State University.
- *WEIGEL, PAUL, Professor of Architecture, Emeritus (1921, 1924, 1959). B. Arch., 1912, Cornell University. Registered Architect in New York, 1917, in Kansas, 1950.
- WENDT, EUGENE G., Instructor in Architecture (1962). B. Arch., 1959, Kansas State University.
- *WHITE, DONALD DAVIDSON, Associate Professor of Architecture (1960). A. B., Arch., 1942, University of Nebraska; M. C. P., 1948, Massachusetts Institute of Technology.

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.
- ADAMANY, RICHARD G., Assistant Professor of English (1962, 1963). B. A., 1952, M. A., 1957, Ph. D., 1962, University of Wisconsin.
- *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.
- *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, 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.
- *ANSDELL, ORA JOYE, Assistant 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.

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- ARENDDT, BILLY D., Instructor in Mathematics (1962). B. S., 1960, M. S., 1962, Iowa State 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.
- BACON, WILLIAM PRATT, Assistant Professor of Air Science (1962). B. A., 1937, Emporia State Teachers College; B. S., 1939, Kansas State University; M. A., 1948, University of California; Ed. D., 1953, University of California, Air Command and Staff College.
- BADGER, THOMAS J., Professor; Head, Department of Military Science (1962). B. A., 1949, George Washington University; Army Command and General Staff College, 1950.
- *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.
- *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.
- *BARTH, WERNER H., Associate Professor of History (1953, 1959). B. A., 1946, Baylor University; Ph. D., 1954, University of Texas.
- 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.
- *BEVAN, WILLIAM, Vice President for Academic Affairs; Professor of Psychology (1959, 1963). A. B., 1942, Franklin and Marshall College; M. A., 1943, Ph. D., 1948, Duke University.
- *BLATT, JEREMIAH L., Assistant Professor of Biophysics (1961). A. A., 1941, A. B., 1943, Ph. D., 1955, University of California at Los Angeles.
- *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.
- BRIGHT, CHARLES DeLOTTER, Assistant Professor of Air Science (1963). S. B., 1948, Massachusetts Institute of Technology; M. B. A., 1950, Harvard Graduate School of Business.
- *BROOKINS, DOUGLAS G., Assistant Professor of Geology (1962). A. B., 1958, University of California; Ph. D., 1963, Massachusetts Institute of Technology.
- BROWN, RICHARD ARNOLD, Assistant Professor of Military Science (1962). B. S., 1956, Kansas State College of Pittsburg; the Armored Officers Career Course.
- *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.
- BRYANT, JOEL WILLIAM, Assistant Professor of Military Science (1962). B. S. C. E., 1952, University of Arkansas; M. S. C. E., 1958, Ohio State University; the Engineer Officers Career Course, 1961.
- *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.
- CAGLE, GARY R., Instructor in Philosophy (1963). A. B., 1959, Monmouth College.
- CALDWELL, WALLACE FORD, Assistant Professor of Political Science (1961, 1964). A. B., 1956, Washington State University; M. A., 1961, University of Washington.
- CANTRELL, BETTY R., Instructor in Modern Languages (1963). Licence es Lettres, 1961, De l'Universite de Paris, La Sorbonne.
- *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.

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- *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.
- *CHELIKOWSKY, JOSEPH RUDOLPH, Professor; Head, Department of Geology and Geography (1937, 1955). B. A., 1931, M. A., 1932, Ph. D., 1935, Cornell University.
- CLARK, ELDON LAVERN, Assistant Professor of Military Science (1962). B. F. A., 1953, University of Kansas; The Infantry Officers Career Course, 1960.
- *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.
- CLARKE, ROBERT H., Assistant Professor of Political Science (1962). A. B., 1958, DePauw University; M. A., 1960, Princeton University.
- CLEARY, ELIZABETH, Instructor in Speech (1961). B. S., 1934, Boston University; M. S., 1961, Kansas State University.
- COHEN, PETER Z., Instructor in English (1961). B. S., 1953, M. A., 1961, University of Wyoming.
- 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, Assistant Professor of Chemistry (1961). B. A., 1954, Swarthmore College; Ph. D., 1957, University of Illinois.
- *CONSIGLI, RICHARD ALBERT, Assistant 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.
- *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.
- *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.
- *CURNUITE, 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 II., 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.
- *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.
- *DARNELL, DONALD K., Assistant Professor of Speech (1962). A. B., 1957, William Jewell College; M. A., 1960, Ph. D., 1964, Michigan State University.
- *DAVES, WALTER F., Assistant Professor of Psychology (1962). A. B., 1957, M. A., 1959, Emory University; Ph. D., 1963, Duke 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 (Pittsburg); M. B. A., 1934, Northwestern University.
- DENNING, DENNIS F., Instructor in Speech (1959). B. S., 1951, M. S., 1956, Kansas State Teachers College (Emporia).
- DeWITZ, ROY A., Assistant Basketball Coach (1964). B. S., 1958, Kansas State University.
- DIAZ, FABRI T., Instructor in Modern Languages (1963). A. B., 1963, Javeriana University.
- 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.
- DONER, JR., JAMES IAN, Instructor in Military Science (1960). B. S., 1959, University of Maryland.
- DONOVAN, ROBERT KENT, Assistant Professor of History (1964). B. A., 1954, Harvard University; M. A., 1958, M. A., 1963, Cambridge University; Ph. D., 1964, Harvard University.
- DOUGHERTY, EDWARD DONALD, Instructor in Military Science (1960). The Infantry Officers' Advanced Course.
- *DOUGLAS, LOUIS HARTWELL, Professor of Political Science (1949). A. B., 1931, Hastings College; M. A., 1937, Ph. D., 1949, University of Nebraska.
- *DRAGSDORE, RUSSELL DEAN, Professor of Physics; Physicist, Agr. Exp. Sta. (1948, 1956). S. B., 1944, Ph. D., 1948, Massachusetts Institute of Technology.
- DUGAS, PAUL, Instructor in Speech (1963). B. A., 1950, University of Miami; M. A., 1963, Miami University.
- 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.
- *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, Assistant 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, 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, University of Minnesota.
- *FARRELL, FRANCIS DAVID, President, Emeritus; Professor of Economics and Sociology (1918, 1943). B. S., 1907, Utah State College; Agr. D., 1925, University of Nebraska; LL. D., 1943, Washburn University.
- *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.
- *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, WALTER DUMMER, Professor of Economics; Economist, Agr. Exp. Sta. (1951, 1957). A. B., 1937, Harvard University; Ph. D., 1943, University of Chicago.
- *FOLAND, NEAL EUGENE, Associate Professor of Mathematics (1961, 1964). B. S., 1954, Northeast Missouri State College; M. A., 1958, Ph. D., 1961, University of Missouri.
- *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, JOHN F., Assistant Professor of History (1962). A. B., 1951, M. A., 1955, Ph. D., 1960, Harvard University.

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- FREER, WAYNE TYLER, Associate Professor of Military Science (1961). B. S., 1948, Adrian College; the Artillery Officers' Advanced Course.
- *FRENCH, NORMAN DuGARD, Assistant Professor of Economics (1951). B. S., 1948, M. S., 1950, University of Illinois.
- *FRENCH, WARREN, Associate Professor of English (1962). B. A., 1943, University of Pennsylvania; M. A., 1948, Ph. D., 1954, University of Texas.
- *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.
- *GAINNEY, 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.
- *GALLANAR, JOSEPH MILTON, Assistant Professor of History (1960). A. B., 1950, M. A., 1952, University of Washington; Ph. D., 1959, Johns Hopkins University.
- *GEYER, KATHERINE, Professor of Physical Education (1927, 1945). B. S., 1927, Ohio State University; M. A., 1934, Columbia University.
- *GIER, HERSCHEL THOMAS, Professor of Zoology; Associate Embryologist, Agr. Exp. Sta. (1947). A. B., 1931, Kansas State Teachers College (Pittsburg); Ph. D., 1936, Indiana University.
- *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.
- *GREENE, VICTOR ROBERT, Assistant Professor of History (1963). A. B., 1955, Harvard University; M. A., 1960, University of Rochester; Ph. D., 1963, University of Pennsylvania.
- *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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- *HAJDA, 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., 1954, Indiana University.
- *HALL, GEORGE L., Professor of Physics (1960, 1964). B. S., 1949, William and Mary College; M. S., 1951, Syracuse University; Ph. D., 1956, University of Virginia.
- *HAMMAKER, ROBERT M., Assistant Professor of Chemistry (1961). B. S., 1956, Trinity College; Ph. D., 1960, Northwestern 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.
- *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.
- *HAUSMAN, CARL R., Associate Professor of Philosophy (1953, 1963). A. B., 1949, University of Louisville; M. A., 1951, Duke University; Ph. D., 1960, Northwestern University.
- *HAYES, MORRIS DWIGHT, Associate Professor of Music (1957, 1961). B. M. E., 1947, M. M. E., 1948, University of Nebraska.
- HAYLETT, WARD H., Head Track Coach, Professor of Athletics, Emeritus (1928, 1963). A. B., 1926, Doane College.
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- HICK, SANDRA RAE, Instructor in Physical Education (1961). B. S., 1960, Mankato State University.
- *HIGGINSON, FRED HALL, Professor of English (1950, 1964). A. B., 1942, M. A., 1947, University of Wichita; Ph. D., 1950, University of Minnesota.
- *HIGHAM, ROBIN DAVID STEWART, Associate Professor of History (1963). A. B., 1950, Harvard College; M. A., 1953, Claremont Graduate School; Ph. D., 1957, Harvard University.
- *HILL, HOWARD TEMPLETON, Professor of Speech, Emeritus (1920, 1959). B. S., 1910, Iowa State University; J. D., 1917, University of Chicago.
- *HILL, RANDALL CONRAD, Professor of Sociology (1929, 1935). B. S., 1924, M. S., 1927, Kansas State University; Ph. D., 1929, University of Missouri.
- HOLLINGWORTH, GEORGE KENNETH, Assistant Professor of Air Science (1963). B. S., 1959, University of Colorado.
- *HOSTETTER, HELEN PANSY, Professor of Technical Journalism, Emerita (1926, 1964). A. B., 1917, University of Nebraska; B. S., 1940, Kansas State University; M. S., 1926, Northwestern University.
- *HOWE, FLORENCE VIRGINIA, Professor of Speech (1947, 1959). A. B., 1935, Elmira College; M. S., 1949, Ed. D., 1958, Boston University.
- *HULBERT, LLOYD C., Associate Professor of Botany; Ecologist, Agr. Exp. Sta. (1955, 1964). B. S., 1940, Michigan State University; Ph. D., 1953, State College of Washington.
- *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.
- JOHNSON, CHARLES E., Instructor in Mathematics (1962). B. S., 1960, University of Utah; M. S., 1962, University of Wisconsin.
- *JOHNSON, GEORGE DANA, Assistant Professor of Chemistry (1952). A. B., 1940, M. A., 1941, Oberlin College; Ph. D., 1946, University of Michigan.
- JOHNSON, JOHN RONALD, Instructor in Zoology (1963). B. S., 1960, Bethany College; M. S., 1962, Kansas State University.
- *JONES, DALE VINCENT, Associate Professor of English (1946, 1951). B. S., 1931, M. S., 1941, Kansas State University.
- JONES, JACK, Associate Professor of Military Science (1960). The Command and General Staff College.
- JULIAN, JOSEPH, Assistant Professor of Sociology (1963). A. B., 1958, San Francisco State College; M. A., 1960, University of Washington.
- *JUSSILA, CLYDE, Assistant Professor of Music (1949, 1952). B. M., 1949, University of Washington; M. S., 1951, Kansas State University.
- KADLEC, JOHN A., Assistant Football Coach (1960). B. S., 1951, M. A., 1952, University of Missouri.
- *KATZ, ROBERT, Professor of Physics; Physicist, Agr. Exp. Sta. (1949, 1956). B. A., 1937, Brooklyn College; M. A., 1938, Columbia University; Ph. D., 1949, University of Illinois.
- *KISER, ROBERT WAYNE, Associate Professor of Chemistry (1957). B. A., 1953, St. Ambrose College; M. S., 1955, Ph. D., 1957, Purdue University.
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- *KRAMER, CHARLES LAWRENCE, Assistant Professor of Botany; Assistant Mycologist, Agr. Exp. Sta. (1958). B. A., 1950, M. A., 1953, Ph. D., 1957, University of Kansas.
- *KRAUSE, GARY F., Assistant Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1963). B. S., 1958, M. S., 1959, Kansas State University; Ph. D., 1963, Virginia Polytechnic Institute.
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- *LAMBERT, JACK L., Associate Professor of Chemistry (1950, 1958). A. B., 1947, M. S., 1947, Kansas State College (Pittsburg); Ph. D., 1950, Oklahoma State University.
- *LANGFORD, ROY CLINTON, Professor of Psychology (1925, 1941). B. S., 1925, M. S., 1926, Kansas State University; Ph. D., 1934, Leland Stanford Junior University.
- *LANNING, FRANCIS C., Associate Professor of Chemistry (1942, 1961). B. S., 1930, M. S., 1931, University of Denver; Ph. D., 1936, University of Minnesota.
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- *LASH, MENDEL ELMER, Professor of Chemistry (1922, 1947). A. B., 1920, M. S., 1922, Ph. D., 1928, Ohio State University.
- *LASHBROOK, RALPH RICHARD, Professor; Head, Department of Technical Journalism (1934, 1944). B. S., 1929, Kansas State University; M. S., 1942, University of Wisconsin.
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- *LEAF, BORIS, Professor of Physics (1946, 1954). B. S., 1939, University of Washington; Ph. D., 1942, University of Illinois.
- *LEAVENGOOD, LUTHER OMAR, Professor; Head, Department of Music (1945). B. M., 1929, University of Kansas; M. M., 1936, University of Michigan.
- LEE, HORACE B., Professor; Director of Athletics (1956). A. B., 1939, Stanford University.
- LEE, RAY, Instructor in Military Science (1962).
- *LEEDHAM, GEORGE EDWIN, Associate Professor of Music (1949). B. M., 1938, Artist Diploma, 1938, Eastman School of Music (University of Rochester).
- LESLIE, GEORGE C., Instructor in Mathematics (1962). B. S., 1958, South Dakota State College; M. S., 1960, Kansas State University.
- *LIMPER, LOUIS HENRY, Professor of Modern Languages, Emeritus (1914, 1944). A. B., 1907, Baldwin-Wallace College; A. M., 1914, University of Wisconsin; Ph. D., 1931, State University of Iowa.
- LIVESAY, BILLY JOE, Instructor in Mathematics (1963). B. S., 1960, Oklahoma State University.
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- *LONG, GLENN WESLEY, Assistant Professor of Sociology (1938, 1945). A. B., 1926, Baker University; M. S., 1940, Kansas State University.
- *LORD, THOMAS HENRY, Professor of Bacteriology; Bacteriologist, Agr. Exp. Sta. (1941, 1952). B. S., 1936, University of Massachusetts; M. S., 1938, Ph. D., 1941, University of Illinois.
- *LYMAN, EVA CAROLINE, Associate Professor of Physical Education (1943, 1947). B. S., 1924, Battle Creek College; M. A., 1930, State University of Iowa.
- *LYON, ERIC ROSS, Associate Professor of Physics, Emeritus (1921, 1962). A. B., 1911, M. S., 1923, Phillips University.
- MACY, ELBERT BONEBRAKE, Associate Professor of Technical Journalism (1946, 1951). B. S., 1930, M. S., 1939, Kansas State University.
- MADDEN, JOHN LANGSTON, Instructor in Economics (1963). B. S., 1957, M. S., 1958, Clemson College.
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- *MARCUS, LESLIE F., Assistant Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1960). B. A., 1951, M. A., 1960, Ph. D., 1962, University of California.
- *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.
- MAXWELL, GEORGE WILLARD, Assistant Professor of Physics, Emeritus (1927, 1960). A. B., 1912, M. S., 1920, University of Michigan.
- *McCRACKEN, ELIZABETH UNGER, Associate Professor of Botany; Associate Cytogeneticist, Agr. Exp. Sta. (1938, 1950). B. A., 1929, M. A., 1932, Wellesley College; Ph. D., 1937, University of California.
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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.
- *McKINLEY, JOHN M., Assistant 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 College of Agriculture and Mechanic Arts; M. S., 1949, Oklahoma State University; Ph. D., 1954, Kansas State University.
- *MEDLIN, CALVIN J., Professor of Technical Journalism; 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.

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- *MEUX, JOHN WESLEY, Assistant Professor of Mathematics (1960). B. S., 1953, Henderson State Teachers College; M. S., 1957, University of Arkansas; Ph. D., 1960, University of Florida.
- *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, MICHAEL HOLMES, Instructor in Mathematics (1960). B. S., 1958, 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.
- *MOORE, FRITZ, Professor of Modern Languages (1934). A. B., 1927, University of Akron; M. A., 1930, Ph. D., 1932, University of Illinois.
- MORGAN, LAURENCE, Instructor in Athletics; Athletic Trainer (1951, 1957). B. S., 1949, St. Ambrose College.
- *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.
- *MOSSMAN, THIRZA ADELINE, Associate Professor of Mathematics (1922, 1946). B. A., 1916, University of Nebraska; M. A., 1922, University of Chicago.
- *MUNRO, DONALD FARNHAM, Associate Professor of Modern Languages (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.
- MURRY, JOHN P., Instructor; Assistant to the Dean (1962). B. S., 1955, Rockhurst College; M. S., 1960, Kansas State University.
- MYERS, DONALD L., Instructor in Mathematics (1964). B. A., 1962, Washburn University; M. S., 1964, Kansas State University.
- MYERS, FRANK LEWIS, Assistant Professor of Physical Education, Emeritus (1925, 1947). B. S., 1925, Kansas State University.
- NELSON, JR., CHARLES HERBERT, Assistant Professor of Military Science (1962). B. S., 1952, Oklahoma State University; the Armored Officers Career Course, 1961.
- *NELSON, JOHN W., Assistant Professor of Physics (1962). B. A., 1949, Washington University; M. A., 1951, Ph. D., 1959, University of Texas.
- *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.
- *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.
- *NOONAN, JOHN P., Associate Professor of English (1947, 1960). B. S., 1947, Rockhurst College; M. S., 1950, Kansas State University; Ph. D., 1955, Denver University.
- *NORDIN, JOHN A., Professor; Head, Department of Economics (1961). B. A., 1935, M. A., 1937, Ph. D., 1941, University of Minnesota.
- *PADY, STUART MCGREGOR, Professor; Head, Department of Botany and Plant Pathology; Mycologist, Agr. Exp. Sta. (1945, 1952). B. A., 1928, M. A., 1929, McMaster University (Canada); Ph. D., 1933, University of Toronto (Canada).
- PAINTER, CLARICE MARIE, Assistant Professor of Music (1924). Certificate, 1922, New England Conservatory of Music.
- *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.
- *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.
- PEDERSON, WINNIFRED, Instructor in English (1954). B. M., Ed., 1940, Bethany College; M. S., 1954, Kansas State University.
- *PELTON, MARION HERFORT, Associate Professor of Music (1928, 1958). B. M., 1927, University of Wisconsin; B. S., 1932, Kansas State University; M. A., 1957, Columbia University.
- *PENNEL, CHARLES A., Assistant Professor of English (1962). B. S., 1955, M. A., 1956, Memphis State College; Ph. D., 1962, University of Illinois.
- PETERSON, ROGER A., Instructor in Military Science (1963).
- *PETERSON, JOHN CHRISTIAN, Professor of Psychology, Emeritus (1917, 1954). A. B., 1913, University of Utah; Ph. D., 1917, University of Chicago.
- *PETTIS, DOROTHY BRADFORD, Associate Professor of Modern Languages (1927, 1937). B. A., 1919, M. A., 1924, University of Nebraska; 1922, Middlebury College; Certificate, 1939, University of Paris.

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- PLOTKIN, NATHAN, Assistant Professor of Military Science (1960). B. A., 1952, University of Illinois.
- *POTNIS, V. R., Assistant Professor of Physics (1962). B. S., 1948, M. S., 1952, Ph. D., 1959, University of Agra, India.
- PRAWL, SHERLUND DALE, Assistant Professor of Military Science (1961). B. S., 1954, Kansas State University.
- *PYLE, ROBERT EMMETT, Associate Professor of Modern Languages (1938, 1959). B. A., 1938, M. A., 1941, University of Kansas; Ph. D., 1957, Columbia University.
- RAILSBACK, ELIZABETH, Instructor in Physical Education (1963). B. S., 1963, University of South Dakota.
- RAPPOPORT, LEON H., Assistant Professor of Psychology (1964). B. A., 1953, New York University; M. A., 1962, Ph. D., 1963, University of Colorado.
- RAST, JACOB P., Instructor in Speech (1962). B. A., 1956, University of South Carolina; M. A., 1961, University of Kansas.
- REED, GLADYS, Instructor in Speech (1963). B. A., 1941, Augustana College; M. A., 1943, Northwestern University.
- REILING, ILSE, Instructor in Modern Languages (1959). B. S., 1958, Kansas State University; M. A., 1963, University of Kansas.
- *RIGGS, HAZEL M., Associate Professor of History (1945, 1952). A. B., 1920, M. A., 1923, University of Kansas.
- *RISEMAN, LOUIS, Assistant Professor of Geology (1946, 1947). B. S., 1934, M. S., 1936, Tufts College.
- *ROBEL, ROBERT JOSEPH, Assistant Professor of Zoology; Assistant Wildlife Conservationist, Agr. Exp. Sta. (1961). B. S., 1956, Michigan State University; M. S., 1959, University of Idaho; Ph. D., 1961, Utah State University.
- ROBERTS, GARLAND FOY, Instructor in Military Science (1960).
- ROGERS, JOSEPH WILSON, Assistant Professor of Sociology (1962). A. B., 1949, San Diego State College.
- *ROGERSON, BREWSTER, Associate Professor of English (1953). A. B., 1941, University of North Carolina; Ph. D., 1945, Princeton University.
- *ROHLES, FREDERICK H., Associate Professor of Psychology (1963). B. S., 1942, Roosevelt University; M. A., 1950, Ph. D., 1956, University of Texas.
- *ROHRER, WAYNE C., Associate Professor of Sociology; Rural Sociologist, Agr. Exp. Sta. (1959). B. S., 1946, M. S., 1948, Texas A. and M. College; Ph. D., 1952, Michigan State University.
- RUGGLES, BERTRAM L., Professor; Head, Department of Air Science (1964). B. S., 1942, Iowa State College; M. A., 1952, American University.
- *SAGESER, ADELBERT BOWER, Professor of History (1938, 1941). A. B., 1925, Nebraska State Teachers College (Wayne); M. A., 1930, Ph. D., 1934, University of Nebraska.
- *SAMELSON, FRANZ, Associate Professor of Psychology (1957, 1961). Diploma in Psychology, 1952, University of Munich (Germany); Ph. D., 1956, University of Michigan.
- *SANGER, RALPH GRAFTON, Professor; Head, Department of Mathematics (1946). B. S., 1925, M. S., 1926, Ph. D., 1931, University of Chicago.
- SCHAEFFER, MARY E., Assistant Professor of History (1964). A. B., 1959, St. Mary's College; M. A., 1962, Indiana 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.
- *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). 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., Assistant Professor of Chemistry (1963). B. S., 1956, M. S., 1958, Kansas State University; Ph. D., 1961, University of Washington.
- *SHENKEL, JR., CLAUDE WESLEY, Professor of Geology (1949, 1958). B. S., 1941, Kansas State University; M. S., 1947, Ph. D., 1952, University of Colorado.
- *SHOWALTER, DONALD FOX, Professor of Psychology, Emeritus (1928, 1961). A. B., 1916, M. A., 1917, University of Nebraska; Ph. D., 1931, University of Kansas.
- *SHROYER, GEORGE F., Assistant Professor of Physical Education (1962, 1964). B. S., 1956, Fort Hays Kansas State College; M. S., 1960, Kansas State University; Ed. D., 1962, University of Wyoming.
- SHULL, PAUL, Assistant Professor of Music (1960). B. M. E., 1950, M. M. E., 1951, University of Colorado.
- *SIDDALL, WILLIAM R., Assistant Professor of Geography (1962). A. B., 1950, Harvard University; M. A., 1955, Ph. D., 1957, University of Washington.
- *SILKER, RALPH, Professor of Chemistry (1941, 1948). B. A., 1927, University of Dubuque; M. S., 1931, Ph. D., 1934, State University of Iowa.

- *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.
- *SINNETT, KATHLEEN K., Temporary Assistant Professor of Psychology (1963). B. A., 1948, M. A., 1949, University of Mississippi; Ph. D., 1957, Radcliffe College.
- SITZ, SARAH G., Instructor in Mathematics (1946). B. S., 1926, Iowa State University.
- SLOAT, FLOYD B., Assistant Professor of Mathematics (1946, 1947). B. A., 1938, Ouachita College; M. A., 1941, University of Arkansas.
- SLOOP, JEAN C., Instructor in Music (1959). B. A., 1953, Gettysburg College; M. A., 1956, Eastman School of Music (University of Rochester).
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- *SMITS, 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.
- *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 Sociology (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).
- *STRATTON, CHARLES WILLIAM, Professor of Music Emeritus (1927, 1964). B. M., 1926, M. S., 1933, Kansas State University.
- *STRATTON, WILLIAM TIMOTHY, Professor of Mathematics, Emeritus (1910, 1951). A. B., 1906, A. M., 1914, Indiana University; Ph. D., 1931, University of Washington.
- *STURMER, ANNA MARIE, Professor of English, Emerita (1920, 1950). A. B., 1917, A. M., 1920, University of Nebraska.
- *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).
- *TAYLOR, ROBERT BARTLEY, Assistant Professor of Economics (1957, 1960). B. S., 1949, Wheaton College; M. S., 1956, Ph. D., 1960, University of Oregon.
- *THOMPSON, FRANK JAMES, Assistant Professor of Physical Education (1937, 1949). B. Ed., 1934, Minnesota State Teachers College (Mankato); M. Ed., 1936, Springfield College (Massachusetts).
- *THORNE, BERTRAM C., Assistant Professor of Speech (1961). B. A., 1952, M. A., 1954, Brooklyn College.
- *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.
- TOLLEY, CHARLES PRESTON, Assistant Professor of Air Science (1963). B. S., 1956, Virginia Military Institute.
- TOWERS, RICHARD E., Assistant Football Coach (1964). B. S., 1953, M. S., 1960, Kansas State University.
- *TREMMELE, WILLIAM C., Director of Student Religious Activities; Associate Professor of Philosophy (1956, 1959). A. B., 1940, Denver University; Th. M., 1945, Th. D., 1950, Hiff School of Theology.
- *TRUMBO, DON ARTHUR, Associate 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, Heidelberg University; Ph. D., 1955, Princeton University.
- VERA, THEODORE, Instructor in Bacteriology (1960, 1961). B. S., 1956, D. V. M., 1956, M. S., 1961, Kansas State University.
- WALKER, BARBARA, Instructor in Music (1962). B. A., 1952, University of Washington.
- *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 B., Instructor in Social Science (1961). B. S., 1954, Kansas State University; M. S., 1957, 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.
- *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.
- *WHITE, ALFRED EVERETT, Professor of Mathematics, Emeritus (1909, 1950). B. S., 1904, M. S., 1909, Purdue University.
- *WHITE, MARY FRANCES, Assistant Professor of English (1947, 1951). B. S., 1928, M. S., 1930, Kansas State University; Ph. D., 1955, Denver University.
- WHITMAN, JOHN FRANKLIN, Assistant Professor of Air Science (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.
- *WILLIAMS, DUDLEY, Distinguished Regents Professor of Physics (1964). A. B., 1933, M. A., 1934, Ph. D., 1936, University of North Carolina.
- *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.
- *WROTEN, HELEN IAMS, Assistant Professor of English (1949). B. S., 1939, M. S., 1941, Kansas State University; Ph. D., 1950, University of Illinois.
- *YATES, RICHARD LEE, Assistant Professor of Mathematics (1960). B. S., 1952, Florida Southern College; M. A., 1954, Ph. D., 1957, University of Florida.
- ZIMMERMAN, JOHN L., Assistant Professor of Zoology (1963). B. S., 1953, M. S., 1959, Michigan State University; Ph. D., 1963, University of Illinois.

College of Commerce

- BARTON-DOBENIN, JOSEPH, Assistant Professor of Business Administration (1958, 1964). B. S., 1956, M. A., 1958, University of Nebraska.
- *BOWLIN, OSWALD D., Associate Professor of Business Administration (1961). B. A., 1951, M. S., 1953, the A & M College of Texas; Ph. D., 1959, University of Illinois.
- *CLARK, WILLIAM JAMES, 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.
- DAVIS, PATRICIA ANN, Instructor in Business Administration (1963). B. B. A., 1957, M. B. A., 1962, University of Oklahoma.
- *ERIKSEN, CONRAD JOHN KERULF, Associate Professor of Business Administration (1946, 1947). B. A., 1929, University of Kansas; M. B. A., 1931, Harvard University.
- FICK, HOWARD DUANE, Instructor in Business Administration (1963). A. B., 1957, Washburn University of Topeka; LL. B., 1960, Washburn University School of Law.
- GILKISON, PAUL DAVID, 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 BELLE, Assistant Professor of Business Administration (1943, 1954). B. S., 1938, M. S., 1946, Kansas State University.
- *GUGLER, MERLE EDWIN, 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.
- *HOBBS, JAMES B., Associate Dean; Assistant Professor of Business Administration (1962). A. B., 1952, Harvard College; M. B. A., 1957, University of Kansas; D. B. A., 1962, Indiana University.
- *JONES, C. CLYDE, Dean; Professor of Business Administration (1960, 1962). B. A., 1944, Marshall College; M. A., 1950, Ph. D., 1954, Northwestern 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.

*Graduate faculty.

- *MULANAX, ALVIN EDGAR, Assistant Professor of Business Administration (1947, 1951). 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).
- *RIDGWAY, VALENTINE F., Associate Professor of Business Administration (1957, 1963). B. S., 1948, M. S., 1950, University of Missouri; Ph. D., 1963, Cornell University.
- TIDWELL, VICTOR H., Assistant Professor of Business Administration (1964). B. S., 1960, Illinois College; M. B. A., 1962, Indiana University.
- TUXBURY, WILLIAM DAVID, 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.

School 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.
- *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.
- *BRACKEN, CHARLES, Assistant Professor of Education (1960). A. B., 1948, M. A., 1949, East Carolina College; Ed. D., 1960, Duke 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., 1950, 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. S., 1951, George Peabody College; Ph. D., 1954, State University of Iowa.
- 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.
- *DONELSON, KENNETH LAVERN, Assistant Professor of Education (1963). B. A., 1950, M. A., 1951, Ph. D., 1963, State University of Iowa.
- *DRUMRIGHT, RUSSEL GRANT, Associate Professor of Education (1956, 1964). B. S., 1943, Oklahoma State University; M. Ed., 1949, University of Colorado; Ph. D., 1956, University of Oklahoma.
- FRIESEN, WALTER S., Assistant Professor of Education; Counselor, Counseling Center (1961, 1964). A. B., 1953, Tabor College; M. S., 1957, Kansas State Teachers College.
- *GREEN, FINIS McCRAZY, 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 (1926, 1941). B. S., 1923, M. S., 1927, Kansas State University.
- *HAWKINS, MICHAEL LEE, Assistant Professor of Education (1963). A. B., 1952, Southwestern College; M. S., 1956, Florida State University; Ed. D., 1963, University of Arkansas.
- *HUNT, BURL, Assistant Professor of Education (1960). B. A., 1949, West Virginia Institute of Technology; M. A., 1953, Florida State University; Ed. D., 1960, University of Arkansas.
- *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.
- *LITRELL, J. HARVEY, Associate Professor of Education (1954, 1961). 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, Assistant Professor of Education (1957, 1960). B. S., 1943, Kansas State Teachers College (Emporia); M. S., 1947, Ed. D., 1958, University of Kansas.
- *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.
- *PECCOLO, CHARLES M., Assistant Professor of Education (1962). A. B., 1948, M. A., 1949, Adams State College; Ph. D., 1962, State University of Iowa.

*Graduate faculty.

- *PETERSON, BERNADINE HELEN, Associate Professor of Education (1961). B. S., 1945, Wisconsin State College; M. S., 1957, Ph. D., 1961, University of Wisconsin.
- PRICE, FLOYD HAMILTON, Instructor in Education (1963). B. A., 1951, Friends University; M. Ed., 1957, University of Wichita; Ed. S., 1960, George Peabody College.
- *RUST, LUCILE OSBORN, Professor of Education, Emerita (1924, 1960). B. S., 1921, Kansas State Teachers College (Pittsburg); M. S., 1922, Kansas State University.
- *STRICKLAND, VIVAN LEWIS, Professor of Education, Emeritus (1917, 1950). A. B., 1906, M. S., 1915, Ph. D., 1925, University of Nebraska.
- SWAIM, ROLAND Q., Assistant Professor of Education; Director, Placement Center (1957, 1964). B. S., 1935, Kansas State Teachers College of Emporia; M. S., 1950, Kansas State University; Ed. D., 1962, University of Wisconsin.
- *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, Associate Professor of Education and Extension (1961). B. S., 1948, Oklahoma State University; M. S., 1960, Ph. D., 1961, University of Wisconsin.

College of Engineering

- 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.
- *BALLIE, RICHARD C., Associate Professor of Nuclear Engineering (1958, 1964). B. S., 1951, Illinois Institute of Technology; M. S., 1957, Wayne State University.
- 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, RICHARD RONALD, Instructor in Mechanical Engineering (1961, 1963). B. S., 1960, University of Nebraska; M. S., 1962, Kansas State University.
- BERTNOLLI, EDWARD CLARENCE, Instructor in Electrical Engineering (1957, 1958). B. S., 1958, M. S., 1961, Kansas State University.
- *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, Associate Professor of Mechanical Engineering (1963). B. S., 1942, M. S., 1949, Kansas State University; Ph. D., 1956, University of California.
- *BRAINARD, BOYD BERTRAND, Professor of Mechanical Engineering (1923, 1938). B. S., 1922, University of Colorado; S. M., 1931, Massachusetts Institute of Technology. Professional Engineer, 1945.
- BYERS, EARLE CONRAD, Assistant Professor of Industrial Arts (1946, 1956). A. B., 1941, Greenville College; M. S., 1954, Kansas State University.
- BYERS, NORMAN REDMAN, Instructor in Mechanical Engineering (1947, 1958). B. S., 1947, M. S., 1950, Kansas State University. Professional Engineer, 1962.
- CARLSON, WALTER WILLIAM, Professor of Industrial Engineering and Industrial Arts, Emeritus (1910, 1917, 1950). B. S., 1908, M. E., 1916, Kansas State University. Professional Engineer, 1935.
- 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.
- CONRAD, LOWELL EDWIN, Professor of Civil Engineering, Emeritus (1908, 1909, 1949). B. S., 1904, C. E., 1906, Cornell College; M. S., 1908, Lehigh University. Professional Engineer in Wyoming, 1909; in Kansas, 1931.
- *COTTOM, 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.
- CRAWFORD, WILLIAM WESLEY, Associate Professor of Civil Engineering, Emeritus (1923, 1942, 1949). B. Di., 1903, M. Di., 1905, Iowa State Teachers College; A. B., 1912, B. S., 1917, Iowa State University.
- CREECH, THOMAS FRANKLYN, Assistant Professor of Applied Mechanics (1957, 1961). B. S., 1957, M. S., 1961, Kansas State University.
- *DAASCH, HARRY L., Professor of Industrial Engineering (1963). B. S., 1925, M. E., 1930, M. S., 1933, Iowa State University. Professional Engineer, 1934.

*Graduate faculty.

- DARBY, EARL G., Professor of Industrial Arts, Emeritus (1941, 1952, 1963). B. S., 1923, M. S., 1943, Kansas State University.
- DIETRICH, HARVEY FREDERICK, Assistant Professor of Industrial Arts (1948, 1957). B. S., 1957, Kansas State University.
- DOLLAR, JOHN PAUL, Instructor in Electrical Engineering (1960). B. S., 1956, 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.
- EHLERS, LAWRENCE EDWARD, Instructor in Applied Mechanics (1957). B. S., 1957, M. S., 1960, Kansas State University. Professional Engineer, 1961.
- *ELIAS, SAMY E. G., Associate Professor of Industrial Engineering (1960, 1962). B. S., 1955, University of Cairo; M. S., 1958, Texas A and M; Ph. D., 1960, Oklahoma 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 E., Assistant Professor of Nuclear Engineering (1962). 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. Professional Engineer, 1945.
- FOWLER, EDDIE R., Instructor in Electrical Engineering (1962). B. S., 1957, Kansas State University.
- FRAZIER, FORREST FAYE, Professor of Civil Engineering, Emeritus (1911, 1922, 1954). C. E., 1910, Ohio State University. Professional Engineer, 1931.
- FUNK, JOHN WILLIAM, Assistant Professor of Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1947, 1951). 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.
- GOWDY, KENNETH KING, Assistant Professor of Mechanical Engineering (1957, 1962). B. S., 1955, M. S., 1961, Kansas State 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.
- *HALIJAK, CHARLES AUGUST, Professor of Electrical Engineering (1956, 1961). B. S., 1943, M. S., 1949, Ph. D., 1956, University of Wisconsin. Professional Engineer, 1959.
- *HALL, RAYMOND CLARENCE, Assistant Professor of Chemical Engineering (1950, 1952). B. S., 1941, Iowa State University; M. S., 1951, Kansas State University.
- *HAMPTON, DELON, Assistant Professor of Civil Engineering (1961). B. S., 1954, University of Illinois; M. S., 1958, Ph. D., 1961, Purdue University. Professional Engineer in Indiana, 1961.
- HANSEN, CARL ULLMAN, Assistant Professor of Industrial Engineering (1957, 1962). B. S., 1936, Kansas State University; M. Sci., 1961, University of Nebraska. Professional Engineer, 1961.
- *HAYRE, HARBHAJAN SINGH, Associate Professor of Electrical Engineering (1962). B. A., 1949, Punjab University; B. S., 1952, M. S., 1953, University of California; D. Sc., 1962, New Mexico University. Professional Engineer in Massachusetts, 1959; in Kansas, 1962.
- 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.
- HO, PING-LIONG, Instructor in Electrical Engineering (1957). B. S., 1957, University of Wisconsin; M. S., 1961, 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.
- *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.

*Graduate faculty.

- *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, Research Associate in Mechanical 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.
- JEROME, FREDERICK SANFORD, Instructor in Chemical Engineering (1963). B. S., 1957, Case Institute of Technology; M. S., 1962, Illinois Institute of Technology.
- JORGENSEN, LOUIS MARK, Professor of Electrical Engineering, Emeritus (1925, 1951, 1954). B. S., 1907, M. S., 1931, Kansas State University.
- KENT, ALBERT CALVIN, Instructor in Mechanical Engineering (1958). B. S., 1956, M. S., 1958, University of Missouri. Professional Engineer, 1961.
- *KERCHNER, RUSSELL MARION, Professor of Electrical Engineering; Electrical Engineer, Engg. Exp. Sta. (1922, 1955). B. S., 1922, University of Illinois; M. S., 1927, Kansas State University. Professional Engineer, 1945.
- *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.
- *KIRMSER, 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.
- KLOEFFLER, ROYCE GERALD, Professor of Electrical Engineering, Emeritus (1916, 1923, 1960). B. S., 1913, University of Michigan; S. M., 1930, Massachusetts Institute of Technology. Professional Engineer, 1945.
- KNOSTMAN, HARRY DANIEL, Instructor in Applied Mechanics (1957). B. S., 1955, M. S., 1961, Kansas State University. Professional Engineer, 1959.
- *KOEPSEL, 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.
- *KUBITZA, WILHELM KARL, Professor of Civil Engineering (1953, 1963). Dipl. Ing., 1950, Technical University of Darmstadt; D. Sc., 1963, Washington University, St. Louis. Professional Engineer, 1959.
- *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.
- *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, Assistant Professor of Applied Mechanics (1949, 1954). B. S., 1942, Oklahoma State University; M. S., 1949, Purdue University; M. S., 1957, Kansas State University; Ph. D., Iowa State University, 1964. 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.
- 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., 1964, Washington University.
- *McCORMICK, FRANK JAMES, Professor of Applied Mechanics (1939, 1947). B. S., 1927, M. S., 1931, Iowa State University. Professional Engineer, 1944.
- *McENTYRE, JOHN GERALD, Professor of Civil Engineering (1946, 1958). B. S., 1942, M. S., 1948, Kansas State University; Ph. D., 1954, Cornell University. Professional Engineer, 1949.
- 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.
- MERRILL, DUANE ROBERT, Instructor in Electrical Engineering (1960). A. A., 1956, Webster City Junior College; B. S., 1959, Iowa State University.
- MESSENHEIMER, ALVA ERNEST, Associate Professor of Mechanical Engineering (1942, 1963). B. S., 1924, Kansas State University. Professional Engineer, 1948.
- MICHAELS, KENNETH BRUCE, Assistant Professor of Mechanical Engineering (1958, 1962). B. S., 1955, M. S., 1961, Kansas State University. Professional Engineer, 1961.
- *MIKHAIL, SAAD ZAGHLOUL, Professor of Nuclear Engineering (1958). B. S., 1946, M. S., 1952, Ph. D., 1954, University of Cairo.
- MILLER, JR., PAUL LEROY, Assistant Professor of Mechanical Engineering (1958, 1961). B. S., 1957, Kansas State University. Professional Engineer, 1962.

*Graduate faculty.

- *MINGLE, JOHN ORVILLE, Associate Professor of Nuclear Engineering (1956, 1960). B. S., 1953, M. S., 1958, Kansas State University; Ph. D., 1960, Northwestern University. Professional Engineer, 1961.
- *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.
- *MURRISH, CHARLES HAROLD, Professor of Electrical Engineering (1961, 1963). B. S. G. E., 1942, University of Denver; M. S., 1948, Stanford University; Ph. D., 1960, University of Wisconsin.
- NEELY, JR., HENRY MASON, Assistant to the Dean, Assistant Professor of Mechanical Engineering (1958, 1963). B. S., 1956, M. S., 1963, Kansas State University. Professional Engineer, 1960.
- NELSON, CLARENCE LESLIE, Instructor in Industrial Arts (1943).
- NESMITH, DWIGHT ALVIN, Associate Professor of Engineering, Engg. Exp. Sta. (1948, 1958). B. S., 1948, Northwestern University; M. S., 1952, Kansas State University. Professional Engineer, 1962.
- NEUENSWANDER, JOHN RALPH, Assistant Professor of Electrical Engineering (1958, 1963). B. S., 1954, University of Kansas; M. S., 1961, Kansas State University.
- *NEVINS, RALPH GRIFFITH, Professor; Head, Department of Mechanical Engineering; Mechanical Engineer, Engg. Exp. Sta. (1948, 1957). 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 Industrial Arts (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.
- PICKER, WILLIAM AUGUST, Instructor in Electrical Engineering (1964). B. S., 1964, Kansas State University.
- REECE, FLOYD NORMAN, Assistant Professor of Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1956, 1959). B. S., 1952, M. S., 1959, Kansas State University. Professional Engineer in Kansas, 1960.
- ROBERTSON, KEITH ELLIS, Instructor in Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1960). B. S., 1959, M. S., 1960, Michigan State University.
- *ROBOHN, WALTER FREDERICK, Assistant Professor of Civil Engineering (1949, 1952). B. S., 1947, M. S., 1950, Kansas State University. Professional Engineer, 1957.
- *ROHLES, JR., FREDERICK HENRY, Associate Professor of Mechanical Engineering (1963). 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.
- *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 in Arizona, 1955.
- *SCHOLER, CHARLES HENRY, Professor of Applied Mechanics, Emeritus; Materials Testing Engineer, Engg. Exp. Sta. (1919, 1922, 1961). B. S., 1914, Kansas State University. Professional Engineer, 1933.
- *SCHRADER, GEORGE F., Professor; Head, Department of Industrial Engineering (1962). B. S., 1947, M. S., 1951, Ph. D., 1960, University of Illinois. Professional Engineer in Illinois, 1955.
- *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.
- *SHUPE, JOHN WALLACE, Associate Dean; Professor of Civil Engineering (1948, 1960). B. S., 1948, Kansas State University; M. S., 1951, University of California; Ph. D., 1958, Purdue University. Professional Engineer, 1948.
- SIEH, WAYNE DELBERT, Assistant Professor of Mechanical Engineering (1946, 1952). B. S., 1952, Kansas State University.
- *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, Associate Professor of Civil Engineering (1948, 1962). B. S., 1944, M. S., 1953, Kansas State University; Ph. D., 1963, Purdue University. Professional Engineer, 1953.

*Graduate faculty.

- *SMITH, DONALD R., Associate Professor of Nuclear Engineering (1963). B. S., 1953, Kansas State University; M. S., 1955, U. S. A. F. Institute of Technology; M. A., 1960, Ph. D., 1963, University of Colorado.
- SMUTZ, FLOYD ALONZO, Professor of Machine Design, Emeritus (1918, 1934, 1960). B. S., 1914, Kansas State University.
- *SNELL, ROBERT ROSS, Assistant Professor of Civil Engineering (1957). 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.
- *TAYLOR, DELOS CLIFTON, Professor of Applied Mechanics (1931, 1956). B. S., 1925, M. S., 1937, Kansas State University. Professional Engineer, 1948.
- *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.
- WAKABAYASHI, ISAAC, Instructor in Electrical Engineering (1955). B. S., 1953, University of California.
- *WALLACK, PAUL M., Associate Professor of Industrial Engineering (1962, 1963). B. S., 1950, University of Tulsa; M. S., 1956, Oklahoma State University. Professional Engineer, 1957.
- *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.
- WEATHERS, BENTON DUNCAN, Instructor in Electrical Engineering (1958). B. S., 1956, M. S., 1958, University of Missouri; Ph. D., 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, M. S., 1949, Kansas State University; M. S., 1961, University of Missouri School of Mines.

College of Home Economics

- *AGAN, ANNA TESSIE, Associate Professor of Family Economics; Associate Family Economist, 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. BETH, 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 (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.
- *BARFOOT, DOROTHY, Professor of Art (1930, 1962). B. A., State University of Iowa; M. A., 1928, Columbia University.
- *BARNES, JANE WILSON, Assistant Professor, Emerita (1939, 1963). B. S., 1912, M. S., 1932, Kansas State University.
- *BORNEMEIER, BETTY LOU, Associate Professor of Clothing and Textiles (1961). B. S., 1958, M. A., 1959, Ph. D., 1961, Texas Women's 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; Associate Textile Economist, Agr. Exp. Sta. (1936, 1941). B. S., 1926, M. S., 1932, Kansas State University.
- *CRAIGIE, BARBARA, Assistant Professor of Art (1954, 1963). B. A., 1932, University of Minnesota; M. A., 1942, University of Missouri.
- DAVIS, IRENE H., Instructor in Family and Child Development (1963). B. S., 1944, Oklahoma State University; M. S., 1948, Purdue University.
- DRAKE, MARY FRANCES, Instructor in Clothing and Textiles (1962). B. S., 1956, M. S., 1962, University of Tennessee.
- *GARZIO, ANGELO C., Associate 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 (1945). A. B., 1922, B. F. A., 1933, University of Kansas; M. A., 1939, Colorado State College of Education.
- *GOERTZ, GRAYCE E., Professor of Foods and Nutrition; Associate Food Economist, Agr. Exp. Sta. (1946, 1958). B. S., 1941, M. S., 1947, Ph. D., 1952, Kansas State University.
- *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.

- *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 (1947, 1963). B. S., 1938, Dakota Wesleyan University; M. S., 1943, Ph. D., 1947, Iowa State University.
- *HEMPHILL, MARJORIE McCALL, Assistant Professor of Institutional Management; Assistant Food Economist, 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, Assistant Professor of Art (1944, 1954). B. S., 1944, M. S., 1950, Kansas State University.
- *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; in charge Home Economics Research, Agr. Exp. Sta. (1954). B. S., 1941, University of Nebraska; M. S., 1943, Michigan State University; Ph. D., 1946, Cornell University.
- HOLLAND, DAVID, Assistant Professor of Family and Child Development (1963). B. A., 1958, State University of Iowa.
- *HOWE, HAZEL DELL, Associate Professor of Clothing and Textiles (1936, 1947). B. S., 1921, M. S., 1935, Kansas State University.
- *HUNSADER, MERCEDES L., Associate Professor of Foods and Nutrition; Associate Food Economist, Agr. Exp. Sta. (1957). B. S., 1944, M. S., 1953, Ph. D., 1957, University of Wisconsin.
- *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.
- KEDZIE, ROSAMOND HARRIET, Associate Professor of Art, Emerita (1938, 1955). B. S., 1906, Michigan State University; M. A., 1938, University of California.
- *KELL, LEONE BOWER, Professor of Family and Child Development; Family Economist, Agr. Exp. Sta. (1927, 1947). B. S., 1923, M. S., 1928, Kansas State University.
- KITTERMAN, MARGARET S., Instructor in Family and Child Development (1963). B. S., 1942, 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.
- LAMBERT, MARY ANN, Instructor in Foods and Nutrition (1961). B. S., 1956, Southeastern Louisiana College; M. S., 1962, Texas Technological College.
- *LATZKE, ALPHA CORINNE, Professor of Clothing and Textiles (1927, 1960). B. S., 1919, M. S., 1928, Kansas State University.
- *LIENKAEMPER, GERTRUDE ELISE, Associate Professor of Clothing and Textiles (1941, 1948). 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.
- MIDDLETON, RAYMONA, Instructor in Institutional Management (1962). B. S., 1937, University of Nebraska; M. S., 1941, 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; Family Economist, 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 Art (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 Art (1956). B. F. A., 1954, Denver University; M. F. A., 1956, State University of Iowa.
- RAFFINGTON, MARGARET ELIZABETH, Assistant Professor (1938, 1939). B. S., 1924, M. S., 1928, Kansas State University; Professional Diploma, 1954, Columbia University.
- RIGGS, JEAN M., Associate Professor of Institutional Management (1960). B. S., 1939, M. S., 1956, Iowa State University.
- *SHUGART, GRACE SEVERANCE, Professor; Head, Department of Institutional Management; Associate Food Economist, Agr. Exp. Sta. (1951, 1961). B. S., 1931, State College of Washington; M. S., 1938, Iowa State University.
- *STITH, MARJORIE MAY, Associate Professor; Head, Department of Family and Child Development (1961). B. S., 1943, Alabama State College for Women; M. S., 1958, Ph. D., 1961, Florida State University.
- *TINKLIN, GWENDOLYN LaVERNE, Associate Professor of Foods and Nutrition; Associate Food Economist, Agr. Exp. Sta. (1943, 1956). B. S., 1940, M. S., 1944, Kansas 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.
- WORTHAM, MARY PAT, Instructor in Foods and Nutrition (1962). B. S., 1959, Loretto Heights College; M. S., 1962, Kansas State University.
- *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

- ADRIAN, RUDOLF WERNER, Instructor in Anatomy; Instructor, Agr. Exp. Sta. (1959). B. V. Sc., 1955, D. V. M., 1958, University of Zurich, Switzerland; M. S., 1961, Kansas State University.
- *ANTHONY, HARRY D., Associate Professor of Pathology; Associate Professor, Agr. Exp. Sta. (1955, 1964). D. V. M., 1952, M. S., 1957, Kansas State University.
- BOWEN, JOHN M., Assistant Professor of Physiology; Assistant Professor, Agr. Exp. Sta. (1960). D. V. M., 1957, University of Georgia; Ph. D., 1960, Cornell University.
- *BURROUGHS, ALBERT L., Associate Professor of Pathology (1960). B. S., 1938, University of Wyoming; D. V. M., 1958, Texas A & M College; M. S., 1941, Montana State College; Ph. D., 1946, University of California.
- *BURT, JAMES HENRY, Professor of Anatomy, Emeritus (1909, 1947). V. S., 1895, Ontario Veterinary College (Canada); D. V. M., 1905, Ohio State University.
- CARNAHAN, DAVID L., Assistant Professor of Surgery and Medicine (1961, 1964). B. S., 1959, D. V. M., 1959, Kansas State University.
- CATLIN, JACK EDWARD, Associate Professor of Surgery and Medicine (1962, 1964). B. A., 1950, Emory University; D. V. M., 1954, University of Georgia.
- *CHRISTENSEN, NEDON R., Assistant Professor of Surgery and Medicine (1961). B. S., 1950, University of Utah; D. V. M., 1959, Washington State; M. S., 1951, University of Utah.
- *COLES, JR., EMBERT HARVEY, Professor; Head of Pathology; Assistant Pathologist, Agr. Exp. Sta. (1954, 1964). D. V. M., 1945, Ph. D., 1958, Kansas State University; M. S., 1948, Iowa State University.
- *FOLSE, DEAN SYDNEY, Associate Professor of Pathology; Associate Pathologist, Agr. Exp. Sta. (1952). B. S., 1945, D. V. M., 1945, Texas A & M College; M. S., 1946, Kansas State University.
- *FRANK, EDWARD RAYMOND, Professor of Surgery and Medicine (1926, 1935). B. S., 1918, D. V. M., 1924, M. S., 1929, Kansas State University.
- FREY, RUSSELL A., Instructor in Physiology (1964). B. S., 1952, D. V. M., 1952, Kansas State University.
- *FRICK, EDWIN JACOB, Professor; Department of Surgery and Medicine (1919, 1935). D. V. M., 1918, Cornell University.
- GUFFY, MARK MITCHELL, Assistant Professor of Surgery and Medicine (1963). D. V. M., 1949, Colorado State University.
- HARTKE, GLENN T., Instructor in Anatomy (1962). B. S., 1958, D. V. M., 1960, Kansas State University.
- HIBBS, CLAIR M., Instructor in Pathology (1962). B. S., 1949, D. V. M., 1953, University of Missouri; M. S., 1962, Kansas State University.
- ISSAR, SOHAN L., Instructor in Pathology, Parasitology and Public Health (1964). M. S., 1958, Kansas State University.
- *KELLEY, DONALD CLIFFORD, Associate Professor of Pathology; Associate Pathologist, Agr. Exp. Sta. (1958). D. V. M., 1935, M. S., 1952, Kansas State University.
- KIMBALL, ALICE DAY, Instructor in Pathology, Emeritus (1934, 1955). B. S., 1935, Kansas State University.
- KIRKBRIDE, CLYDE ARNOLD, Assistant Professor of Surgery and Medicine (1963). D. V. M., 1953, Oklahoma State University.
- KITCHELL, RALPH L., Professor; Dean of Veterinary Medicine (1964). B. S., 1938, Ph. D., 1951, University of Minnesota; D. V. M., 1943, Iowa State University.
- *KITSELMAN, CHARLES HOWARD, Professor of Pathology; Pathologist, Agr. Exp. Sta. (1919, 1933). 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.
- LARSEN, JAMES STANLEY, Assistant Professor of Surgery and Medicine (1959). B. S., 1955, D. V. M., 1955, University of Illinois.
- *LEASURE, ELDEN EMANUEL, Dean Emeritus; Professor of Physiology; Veterinarian in charge, Agr. Exp. Sta. (1926, 1948, 1964). D. V. M., 1923, M. S., 1930, Kansas State University.
- *LUMB, JOHN WALLACE, Professor of Anatomy, Emeritus (1924, 1957). D. V. M., 1910, M. S., 1930, Kansas State University.
- *MEBUS, CHARLES ALBERT, Associate Professor of Pathology (1963). D. V. M., 1956, Cornell University; M. S., 1962, Ph. D., 1963, Kansas State University.

- MILLERET, ROY JOSEPH, Assistant Professor of Pathology (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.
- *MUSSMAN, HARRY CHARLES, Instructor in Pathology; Assistant Pathologist, Agr. Exp. Sta. (1956). B. S., 1955, University of Wisconsin; M. S., 1957, Ph. D., 1959, Kansas State University.
- *NOORDSY, JOHN LEROY, Assistant Professor of Surgery and Medicine (1960). B. S., 1943, South Dakota State College; D. V. M., 1946, M. S., 1962, Kansas State University.
- *OEHME, FREDERICK W., Assistant Professor of Surgery and 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.
- RHOADES, JOHN DAVID, Assistant Professor of Surgery and Medicine (1961, 1964). B. S., 1959, D. V. M., 1961, University of Missouri.
- *SWANSON, ROBERT NEIL, Assistant Professor of Physiology (1960, 1964). B. S., 1953, Fort Hays Kansas State College; D. V. M., 1960, M. S., 1960, Ph. D., 1964, Kansas State University.
- *TROTTER, DONALD McLEAN, 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; Head, Department of Physiology; 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 LESLIE, Professor of Pathology; Pathologist, Agr. Exp. Sta. (1953). D. V. M., 1936, Kansas State University; M. S., 1946, Ph. D., 1950, University of Wisconsin.

Division of Extension

RESIDENCE STAFF

- ADAMS, ALBERT WHITTEN, Assistant Professor; Extension Specialist in Poultry Science (1962). B. S., 1951, M. S., 1955, 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.
- 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.
- 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, JACK VERNON, Associate Professor, Extension Specialist in Crops and Soils (1961). B. S., 1949, M. S., 1951, University of Nebraska; Ph. D., 1955, Washington State University.
- *BAIRD, MAE, Professor; Department Head; State Home Economics Leader (1954). B. S., 1930, University of Nebraska; M. A., 1943, Columbia University.
- *BANKS, QUENTIN D., Assistant Professor; Extension Economist, Marketing Information (1962). B. S., 1941, M. S., 1957, Ph. D., 1962, University of Missouri.
- 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 & M; M. S., 1960, University of Wisconsin.
- *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 GEARHART, Professor; Extension Specialist in Agronomy (1941, 1949). B. S., 1938, M. S., 1949, Kansas State University.
- BILLINGS, ADA GRACE, Professor, Emeritus; Continuing Education (1921, 1946). B. S., 1916, M. S., 1927, Kansas State University.
- BISWELL, CLIFFORD RANDOLPH, Instructor; District Extension Forester (1957). B. S., 1954, 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.
- BOETTCHER, JAROLD W., Assistant Instructor; Civil Defense Training Contract, Department of Continuing Education (1963). B. S., 1963, Kansas State University.

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- *BOHANNON, ROBERT ARTHUR, Associate 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.
- BOOTON, CARL ADELBERT, Assistant Professor; Coordinator, Evening College and Extension Classes; Continuing Education (1956, 1961). B. S., 1948, M. A., 1949, University of Nebraska; M. S., 1959, Kansas State University.
- BOWMAKER, LEE E., Instructor; Civil Defense Training Contract, Department of Continuing Education (1963). B. S., 1951, Kansas State University.
- BRIGGS, VIVIAN BAHR, Assistant Professor; Extension Specialist in Family Life (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.
- BRYSON, G. KATHLEEN, Instructor; Supervisor of Evening College, Department of Continuing Education (1962). B. A., 1962, Kansas State University.
- 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; Associate State Club Leader (1941, 1958, 1964). B. S., 1941, Kansas State University; M. S., 1957, Cornell University.
- CALL, EDWARD P., Instructor; Extension Specialist, Dairy Science (1963). B. S., 1951, Ohio State University; M. S., 1963, Kansas State University.
- CLEAVINGER, EUGENE ARTHUR, Professor; Extension Specialist in Crops and Soils (1926, 1947). B. S., 1925, Kansas State University.
- 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, Assistant Professor, District Agent (1952, 1959). B. S., 1948, Oklahoma State University; M. S., 1960, Kansas State University.
- DAVISON, RICHARD L., Assistant Professor; Coordinator, Community and Special Services, Department of Continuing Education (1963). B. S., 1956, Maryville State College; M. S., 1960, University of North Dakota.
- 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.
- DIERKING, GARY ROGER, Instructor; Visual Instructor (1961). B. F. A., 1958, University of Kansas.
- DODRILL, ISABEL NAOMI, Assistant Professor; District Home Economics Agent (1942, 1954). B. A., 1937, Fort Hays Kansas State College; B. S., 1941, Kansas State University; M. S., 1957, Columbia 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., 1950, Kansas State University.
- EYESTONE, CECIL LAVERNE, Assistant Professor; Extension Specialist in 4-H Club Work (1943, 1958). B. S., 1944, Kansas State University; M. S., 1958, Colorado State University.
- *FERGUSON, CLYDE RANDOLPH, Assistant Professor; Continuing Education (1960). B. A., 1955, University of Oklahoma; M. A., 1957, Ph. D., 1960, Duke University.
- FERGUSON, JOHN MOSES, Professor; State Leader, Extension Engineers (1937, 1958). B. S., 1934, Kansas State University.
- FITZGERALD, LYNDELL WORTH, Assistant Professor; Area Extension Engineer (1959). B. S., 1951 and 1959, Kansas State University.
- FRAZIER, LESLIE P., Assistant Professor; Area Extension Specialist, Rural Development (1943, 1962). B. S., 1942, Oklahoma State University; M. S., 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; State Extension Forester (1951). 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.
- GLOVER, OTIS BENTON, Associate Professor; Emeritus District Agent (1929, 1963). B. S., 1917, Kansas State University.
- GORTON, ROBERT, Instructor; Continuing Education (1960). B. S., 1953, Louisiana Polytechnic Institute; M. S., 1960, Louisiana State University.

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- GOULD, LEONARD K., Instructor; District Extension Forester (1963). 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, Instructor; 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.
- GRONEWOLLER, HENRY PAUL, Instructor; Economist in Farm Management (1961). B. S., 1952, New Mexico A & M; M. S., 1961, Kansas State University.
- GUY, WILLIAM DONALD, Instructor; Extension Economist in Farm Management (1951, 1953). Chanute. B. S., 1942, Kansas State University.
- HAGANS, FRANK ALEXANDER, Associate Professor; 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.
- HANNA, JOHN BONAR, Associate Professor; Extension Specialist in 4-H Club Work (1934, 1960). B. S., 1932, M. S., 1954, Kansas State University.
- HAROLD, E. NORMAN, Assistant Professor; Civil Defense Training Contract, Department of Continuing Education (1963). B. A., 1960, Kansas State Teachers College; M. A., 1962, Vanderbilt University.
- HARPER, HAROLD BYRON, Assistant Professor; Extension Specialist in Soil Conservation (1932, 1946). B. S., 1933, M. S., 1957, Kansas State University.
- HAWES, DONICE AVERNE, Assistant Professor; Extension Specialist in Clothing and Textiles (1955, 1960). B. S., 1943, M. S., 1961, Kansas State University.
- HERPICH, RUSSELL LOUIS, Associate Professor; Extension Irrigation Engineer (1951, 1958). B. S., 1950, M. S., 1953, Kansas State University.
- HILL, HOWARD TEMPLETON, JR., Assistant Professor; Extension Specialist in Radio and Television (1962). B. S., 1955, Kansas State University; M. A., 1957, Pennsylvania State University.
- HJORT, ARTHUR LAWRENCE, Emeritus (1947, 1948).
- 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, Assistant Professor; District Agent (1935, 1958). B. S., 1930, Kansas State University.
- 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.
- JACOBS, VICTOR EDWIN, Instructor; Extension Specialist in Farm Management (1958). B. S., 1951, University of Missouri; M. S., 1958, University of Illinois.
- JEPSEN, RICHARD L., Instructor; 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.
- JONES, FRANCIS EUGENE, Assistant Professor; Extension Specialist in Radio Programming (1956, 1959). B. S., 1947, Kansas State Teachers College (Emporia); M. S., 1959, Kansas State University.
- *JONES, HAROLD EUGENE, Professor; Director of Extension (1946, 1956). B. S., 1940, Kansas State University; M. S., 1942, Ph. D., 1949, Purdue University.
- JONES, MARIELLEN, Instructor; Assistant to State Leader, Home Economics (1955, 1963). B. S., 1955, Kansas State University.
- KEPLER, JACK E., Assistant Professor; District Extension Forester (1963). B. S., 1960, University of Connecticut; M. S., 1962, Iowa State University.
- KING, CLAUDE LEWIS, Associate 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.
- KITCHENS, JOHN EDWARD, Professor; Head, Department of Continuing Education (1956, 1964). B. A., 1949, New Mexico Western College; M. A., 1954, University of New Mexico.
- KNOX, JOHN W., Instructor; Extension Specialist in Rural Areas Development (1951, 1961). B. S., 1951, Oklahoma State University; M. E., 1961, Colorado State University.
- KOENIG, MARGARET ANNABELLE, Professor; Associate Home Economics Leader (1929, 1959). B. S., 1928, Kansas State University; M. S., 1958, University of Wisconsin.

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- KUEHN, LOWELL D., Instructor; Extension Television Producer (1962). B. S., 1950, Iowa State University.
- LARSEN, EMERSON W., Itinerant Teacher; Job Training and Safety Program (1963).
- LIND, REUBEN CARL, Professor; Extension Specialist in Soil Conservation (1933, 1950). B. S., 1923, Kansas State University.
- LONGSDORF, LISLE LESLIE, Professor, Emeritus; Extension Editor (1927, 1946). B. S., 1921, M. S., 1926, University of Wisconsin.
- 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.
- McCULLICK, JACK JOE, Instructor; Continuing Education (1961). B. S., 1957, Fort Hays Kansas State College; M. S., 1960, Kansas State University.
- McDONALD, HUGH JOHN, Assistant Professor; Extension Specialist in Grain Marketing (1955, 1959). B. S., 1955, M. S., 1961, Kansas State University.
- 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.
- MEANS, EARL T., Instructor, Extension Economist in Farm Management (1944, 1952). B. S., 1922, Kansas State University.
- MEYER, ELLA MABLE, Assistant Professor, Emeritus; District Home Economics Agent (1925, 1956). B. S., 1907, Kansas State University.
- MILES, DONALD L., Assistant Professor; Extension Irrigation Engineer (1963). B. S., 1960, M. S., 1962, Colorado State University.
- MILLER, ELSIE LEE, Assistant Professor; Extension Specialist, Foods and Nutrition (1941, 1962). B. S., 1934, M. S., 1942, Kansas State University.
- MILLER, MAX BYRON, Assistant Professor; Conferences and Classes (1946, 1959). B. S., 1946, M. S., 1950, Kansas State University.
- MORDY, LUCILLE ERNA, Assistant Professor; Continuing Education (1947, 1960). B. S., 1928, Kansas State Teachers College (Emporia); M. S., 1951, Kansas State University.
- MOYER, WENDELL AUSTIN, Professor; 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.
- NEFF, LEONARD FAY, Associate Professor, Emeritus; Coordinator of Extension Personnel Training (1924, 1958). B. S., 1922, Purdue University.
- NEUFELD, DOROTHY HARBIN, Instructor; District Home Management Specialist (1962). B. S., Texas Technological College, 1950.
- *NORBY, OSCAR WOODROW, Professor; 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.
- OSBURN, MELVIN WILLIAM, Associate Professor; 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.
- PARKS, CHARLES ELWOOD, Assistant Professor; Extension Specialist in Landscape Architecture (1949, 1950). B. S., 1949, University of Illinois; M. S., 1957, Kansas State University.
- PARRIS, FRED M., Assistant 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 A & M.
- PATTISON, FLOYD HOLMES, Professor, Emeritus; Continuing Education (1919, 1927). B. S., 1912, Kansas State University; M. S., 1929, Massachusetts Institute of Technology.
- PECK, ERNEST GEORGE, Instructor; Visual Assistant (1955, 1961). B. S., 1950, Kansas State University.
- PLETCHER, VERA E., Instructor; History and Government, Home Study (1962). B. S., 1956, M. A., 1960, Kansas State University.
- REGNIER, ROGER ELI, Professor; State Club Leader (1934, 1958). 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 & M University.

*Graduate faculty.

- ROSS, EUGENE, Assistant Professor; Extension Specialist in Rural Areas Development (1955, 1962). B. S., 1952, Oklahoma State University; M. S., 1962, Kansas State University.
- SAVAGE, RUSSELL FRANK, Itinerant Instructor; Job Training and Safety Program, Continuing Education (1957).
- 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.
- *SCHOEFF, ROBERT WAYNE, Professor; Extension Economist in Marketing and Utilization of Formula Feed (1960). B. S., 1942, M. S., 1947, Ph. D., 1952, Purdue 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.
- SHERMAN, LOUIS LEROY, Instructor; Continuing Education (1962). B. M., 1954, Bethany College; M. S., 1962, Kansas State University.
- SHREVE, LOY W., Instructor; District Extension Forester (1964). B. S. F., 1951, West Virginia University.
- SLUSHER, JOHN PAUL, Instructor; District Extension Forester (1961). 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 E., Assistant Professor; Area Extension Specialist in Agricultural Development (1956, 1962). B. S., 1953, M. S., 1958, Kansas State University.
- SPRINGER, DONALD M., Instructor; Extension Television Producer (1957, 1962). B. S., 1957, Kansas State University.
- STARK, MAURICE EARL, Instructor; Administrative Assistant (1962). B. S., 1959, Kansas State University; C. P. A., 1961, Kansas.
- STARKEY, WINONA McNEIGHT, Assistant Professor; Extension Specialist in Home Furnishings (1944, 1956). B. S., 1947, M. S., 1954, Kansas State University.
- STEVENS, JR., CARL A., Instructor; Extension Economist, Formula Feeds (1962). B. S., 1960, M. S., 1963, Kansas State University.
- STOVER, HAROLD EARL, Professor; Extension Agricultural Engineer (1936, 1954). B. S., 1929, Kansas State University.
- STRICKLER, JOHN KEMPER, Instructor; District Extension Forester (1961). B. S., 1957, University of Missouri.
- SUGIRUE, KATHRYN EILEEN, Assistant Professor; District Home Economics Agent (1937, 1961). B. S., 1936, Kansas State University.
- TEAGARDEN, EARL HICKS, Emeritus (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, Assistant Professor; Extension Economist in Farm Management (1946, 1960). B. S., 1937, M. S., 1960, Kansas State University.
- TITUS, RALPH SEASE, Instructor; Extension Specialist in Radio and TV (1961). B. S., 1955, 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., 1953, University of Wisconsin.
- 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; 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, Kansas State University.
- TRUE, JOHN ANDREWS, Assistant Professor; Extension Agricultural Engineer (1962). B. S., Michigan State University, 1951.
- UNRUH, CHESTER RAY, Assistant Professor; Assistant Extension Editor (1961). A. B., 1940, Bethel College; M. S., 1956, 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.
- *VERHAALLEN, ROMAN J., Professor; Head, Department of Continuing Education (1954, 1957). B. A., 1946, M. A., 1947, Ph. D., 1949, Wyoming University.

*Graduate faculty.

- WALKER, MILDRED LUCILLE, Assistant Professor; Extension Specialist in Consumer Information (1956). B. S., 1952, Kansas State University; M. S., 1960, Pennsylvania State University.
- WARNER, EUGENE DECATUR, Professor; Extension Editor (1935, 1947). B. S., 1934, Kansas State University.
- WECKE, HAROLD W., Assistant Professor; Rural Blind Operations (1962). B. S., 1950, M. S., 1953, University of Missouri.
- 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, Associate Professor; Extension Agricultural Engineer (1947, 1958). B. S., 1947, M. S., 1956, Kansas State University.
- WESTMEYER, HERMAN W., Instructor; Extension Specialist in Animal Husbandry (1936, 1961). B. S., 1936, University of Missouri.
- WHITEHAIR, NORMAN VINCENT, Professor; Assistant Head Department of Economics, State Leader in Marketing (1946, 1961). B. S., 1943, M. S., 1953, Kansas 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.
- WILKINS, HOWARD DENSER, Instructor; 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.
- WILLIAMSON, MICHAEL M., Instructor; Art (1962). B. S., 1956, M. S., 1962, Kansas State University.
- WILLIS, WILLIAM GRANT, Instructor; Extension Specialist in Plant Pathology (1951, 1962). B. S., 1951, Kansas State University.
- WRIGHT, GEORGE W., Assistant Professor; Extension Specialist, Soil Testing (1949, 1962). B. S., 1951, M. S., 1956, 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.

COUNTY CLUB AGENTS

- BARNES, JOHN H., Harvey County (1953, 1959). Newton.
- BORST, WILLIAM H., Wyandotte County (1953). Kansas City.
- CARLSON, VIRGIL P., McPherson County (1957, 1959). McPherson.
- CHILDERS, JAMES R., Reno County (1944). Hutchinson.
- FULTZ, WILLIAM E., Greenwood County (1962, 1963). Eureka.
- GEIST, WAYNE D., Labette County (1962, 1963). Altamont.
- GOTTSCHE, ALBERT H., Butler County (1954, 1956). El Dorado.
- HAMILTON, DONALD F., Saline County (1960, 1962). Salina.
- HECHT, ROGER, Shawnee County (1952, 1960). Topeka.
- HENDERSHOT, ROYAL C., Kingman County (1956, 1960). Kingman.
- HENSLEY, DALE, Montgomery County (1957). Independence.
- HINES, PAUL N., Marshall County (1944, 1961). Marysville.
- HUNDLEY, JR., WILLIAM C., Douglas County (1955). Lawrence.
- KERNS, DAVID S., Washington County (1962). Washington.
- LOYD, DONALD G., Crawford County (1948, 1949). Girard.
- MCGINNIS, KENNETH E., Johnson County (1945). Olathe.
- MAYGINNES, PAUL H., Marion County (1951). Marion.
- MEIREIS, CLIFFORD L., Sumner County (1955, 1962). Wellington.
- NELSON, ROSS M., Franklin County (1959, 1960). Ottawa.
- NYHART, SYLVESTER O., Russell County (1958, 1959). Russell.
- RECTOR, RALPH B., Leavenworth County (1948, 1956). Leavenworth.
- RIAT, LARRY D., Dickinson County (1961). Abilene.
- SMITH, JIMMIE W., Riley County (1958). Manhattan.
- SMITH, WILBUR D., Lyon County (1963). Emporia.
- UMSCHEID, SYLVESTER C., Ellsworth County (1962, 1963). Ellsworth.
- VAN METER, E. L., Rice County (1960, 1961). Lyons.
- VAN SKIKE, WILLIAM V., Barton County (1950, 1956). Great Bend.
- WERNER, NORMAN A., Cherokee County (1963). Columbus.
- WREN, THURMAN S., Sedgwick County (1949, 1955). Wichita.
- YAUK, DON O., Ellis County (1963, 1964). Hays.

COUNTY HOME ECONOMICS AGENTS

- ALLEN, GAYLA JO, Cowley County (1960, 1962). Winfield.
- ARGANBRIGHT, MAHALA M., McPherson County (1949, 1960). McPherson.
- BAKER, SHIRLEY F., Jefferson County (1959, 1961). Oskaloosa.
- BERGDAL, NANCY J., Hamilton County (1963). Syracuse.

BIEHL, FLORENCE F., Johnson County (1962). Olathe.
BISHOP, BEVERLY JEAN, Jewell County (1961). Mankato.
BLACKWELL, CORA A., Ottawa County (1948, 1962). Minneapolis.
BLACKWOOD, HELEN H., Reno County (1960, 1962). Hutchinson.
BLEVINS, OLETHA L., Douglas County (1959). Lawrence.
BOOTH, MYRTLE FAYE, Republic County (1960, 1961). Belleville.
BRANDEN, ELSIE PAINTER, Finney County (1955, 1961). Garden City.
BROOKS, BLANCHE, Osage County (1941, 1942). Lyndon.
BROWN, JUDY A., Kearny County (1963). Lakin.
BRYSON, FRANCES R., Miami County (1962). Paola.
CARLSON, JEAN K., Lyon County (1950, 1952). Emporia.
CARR, LINDA J., Montgomery County (1963). Independence.
CLINE, LUCILE G., Pawnee County (1951, 1963). Larned.
COBB, DORIS W., Kiowa County (1959, 1963). Greensburg.
COLE, GERALDINE, Phillips County (1959, 1962). Phillipsburg.
CONLEY, JOSEPHINE, Johnson County (1955). Olathe.
CRESS, JEANICE A., Allen County (1955, 1956). Iola.
CRIST, ROSEMARY A., Franklin County (1950). Ottawa.
CURRIE, TRELLE, Cloud County (1955). Concordia.
DAVIS, OLIVE, Morton County (1955). Elkhart.
DAVIS, THYRA K., Douglas County (1964). Lawrence.
DISNEY, W. ELAINE, Ellis County (1961). Hays.
DOMSCH, L. ANN, Rawlins County (1959). Atwood.
DREESEN, MONA RUTH, Butler County (1958). El Dorado.
DUGGAN, MARGARET H., Graham County (1963). Hill City.
DUNNING, BEVERLY K., Sedgwick County (1964). Wichita.
ECK, DELORES S., Sedgwick County (1957, 1961). Wichita.
ECKERT, JOANNE E., Pratt County (1963). Pratt.
EDIGER, VENETA H., McPherson County (1961). McPherson.
EDWARDS, MARY LEE, Woodson County (1961). Yates Center.
EMERSON, MARGARET W., Edwards County (1963). Kinsley.
FAIR, LINDA J., Pottawatomie County (1963). Westmoreland.
FICKEN, LOIS, Grant County (1957). Ulysses.
FISHER, SHARON GAY, Meade County (1959). Meade.
FREDENBURG, NEOSHO LOUISE, Morris County (1953). Council Grove.
FREY, ALICE L., Clay County (1955). Clay Center.
GASTON, GLORIA J., Marshall County (1960). Marysville.
GEMAEHLICH, MARGARET J., Scott County (1963). Scott City.
GRABER, VIVIAN E., Kingman County (1955). Kingman.
GUTHRIE, GERSILDA, Hodgeman County (1958). Jetmore.
HAMMONS, JUDITH A., Ellsworth County (1962). Ellsworth.
HANSEN, MARTHA A., Barber County (1957). Medicine Lodge.
HAYES, MARY M., Sheridan County (1962). Hoxie.
HEINLY, FREDA K., Rice County (1957). Lyons.
HENDERSON, FLORENCE E., Russell County (1962). Russell.
HERNDON, MAY BETH, Rush County (1953). La Crosse.
HESTER, MARIAN V., Barton County (1953). Great Bend.
HINTZ, NORMA J., Sherman County (1961). Goodland.
HINZ, CYNTHIA S., Ness County (1963). Ness City.
HOVE, GERTRUDE, Cherokee County (1949, 1961). Columbus.
HUND, MARGARET ANN, Jackson County (1960). Holton.
HURD, MARTHA J., Stevens County (1963). Hugoton.
JOHNSON, JUANITA B., Crawford County (1948). Girard.
KAISER, MADELINE A., Saline County (1963). Salina.
KEMP, PHYLLIS E., Marion County (1962). Marion.
KENT, NANCY JO, Comanche County (1959). Coldwater.
KINDLER, BEVERLY L., Norton County (1951, 1960). Norton.
KRETCHMAR, MARY K., Anderson County (1960). Garnett.
KRUMSICK, MARY E., Shawnee County (1963). Topeka.
LAIDIG, JANICE K., Cheyenne County (1961, 1962). St. Francis.
LEIKAM, ELEANORA, Gray County (1954). Cimarron.
LONG, ANNABELLE B., Shawnee County (1955). Topeka.
MCCAULEY, EULA NEAL, Doniphan County (1930, 1959). Troy.
MCCOLLUM, MARGARET J., Chautauqua County (1962). Sedan.
McMURTRAY, JANET A., Saline County (1960, 1961). Salina.

MANSFIELD, EVA P., Leavenworth County (1953). Leavenworth.
 MATHIAS, JEANETTE J., Greenwood County (1963). Eureka.
 MEEK, MARY E., Dickinson County (1953). Abilene.
 MERIWETHER, NANCY A., Nemaha County (1958, 1960). Seneca.
 MOLZ, DIXIE IRENE, Stafford County (1953). St. John.
 MOORE, ALVERDA, Riley County (1955). Manhattan.
 NEELLY, ERMA M., Trego County (1950). Wakeeney.
 NEUSCHWANDER, OCIE A., Greeley County (1957). Tribune.
 NEWBY, GRACE L., Chase County (1961). Cottonwood Falls.
 OLEN, ALICE M., Seward County (1956). Liberal.
 OLSON, ELEANOR ANN, Mitchell County (1960). Beloit.
 PALMER, RACHEL F., Sedgwick County (1941). Wichita.
 PAUL, MARY L., Wallace County (1962). Sharon Springs.
 PEASE, MURIEL F., Bourbon County (1940, 1957). Fort Scott.
 PRICE, BETTY J., Wyandotte County (1961, 1963). Kansas City.
 PRICE, MARJORIE E., Coffey County (1957, 1960). Burlington.
 PROFFITT, JOANNA M., Rice County (1963). Lyons.
 PTACEK, ARIA NEAL, Rooks County (1954). Stockton.
 RALSTON, NANEEN B., Sedgwick County (1963). Wichita.
 ROSSER, KAREN E., Harvey County (1961). Newton.
 ROSSILLON, MARY A., Brown County (1958, 1960). Hiawatha.
 SCHROEDER, DOROTHEA A., Wyandotte County (1942, 1943). Kansas City.
 SCHROEDER, MARY M., Thomas County (1960, 1961). Colby.
 SHIPMAN, LORETTA KAY, Elk County (1961). Howard.
 STEWART, MARGARET V., Gove County (1962). Gove.
 STUBBS, LUCILLE, Smith County (1955). Smith Center.
 TEMPLETON, BARBARA ANN, Decatur County (1962). Oberlin.
 THIEL, SONJA R., Haskell County (1963). Sublette.
 TRUAX, RUBY C., Sedgwick County (1959). Wichita.
 VICE, FAYE E., Labette County (1946, 1947). Altamont.
 WALLACE, ALLENA F., Reno County (1962). Hutchinson.
 WEAVER, MAE K., Barton County (1952). Great Bend.
 WERTH, CAROL A., Logan County (1963). Oakley.
 WONER, ELIZABETH, Harper County (1949, 1950). Anthony.

COUNTY AGRICULTURAL AGENTS

ADAMS, E. BLAIR, Wyandotte County (1963). Kansas City.
 ALBRIGHT, KENNETH B., Ellis County (1955, 1957). Hays.
 APPLEBY, THOMAS C., Elk County (1960, 1963). Howard.
 AUFDENGARTEN, CHARLES H., Washington County (1963). Washington.
 BAIRD, C. JACK, Mitchell County (1953, 1958). Beloit.
 BAKER, E. KIRK, Russell County (1955). Russell.
 BARBER, ARNOLD, Atchison County (1955). Effingham.
 BIERY, FREEMAN E., Jewell County (1953). Mankato.
 BLAIR, W. LAWRENCE, Linn County (1960, 1961). Mound City.
 BLUME, WILLIS L., Haskell County (1948). Sublette.
 BOZWORTH, ROBERT W., Labette County (1960, 1963). Altamont.
 BROWN, DONALD A., Franklin County (1949, 1950). Ottawa.
 BULK, HERBERT W., Shawnee County (1949). Topeka.
 BURCHETT, LOWELL ALAN, Jackson County (1961). Holton.
 BURKHART, PEYTON H., Logan County (1962). Oakley.
 BYARLAY, HAL DEAN, Lincoln County (1963). Lincoln.
 BYARLAY, LOWELL H., Osborne County (1959, 1960). Osborne.
 CLARK, MONTE C., Ford County (1949, 1961). Dodge City.
 COLLINS, BILL D., Harvey County (1954). Newton.
 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.
 DICKSON, WILLIAM M., Neosho County (1961). Erie.
 DIVINE, JOE B., Osage County (1944). Lyndon.
 DUCKERS, JR., HARRY, Wyandotte County (1943). Kansas City.
 DUNAVAN, WILBUR J., Smith County (1960). Smith Center.
 ENGLE, KERMIT V., Ellsworth County (1936). Ellsworth.
 ETHERIDGE, RAY W., Barber County (1954, 1959). Medicine Lodge.

FAIDLEY, DONALD L., Graham County (1956, 1963). Hill City.
 FISH, G. KEITH, Trego County (1958, 1959). Wakeeney.
 FROMM, KENNETH W., Finney County (1953, 1960). Garden City.
 FRYE, RAYMOND G., Sumner County (1943). Wellington.
 GEBHART, JEWELL O., Sheridan County (1945, 1963). Hoxie.
 GERMANN, RALPH, Hodgeman County (1956, 1958). Jetmore.
 GOERTZ, HARVEY E., Brown County (1937). Hiawatha.
 GOLLADAY, RICHARD E., Hamilton County (1957). Syracuse.
 GREENWOOD, WILLIAM L., Scott County (1960, 1962). Scott City.
 GRIFFIN, HOWARD M., Morris County (1961, 1963). Council Grove.
 GRIFFITH, LESTER E., Marion County (1949, 1960). Marion.
 GRIGGS, OTIS R., Reno County (1951, 1960). Hutchinson.
 HACKLER, RAYMOND F., Nemaha County (1960, 1962). Seneca.
 HALL, C. T., Johnson County (1934, 1939). Olathe.
 HAMILTON, ROBERT J., Rush County (1956). La Crosse.
 HARDING, WARREN G., Rooks County (1955). Stockton.
 HARRINGTON, MAURICE C., Anderson County (1958, 1960). Garnett.
 HARRIS, A. EUGENE, Meade County (1938, 1940). Meade.
 HARRIS, LOREN E., Saline County (1958, 1961). Salina.
 HEDSTROM, EDWIN, Marshall County (1935). Marysville.
 HENDERSHOT, ROGER L., Harper County (1941, 1951). Anthony.
 HENRY, LARRY G., Greeley County (1956, 1959). Tribune.
 HEROD, JON, Morton County (1957). Elkhart.
 HINKLE, JR., EDGAR N., Decatur County (1960). Oberlin.
 HOLLINGSWORTH, CLARENCE A., Greenwood County (1937, 1953). Eureka.
 INGLE, DONALD W., Sedgwick County (1930, 1947). Wichita.
 JEPSEN, DELBERT D., Phillips County (1962, 1963). Phillipsburg.
 JOHNSON, ARTHUR R., Jefferson County (1958, 1960). Oskaloosa.
 JORDAN, J. WILLIS, Seward County (1953, 1961). Liberal.
 KIVETT, HARRY L., Edwards County (1957). Kinsley.
 KRAISINGER, WILBUR S., Pratt County (1951). Pratt.
 KUBIK, RICHARD W., Thomas County (1949). Colby.
 LINE, MERLIN E., Kearny County (1946, 1949). Lakin.
 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., Rawlins County (1956). Atwood.
 MADDUX, ALBERT G., Chase County (1959, 1960). Cottonwood Falls.
 MALEY, ALVIN E., Lyon County (1953, 1963). Emporia.
 MANN, RAY H., Wallace County (1956, 1957). Sharon Springs.
 MANNY, E. CLIFFORD, Pawnee County (1940, 1947). Larned.
 MARLOW, DAROLD DEAN, Wabaunsee County (1950). Alma.
 MAXWELL, THOMAS R., Allen County (1954, 1956). Iola.
 NEILL, JOE P., Cloud County (1946, 1960). Concordia.
 NEWSOME, B. W., Riley County (1955, 1960). Manhattan.
 NIGHSWONGER, JAMES J., Johnson County (1961, 1962). Olathe.
 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., Wilson County (1958, 1960). Fredonia.
 ROBERTSON, JOHN F., Comanche County (1956, 1959). Coldwater.
 ROBINSON, JOHN W., Lane County (1959, 1960). Dighton.
 SALLEE, LESLIE H., Clay County (1957, 1960). Clay Center.
 SCHILLING, DALE R., Kingman County (1958, 1960). Kingman.
 SCHLESENER, NORMAN E., Barton County (1956, 1963). Great Bend.
 SISK, ENSLEY J., Miami County (1960). Paola.
 SIX, DEAL D., Douglas County (1935). Lawrence.
 SMITH, CHARLES W., Cowley County (1955). Winfield.
 SMITH, JOHN F., Leavenworth County (1956). Leavenworth.
 SPENCER, ALBERT E., Pottawatomie County (1960, 1962). Westmoreland.
 SPITZE, DONALD C., Stanton County (1957, 1958). Johnson.
 STAGG, BEVERLY R., McPherson County (1940, 1960). McPherson.

STRAWN, AUBREY L., Chautauqua County (1962, 1963). Sedan.
STROADE, RICHARD E., Republic County (1959, 1962). Belleville.
STROUD, NELSON E., Geary County (1952). Junction City.
TAYLOR, GARLAND E., Stevens County (1961, 1962). Hugoton.
THOMPSON, JERRY D., Cherokee County (1946, 1960). Columbus.
TOWNSEND, JR., LAWRENCE W., Franklin County (1962). Ottawa.
TYLER, WAYNE H., Bourbon County (1954, 1955). Fort Scott.
URBAN, KENNETH E., Sedgwick County (1962). Wichita.
WAGNER, VERNON D., Cheyenne County (1961, 1963). St. Francis.
WALKER, JR., MARSHALL F., Grant County (1951). Ulysses.
WARD, DON F., Butler County (1961, 1963). El Dorado.
WARY, JR., RAYMOND E., Woodson County (1958, 1960). Yates Center.
WEST, JAY A., Doniphan County (1952). Troy.
WHIPPS, LOREN E., Sherman County (1946). Goodland.
WILES, DON K., Clark County (1956, 1958). Ashland.
WILSON, JACK H., Wichita County (1951). Leoti.
WILSON, PAUL H., Barton County (1946, 1947). Great Bend.

Statistical Summary for 1961-62

Students by States, Foreign Countries, and Kansas Counties

States

Alabama	1	Kentucky	1	Ohio	27
Alaska	4	Louisiana	14	Oklahoma	48
Arizona	9	Maryland	11	Oregon	7
Arkansas	19	Massachusetts	10	Pennsylvania	31
California	49	Michigan	15	South Carolina	3
Colorado	31	Minnesota	32	South Dakota	18
Connecticut	13	Mississippi	9	Tennessee	6
Delaware	1	Missouri	251	Texas	36
Florida	12	Montana	3	Utah	1
Georgia	4	Nebraska	139	Vermont	9
Hawaii	17	Nevada	3	Virginia	16
Idaho	3	New Jersey	53	Washington	3
Illinois	104	New Mexico	12	West Virginia	8
Indiana	35	New York	74	Wisconsin	30
Iowa	40	North Carolina	9	Wyoming	9
Kansas	7485	North Dakota	8	Total	8723

Foreign Countries and Territories Outside the Continental United States

Afghanistan	2	Greece	5	Nigeria	2
Arabia	1	Guam	1	Norway	2
Argentina	5	Guatemala	1	Okinawa	2
Aruba	2	Honduras	3	Pakistan	8
Bolivia	1	India	182	Palestine	1
Cambodia	6	Indonesia	1	Papaikou	1
Canada	7	Iran	11	Peru	6
Canal Zone	1	Iraq	12	Philippines	10
Chile	2	Israel	5	Puerto Rico	8
China	90	Italy	1	Sudan	3
Colombia	7	Japan	2	Switzerland	3
Costa Rica	1	Jordan	10	Syria	3
Curacao	1	Korea	18	Thailand	15
Cyprus	1	Lebanon	2	Turkey	4
District of Columbia	4	Malaya	2	Venezuela	7
Ecuador	1	Mexico	6	Vietnam	8
Egypt	14	Morocco	2	W. Pakistan	3
England	2	Nepal	1	Yugoslavia	2
Ethiopia	2	Netherlands	1	Total	510
Germany	1	Nicaragua	5		

Kansas Counties

Allen	39	Greenwood	33	Pawnee	37
Anderson	13	Hamilton	10	Phillips	41
Atchison	70	Harper	38	Pottawatomie	140
Barber	24	Harvey	85	Pratt	48
Barton	99	Haskell	14	Rawlins	23
Bourbon	16	Hodgeman	6	Reno	179
Brown	79	Jackson	49	Republic	83
Butler	103	Jefferson	28	Rice	67
Chase	20	Jewell	43	Riley	1156
Chautauqua	21	Johnson	407	Rooks	27
Cherokee	31	Kearny	7	Rush	22
Cheyenne	42	Kingman	52	Russell	53
Clark	18	Kiowa	28	Saline	224
Clay	131	Labette	44	Scott	49
Cloud	114	Lane	18	Sedgwick	515
Coffey	29	Leavenworth	76	Seward	32
Comanche	20	Lincoln	42	Shawnee	253
Cowley	88	Linn	25	Sheridan	22
Crawford	24	Logan	15	Sherman	36
Decatur	31	Lyon	56	Smith	27
Dickinson	176	McPherson	118	Stafford	53
Doniphan	16	Marion	48	Stantou	5
Douglas	38	Marshall	118	Stevens	9
Edwards	28	Meade	23	Summer	98
Elk	5	Miami	34	Thomas	55
Ellis	44	Mitchell	64	Trego	17
Ellsworth	50	Montgomery	82	Wabaunsee	57
Finney	66	Morris	49	Wallace	17
Ford	40	Morton	3	Washington	96
Franklin	45	Nemaha	67	Wichita	19
Geary	235	Neosho	45	Wilson	34
Gove	10	Ness	23	Woodson	16
Graham	13	Norton	62	Wyandotte	194
Grant	13	Osage	60	Total	7485
Gray	16	Osborne	36		
Greeley	9	Ottawa	57		

Statistical Summary for 1962-63
Students by States, Foreign Countries, and Kansas Counties

States			
Alabama	6	Louisiana	14
Alaska	4	Maine	1
Arizona	8	Maryland	10
Arkansas	18	Massachusetts	20
California	51	Michigan	17
Colorado	33	Minnesota	34
Connecticut	14	Mississippi	11
Delaware	1	Missouri	251
Florida	13	Montana	6
Georgia	10	Nebraska	144
Hawaii	20	Nevada	2
Idaho	5	New Hampshire	2
Illinois	100	New Jersey	49
Indiana	27	New Mexico	9
Iowa	44	New York	105
Kansas	8301	North Carolina	7
Kentucky	2	North Dakota	11
		Ohio	27
		Oklahoma	56
		Oregon	8
		Pennsylvania	30
		Rhode Island	1
		South Carolina	3
		South Dakota	24
		Tennessee	11
		Texas	40
		Utah	2
		Vermont	6
		Virginia	18
		Washington	7
		West Virginia	8
		Wisconsin	35
		Wyoming	10
		Total	9636

Foreign Countries and Territories Outside the Continental United States

Afghanistan	2	Greece	1	Nyasaland	1
Arabia	1	Honduras	1	Okinawa	1
Argentina	1	India	244	Pakistan	16
Aruba	2	Indonesia	1	Palestine	1
Australia	1	Iran	13	Panama	1
Bolivia	2	Iraq	13	Peru	3
Cambodia	4	Israel	2	Philippines	17
Canada	8	Italy	1	Puerto Rico	10
Canal Zone	2	Ivory Coast	1	S. Rhodesia	3
Chile	2	Japan	5	Scotland	1
China	109	Jordan	12	Sudan	1
Colombia	3	Korea	18	Switzerland	2
Costa Rica	1	Lebanon	4	Syria	2
Cyprus	4	Libya	1	Thailand	15
District of Columbia	4	Malaya	2	Turkey	5
Ecuador	1	Mexico	9	USSR	1
Egypt	19	Morocco	2	Venezuela	5
England	2	Nepal	2	Vietnam	6
Ethiopia	2	Netherlands	1	W. Africa	1
Formosa	8	Nicaragua	4	W. Indies	1
France	1	Nigeria	6	Zanzibar	1
Germany	4	Norway	1		
Ghana	1			Total	622

Kansas Counties

Allen	36	Greenwood	32	Pawnee	44
Anderson	17	Hamilton	13	Phillips	40
Atchison	83	Harper	29	Pottawatomie	158
Barber	30	Harvey	84	Pratt	56
Barton	129	Haskell	16	Rawlins	27
Bourbon	14	Hodgeman	4	Reno	193
Brown	87	Jackson	66	Republic	87
Butler	110	Jefferson	35	Rice	70
Chase	18	Jewell	52	Riley	1211
Chautauqua	19	Johnson	445	Rooks	38
Cherokee	26	Kearny	9	Rush	28
Cheyenne	48	Kingman	53	Russell	58
Clark	22	Kiowa	35	Saline	257
Clay	138	Labette	51	Scott	43
Cloud	121	Lane	30	Sedgwick	627
Coffey	37	Leavenworth	93	Seward	40
Comanche	22	Lincoln	42	Shawnee	300
Cowley	94	Linn	21	Sheridan	25
Crawford	29	Logan	16	Sherman	40
Decatur	27	Lyon	65	Smith	39
Dickinson	200	McPherson	123	Stafford	65
Doniphan	23	Marion	57	Stanton	5
Douglas	52	Marshall	128	Stevens	16
Edwards	31	Meade	21	Summer	90
Elk	10	Miami	46	Thomas	57
Ellis	47	Mitchell	76	Trego	22
Ellsworth	67	Montgomery	74	Wabaunsee	50
Finney	55	Morris	63	Wallace	20
Ford	50	Morton	9	Washington	106
Franklin	45	Nemaha	79	Wichita	23
Geary	261	Neosho	46	Wilson	34
Gove	11	Ness	23	Woodson	22
Graham	18	Norton	73	Wyandotte	225
Grant	20	Osage	54		
Gray	21	Osborne	31	Total	8301
Greeley	6	Ottawa	67		

Degrees Conferred in the Year 1962

COLLEGE OR SCHOOL	Men	Women	Total
SCHOOL OF AGRICULTURE	139		139
Agriculture	109		109
Feed Technology	20		20
Landscape Design	2		2
Milling Technology	6		6
Landscape Architecture	2		2
SCHOOL OF ARTS AND SCIENCES	451	236	687
Bachelor of Arts	63	60	123
Bachelor of Science	193	55	248
Business Administration	136	12	148
Elementary Education	26	91	117
Music Education	2	6	8
Physical Education	30	11	41
Technical Journalism	0	1	1
Bachelor of Music	1	0	1
SCHOOL OF ENGINEERING AND ARCHITECTURE	244	1	245
Agricultural Engineering	10		10
Architectural Engineering	10		10
Architecture	38		38
Chemical Engineering	11		11
Civil Engineering	25		25
Electrical Engineering	84		84
Industrial Education			
Industrial Engineering	10		10
Industrial Technology	5		5
Mechanical Engineering	37	1	38
Nuclear Engineering	14		14
Regional Planning			
SCHOOL OF HOME ECONOMICS	1	89	90
Home Economics		83	83
Home Economics and Journalism		6	6
Restaurant Management	1		1
SCHOOL OF VETERINARY MEDICINE	57	2	59
Veterinary Medicine	57	2	59
GRADUATE SCHOOL (Master of Architecture)	1		1
GRADUATE SCHOOL (Master of Arts)	17	3	20
Art (Architecture)	2		2
Art (Home Economics)			
Economics	2		2
English	3	1	4
Geography			
History	4		4
Mathematics			
Music	1	1	2
Political Science	1		1
Sociology	1		1
Speech	3	1	4
GRADUATE SCHOOL (Master of Regional Planning)	3		3
GRADUATE SCHOOL (Master of Science)	212	29	241
Accounting			
Agricultural Economics	8		8
Agricultural Engineering	3		3
Agronomy	13		13
Animal Husbandry	10		10
Applied Mechanics	5		5
Bacteriology	3		3
Biochemistry	1	1	2
Botany	1		1
Business Administration	6		6
Chemical Engineering	7		7
Chemistry	7		7
Civil Engineering	12		12
Clothing and Textiles		1	1
Dairy Science	6		6
Education	26	12	38
Electrical Engineering	10	1	11
Entomology	7		7
Extension Education	2		2
Family and Child Development		3	3
Family Economics		3	3

Degrees Conferred in the Year 1962—Concluded

COLLEGE OR SCHOOL	Men	Women	Total
Feed Technology	1		1
Foods and Nutrition		1	1
Genetics	1		1
Geology	1		1
Home Economics Education		1	1
Horticulture	6		6
Industrial Education	1		1
Industrial Engineering	5		5
Institutional Management		4	4
Mathematics	11		11
Mechanical Engineering	9		9
Milling Industry	6		6
Music	2		2
Nuclear Engineering	4		4
Parasitology	2		2
Pathology	7		7
Physical Education	8		8
Physical Science Teaching	1		1
Physics	4		4
Physiology	1		1
Poultry Science	2		2
Psychology	1	1	2
Statistics	5	1	6
Surgery and Medicine	3		3
Technical Journalism	1		1
Zoology	3		3
GRADUATE SCHOOL (Doctor of Philosophy)	35	1	36
Agricultural Economics	1		1
Agronomy	4		4
Animal Nutrition	2		2
Applied Mechanics	1		1
Bacteriology	2	1	3
Biochemistry	1		1
Chemistry	5		5
Electronics	1		1
Entomology	7		7
Horticulture	5		5
Mechanical Engineering	2		2
Milling Industry	1		1
Physics	1		1
Veterinary Medicine (Pathology)	1		1
Zoology	1		1
Grand Total	1160	361	1521

Degrees Conferred in the Year 1963

COLLEGE OR SCHOOL	Men	Women	Total
COLLEGE OF AGRICULTURE	140		140
Agriculture	98		98
Agricultural Journalism	2		2
Feed Technology	21		21
Landscape Architecture	11		11
Landscape Design	2		2
Milling Technology	6		6
COLLEGE OF ARTS AND SCIENCES	284	251	535
Bachelor of Arts.....	96	70	166
Bachelor of Science	149	63	212
Elementary Education	10	99	109
Bachelor of Music	2	1	3
Music Education	1	11	12
Physical Education	25	7	32
Chemistry	1		1
COLLEGE OF COMMERCE	134	10	144
Business Administration	134	10	144
COLLEGE OF ENGINEERING AND ARCHITECTURE	275	1	276
Agricultural Engineering	7		7
Architectural Engineering	5		5
Architecture	33	1	34
Chemical Engineering	19		19
Civil Engineering	54		54
Electrical Engineering	74		74
Industrial Engineering	17		17
Industrial Technology	4		4
Mechanical Engineering	45		45
Nuclear Engineering	17		17
COLLEGE OF HOME ECONOMICS	1	103	104
Home Economics		93	93
Home Economics and Journalism		9	9
Restaurant Management	1	1	2
COLLEGE OF VETERINARY MEDICINE	62	1	63
Veterinary Medicine	62	1	63
GRADUATE SCHOOL (Master of Architecture)	1		1
GRADUATE SCHOOL (Master of Arts)	21	15	36
Art (Architecture)	2	2	4
Art (Home Economics)	1		1
Economics	5	2	7
English	5	4	9
Geography	1		1
History	4	1	5
Mathematics	1	1	2
Sociology	1	3	4
Speech	1	2	3
GRADUATE SCHOOL (Master of Regional Planning)	4		4
GRADUATE SCHOOL (Master of Science)	249	29	278
Accounting	3		3
Agricultural Economics	10		10
Agricultural Education	1		1
Agricultural Engineering	5		5
Agronomy	8		8
Animal Husbandry	12		12
Applied Mechanics	3		3
Bacteriology	10	1	11
Biochemistry	1		1
Botany		1	1
Business Administration	2		2
Chemical Engineering	14		14
Chemistry	5		5
Civil Engineering	17		17
Clothing and Textiles		1	1
Dairy Science	7		7
Education	33	11	44
Electrical Engineering	11		11
Entomology	3		3
Extension Education	3		3
Family and Child Development		3	3
Family Economics	1	1	2

Degrees Conferred in the Year 1963—Concluded

COLLEGE OR SCHOOL	Men	Women	Total
Farm Mechanics	4		4
Feed Technology	1		1
Foods and Nutrition		3	3
Genetics		2	2
Geography	3		3
Geology	8		8
Horticulture	2		2
Industrial Engineering	7		7
Mathematics	10	1	11
Mechanical Engineering	15		15
Milling Industry	6	2	8
Music	1		1
Nuclear Engineering	3		3
Pathology	2	1	3
Physical Education	6		6
Physical Science Teaching	1		1
Physics	5	1	6
Physiology	2		2
Plant Pathology	1		1
Poultry Science	4		4
Psychology	2		2
Statistics	9		9
Surgery and Medicine	3		3
Technical Journalism	2		2
Zoology	3	1	4
GRADUATE SCHOOL (Doctor of Philosophy)	44	3	47
Agricultural Economics	1		1
Agronomy	6		6
Animal Breeding	1		1
Applied Mechanics	1		1
Bacteriology	2		2
Biochemistry	3		3
Botany	3		3
Chemistry	8		8
Entomology	4		4
Foods and Nutrition		2	2
Genetics	1		1
Horticulture	1		1
Mechanical Engineering	1		1
Milling Industry		1	1
Parasitology	2		2
Physics	2		2
Psychology	1		1
Veterinary Medicine (Pathology)	2		2
Zoology	5		5
GRADUATE SCHOOL (Specialist in Education)	1		1
Grand Total	1216	413	1629

Tabulation for First Semester 1961-62

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	158	4	112		69		56	1			395	5	400
Agricultural Economics	1		4		22		20				47		47
Agrie. Economics (Tech.)					1		2				3		3
Agricultural Education	21		19		14		18				72		72
Agricultural Journalism					1		1				2		2
Dairy Manufacturing			3		1		4				8		8
Feed Technology	21		15		15		21				72		72
Horticulture (Specialized) ..	1		2		2		1				6		6
Landscape Design	6		5	1	11		5				27	1	28
Milling Technology	19		8		8		7				42		42
Technical Agronomy					6		11				17		17
Special Students	1	2							5	3	6	5	11
TOTAL	228	6	168	1	150	1	146	1	5	3	697	11	708

SCHOOL OF ARTS AND SCIENCES

Applied Music	2	2		2			4	2			6	6	12
Biological Science	140	40	148	30	19	15	17	4			324	89	413
Business Administration	134	30	124	16	126	9	155	13			539	68	607
Education	73	176	81	169	85	147	122	168		2	361	662	1023
General	155	87	53	40	25	5	20	5			253	137	390
Geology (Professional)							1				1		1
Humanities	26	56	22	54	26	51	22	32		1	96	194	290
Physical Science	73	15	31	12	58	6	73	6			235	39	274
Social Science	65	41	64	36	56	24	65	26			250	127	377
Technical Journalism					1						1		1
Special Students	1	1					1		26	33	28	34	62
TOTAL	669	448	523	359	396	257	480	256	26	36	2094	1356	3450

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	11		16		11		13				51		51
Architectural Engineering	22	1	12		11		12				57	1	58
Architecture	87	6	85	1	69	2	90	2			331	11	342
Chemical Engineering	43	1	38	1	34		17				132	2	134
Civil Engineering	58		38		61	1	45				202	1	203
Electrical Engineering	93		112		106		109				420		420
Industrial Engineering	12		6		16		15				49		49
Industrial Technology					1		8				9		9
Mechanical Engineering	88		63		64		52	1			267	1	268
Nuclear Engineering	34	2	38		28	2	18				118	4	122
Special Students	2								2	1	4	1	5
TOTAL	450	10	408	2	401	5	379	3	2	1	1640	21	1661

SCHOOL OF HOME ECONOMICS

Home Economics	4	197	2	142	1	93	1	72			8	504	512
Dietetics and Inst. Mngt.		13		6		7		8				34	34
Home Ec. with Lib. Arts		6		5				1				12	12
Home Ec. and Journalism		9		4		6		7				26	26
Home Ec. and Nursing		38		16				1				55	55
Restaurant Management	4	2	4	1	1	1					9	4	13
Special Students		18		1						5		24	24
TOTAL	8	283	6	175	2	107	1	89	1	5	17	659	676

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	68	2	57	3	62	1	57	2	1		245	8	253
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SUMMARY

Net Total Undergraduates	1423	749	1162	540	1011	370	1063	351	34	45	4693	2055	6748
Graduate School											709	149	858
Evening on Campus											128	115	243
GRAND TOTAL											5530	2319	7849

Tabulation for Second Semester 1961-62

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	143	3	118		69		43	1			373	4	377
Agricultural Economics			3		22		14				39		39
Agric. Economics (Tech.)					1		2				3		3
Agricultural Education	23		20		13		9				65		65
Agricultural Journalism					1		1				2		2
Dairy Manufacturing	1		1		1		3				6		6
Feed Technology	17		15		15		11		1		59		59
Horticulture (Specialized) ..	1		1		2						4		4
Landscape Architecture	6		8	1	14		7				35	1	36
Milling Technology	15		12		9		3				39		39
Technical Agronomy					7		8				15		15
Special Students		1							5	3	5	4	9
TOTAL	206	4	178	1	154	1	101	1	6	3	645	9	654

SCHOOL OF ARTS AND SCIENCES

Applied Music	2	1		2			4	2			6	5	11
Biological Science	138	34	146	29	26	11	15	3		1	325	78	403
Business Administration	118	30	126	13	136	9	138	10			518	62	580
Education	90	193	85	174	92	145	98	143			365	655	1020
General	177	73	62	23	24	4	20	4			283	104	387
Geology (Professional)			1		1		1				3		3
Humanities	26	59	26	67	20	55	19	26		1	91	208	299
Physical Science	55	14	36	12	54	5	63	5			208	36	244
Social Science	74	42	70	32	68	27	53	25			265	126	391
Technical Journalism					1						1		1
Special Students	2						1		25	33	28	33	61
TOTAL	682	446	552	352	422	256	412	218	25	35	2093	1307	3400

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	5		17		14		8				44		44
Architectural Engineering	16	1	12		11		9				48	1	49
Architecture	74	6	85	1	61	2	81	2			301	11	312
Chemical Engineering	37	1	31	1	33		19		1		121	2	123
Civil Engineering	51	1	36		58	1	38				183	2	185
Electrical Engineering	79		105		102		73				359		359
Industrial Engineering	11		8		17		15				51		51
Industrial Technology					1		4				5		5
Mechanical Engineering	62		48		59		36				205		205
Nuclear Engineering	30		32		25	2	15				102	2	104
Special Students	1								3	1	4	1	5
TOTAL	366	9	374	2	381	5	298	2	4	1	1423	19	1442

SCHOOL OF HOME ECONOMICS

Home Economics	1	184		127	1	88	1	62		2	3	463	466
Dietetics and Inst. Mngt.		13	1	5		7		9			1	34	35
Home Ec. and Journalism ..		9		4		6		7				26	26
Home Ec. with Liberal Arts ..		5		3				1				9	9
Home Ec. and Nursing		33		18		1				1		53	53
Restaurant Management	3	3	5	1	1						9	4	13
Special Students		9								10		19	19
TOTAL	4	256	6	158	2	102	1	79	1	13	13	608	621

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	60	2	57	3	62	1	57	2	1		237	8	245
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SUMMARY

Net Total Undergraduates ...	1318	717	1167	516	1021	364	869	302	36	52	4411	1951	6362
Graduate School											734	148	882
Evening on Campus											412	102	514
GRAND TOTAL											5557	2201	7758

Tabulation for Summer School 1962

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	16	1	19		6		2	2			43	3	46
Agricultural Economics					2		2				4		4
Agricultural Education			2		1		1				4		4
Agricultural Journalism					1						1		1
Dairy Manufacturing					1						1		1
Feed Technology	2		2		7		1				12		12
Landscape Design	1			1	1						2	1	3
Milling Technology	2		1		1						4		4
Technical Agronomy					3		1				4		4
Special Students	1								4		5		5
TOTAL	22	1	24	1	23		7	2	4		80	4	84

SCHOOL OF ARTS AND SCIENCES

Biological Science	21	6	32	16	9	6	3				65	28	93
Humanities	6	20	6	14	8	20	6	2	1		27	56	83
Physical Science	8	5	9	5	13	2	21	1	1		52	13	65
Social Science	10	11	16	6	18	15	10	6	1		55	38	93
Education	9	47	16	54	27	70	27	71		7	79	249	328
General	25	17	4	1	5	2	5			1	39	21	60
Business Administration	21	1	20	6	47	4	33	3	1		122	14	136
Applied Music		2		2			1	2			1	6	7
Special Students	1	1		1			2	1	60	102	63	105	168
TOTAL	101	110	103	105	127	119	108	86	64	110	503	530	1033

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	2		2		3		2				9		9
Architectural Engineering	2		2		5		2				11		11
Architecture	7	1	7		22	1	42		1		79	2	81
Chemical Engineering	11		8		8		4				31		31
Civil Engineering	4		2		11		11		1		29		29
Electrical Engineering	19		23		37		15		1		95		95
Industrial Engineering	4		2		2		7				15		15
Industrial Technology							1				1		1
Mechanical Engineering	7		4		15		10				36		36
Nuclear Engineering	3		11		8	1	3				25	1	26
Special Students	1								13		14		14
TOTAL	60	1	61		111	2	97		16		345	3	348

SCHOOL OF HOME ECONOMICS

Home Economics		47	1	26	1	22		15		1	2	111	113
Dietetics and Inst. Mngt.		3		2		1		2				8	8
Home Ec. and Journalism				3		4		2				9	9
Home Ec. and Nursing		12	1	12		1				1	1	26	27
Restaurant Management	1			2		1					1	3	4
Special Students				1						1	6	1	8
TOTAL	1	62	2	46	1	29		19	1	8	5	164	169

SCHOOL OF VETERINARY MEDICINE

Special Veterinary Med.										1		1	1
Veterinary Medicine.....	2		4		3					1		10	10
TOTAL	2		4		3					2		11	11

SUMMARY

Net Total Undergraduates ..	186	174	194	152	265	150	212	107	87	118	944	701	1645
Graduate School											705	304	1009
Evening on Campus											64	6	70
GRAND TOTAL											1713	1011	2724

NEW AND DIFFERENT STUDENTS ENROLLED AT KANSAS STATE UNIVERSITY

First, Second Semester and
Summer School, 1961-62

Freshmen	2363
Sophomores	1871
Juniors	1517
Seniors	1440
Special and Provisional	364
5th and 6th Year	46
Graduate	1634
TOTAL	9235

Tabulation for First Semester 1962-63

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	144	7	109	5	81	.....	68	2	.....	.....	402	14	416
Agricultural Economics .....	.....	.....	.....	.....	8	.....	18	.....	.....	.....	26	.....	26
Ag. Economics (Tech.) .....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Agricultural Education	22	.....	28	.....	19	.....	14	.....	.....	.....	83	.....	83
Agricultural Journalism .....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	.....	2
Dairy Manufacturing	4	.....	.....	.....	2	.....	1	.....	.....	.....	7	.....	7
Feed Technology	24	.....	14	.....	12	.....	21	.....	.....	.....	71	.....	71
Horticulture (Specialized) .....	.....	.....	.....	.....	2	.....	2	.....	.....	.....	4	.....	4
Landscape Architecture	8	1	7	1	6	1	15	.....	.....	.....	36	3	39
Milling Technology	10	.....	12	1	16	.....	6	.....	.....	.....	44	1	45
Technical Agronomy .....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	5	.....	5
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	8	4	8	4	12
TOTAL	212	8	170	7	146	1	153	2	8	4	689	22	711

SCHOOL OF ARTS AND SCIENCES

Applied Music	3	4	1	1	.....	3	3	2	.....	.....	7	10	17
Biological Science	212	57	177	34	36	23	24	8	.....	.....	449	122	571
Education	80	224	67	194	90	189	118	164	.....	1	355	772	1127
General	187	136	101	51	40	21	27	1	.....	.....	355	209	564
Humanities	24	65	21	66	24	46	25	45	.....	.....	94	222	316
Physical Science	56	21	45	11	41	13	54	7	.....	.....	196	52	248
Social Science	55	45	71	30	68	26	77	24	.....	.....	271	125	396
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	19	40	19	40	59
TOTAL	617	552	483	387	299	321	328	251	19	41	1746	1552	3298

SCHOOL OF COMMERCE

Business Administration	83	25	60	20	79	4	98	11	.....	.....	320	60	380
Accounting	51	10	50	11	48	3	47	.....	.....	.....	196	24	220
TOTAL	134	35	110	31	127	7	145	11	.....	.....	516	84	600

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	30	.....	12	.....	15	.....	12	.....	.....	.....	69	.....	69
Architectural Engineering	30	.....	16	1	14	.....	8	.....	.....	.....	68	1	69
Architecture	114	2	69	6	67	2	101	4	.....	.....	351	14	365
Chemical Engineering	44	1	29	.....	35	1	35	.....	.....	.....	143	2	145
Civil Engineering	81	.....	51	.....	45	1	57	.....	.....	.....	234	1	235
Electrical Engineering	147	1	100	.....	96	.....	105	.....	.....	.....	448	1	449
Industrial Engineering	18	.....	11	.....	9	.....	19	.....	.....	.....	57	.....	57
Industrial Technology .....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	.....	2
Mechanical Engineering	107	.....	68	.....	60	.....	53	.....	.....	.....	288	.....	288
Nuclear Engineering	47	.....	38	1	31	1	23	1	.....	.....	139	3	142
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	6	.....	6
TOTAL	618	4	394	8	372	5	415	5	6	.....	1805	22	1827

SCHOOL OF HOME ECONOMICS

Home Economics .....	.....	224	2	167	2	123	2	87	.....	.....	6	601	607
Dietetics and Inst. Mngt. ....	.....	10	1	10	.....	4	.....	5	.....	.....	1	29	30
Home Ec. and Journalism .....	.....	13	.....	9	.....	4	.....	9	.....	.....	.....	35	35
Home Ec. with Liberal Arts ..	.....	15	.....	5	.....	2	.....	.....	.....	.....	.....	22	22
Home Ec. and Nursing .....	.....	30	.....	29	1	3	.....	.....	.....	.....	1	62	63
Restaurant Management	1	1	6	1	3	2	1	1	.....	.....	11	5	16
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	1	4	5
TOTAL	1	293	9	221	6	138	3	102	1	4	20	758	778

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	74	2	61	2	54	3	62	1	1	252	8	260
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SUMMARY

Net Total Undergraduates ..	1656	894	1227	656	1004	475	1106	372	35	49	5028	2446	7474
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	831	172	1003
Evening on Campus .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	269	163	432
GRAND TOTAL											6128	2781	8909

Tabulation for Second Semester 1962-63

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	147	2	121	4	80	.....	51	1	.....	.....	399	7	406
Agricultural Economics .....	.....	.....	.....	.....	7	.....	13	.....	.....	.....	20	.....	20
Ag. Economics (Tech.) .....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Agricultural Education	22	.....	29	.....	21	.....	7	.....	.....	.....	79	.....	79
Agricultural Journalism .....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Dairy Manufacturing	3	.....	2	.....	2	.....	1	.....	.....	.....	8	.....	8
Feed Technology	25	.....	13	.....	12	.....	14	.....	.....	.....	64	.....	64
Horticulture (Specialized) .....	.....	.....	.....	.....	2	.....	1	.....	.....	.....	3	.....	3
Landscape Architecture	9	.....	10	2	8	1	10	.....	.....	.....	37	3	40
Milling Technology	10	.....	12	1	16	.....	4	.....	.....	.....	42	1	43
Technical Agronomy .....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	3	.....	3
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	10	7	10	7	17
TOTAL	216	2	187	7	148	1	106	1	10	7	667	18	685

SCHOOL OF ARTS AND SCIENCES

Applied Music	3	2	1	.....	.....	3	1	2	.....	.....	5	7	12
Biological Science	186	50	166	30	41	19	17	7	1	.....	411	106	517
Education	85	223	78	197	91	170	94	138	.....	3	348	731	1079
General	197	133	98	33	38	15	17	1	.....	.....	350	182	532
Humanities	22	59	21	70	27	48	23	35	.....	.....	93	212	305
Physical Science	54	20	37	11	48	13	46	7	.....	1	185	52	237
Social Science	69	44	78	29	74	25	58	18	.....	.....	279	116	395
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	23	29	23	29	52
TOTAL	616	531	479	370	319	293	256	208	24	33	1694	1435	3129

SCHOOL OF COMMERCE

Business Administration	112	25	77	20	85	7	74	12	.....	.....	348	64	412
Accounting	62	10	53	10	50	2	40	.....	.....	.....	205	22	227
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	5	.....	5
TOTAL	174	35	130	30	135	9	114	12	5	.....	558	86	644

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	27	.....	12	.....	13	.....	9	.....	.....	.....	61	.....	61
Architectural Engineering	23	.....	12	1	14	.....	5	.....	.....	.....	54	1	55
Architecture	104	1	67	3	56	1	93	3	.....	.....	320	8	328
Chemical Engineering	41	1	25	.....	32	1	29	.....	.....	.....	127	2	129
Civil Engineering	64	.....	40	.....	44	1	34	.....	.....	.....	182	1	183
Electrical Engineering	126	1	94	.....	90	.....	74	.....	.....	.....	384	1	385
Industrial Engineering	19	.....	9	.....	10	.....	13	.....	.....	.....	51	.....	51
Industrial Option .....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	1
Industrial Technology .....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Mechanical Engineering	83	.....	54	.....	57	.....	36	.....	.....	.....	230	.....	230
Nuclear Engineering	37	.....	38	.....	29	1	21	1	.....	.....	125	2	127
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	8	1	8	1	9
TOTAL	524	3	351	4	346	4	315	4	8	1	1544	16	1560

SCHOOL OF HOME ECONOMICS

Home Economics .....	.....	217	2	153	2	107	2	76	.....	1	6	554	560
Dietetics and Inst. Mngt. ....	.....	9	1	12	.....	7	.....	5	.....	.....	1	33	34
Home Ec. and Journalism .....	.....	13	.....	8	.....	2	.....	8	.....	.....	.....	31	31
Home Ec. with Liberal Arts .....	.....	15	.....	3	.....	6	.....	.....	.....	.....	.....	24	24
Home Ec. and Nursing .....	.....	28	.....	21	.....	4	.....	.....	1	.....	.....	54	54
Restaurant Management	3	1	4	1	4	2	1	1	.....	.....	12	5	17
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	.....	11	11
TOTAL	3	283	7	198	6	128	3	90	.....	13	19	712	731

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	73	2	59	2	54	3	62	1	1	249	8	257
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SUMMARY

Net Total Undergraduates ..	1606	856	1213	611	1008	438	856	316	48	54	4731	2275	7006
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	823	177	1000
Evening on Campus .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	221	130	351
GRAND TOTAL .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5775	2582	8357

Tabulation for Summer School 1963

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	19		15	1	13		2	1			49	2	51
Agricultural Economics					1		1				2		2
Agricultural Education	1		1		2		3				7		7
Feed Technology	4		1		5		3				13		13
Landscape Architecture	4		4	1	2	1	3				13	2	15
Milling Technology	2		2		1		1				6		6
Special Students									6		6		6
TOTAL	30		23	2	24	1	13	1	6		96	4	100

SCHOOL OF ARTS AND SCIENCES

Applied Music	1						2	1	2		2	4	6
Biological Science	37	16	28	6	8	8	5	2			78	32	110
Education	18	76	15	49	19	66	29	79		5	81	275	356
General	34	35	11	4	9	7	1				55	46	101
Humanities	5	22	3	13	9	20	7	4			24	59	83
Physical Science	15	1	7	5	13	2	11	1	1	1	47	10	57
Social Science	15	10	16	9	23	2	13	5		1	67	27	94
Special Students									46	76	46	76	122
TOTAL	125	160	80	86	81	107	67	93	47	83	400	529	929

SCHOOL OF COMMERCE

Business Administration	14	6	8	6	26	3	21	6	2		71	21	92
Accounting	10	2	11	1	17	1	4				42	4	46
Special Students									2		2		2
TOTAL	24	8	19	7	43	4	25	6	4		115	25	140

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	1		2		1		3				7		7
Architectural Engineering	4		1		3		2				10		10
Architecture	10	1	11	2	8		44	3	1		74	6	80
Chemical Engineering	7		5		8		2				22		22
Civil Engineering	6		5		16		11				38		38
Electrical Engineering	26	1	33		25		20				104	1	105
Industrial Engineering	3		1		3		10				17		17
Mechanical Engineering	17		7		18		10				52		52
Nuclear Engineering	11		15		12		10				48		48
Special Students									13		13		13
TOTAL	85	2	80	2	94		112	3	14		385	7	392

SCHOOL OF HOME ECONOMICS

Home Economics	2	56	1	39	1	37		7		5	4	144	148
Dietetics and Inst. Mngt.		1		1		4						6	6
Home Ec. and Journalism		4		2								6	6
Home Ec. with Liberal Arts		1		2		3						6	6
Home Ec. and Nursing	1	20		15		2					1	37	38
Restaurant Management			1		2		1				4		4
Special Students										11		11	11
TOTAL	3	82	2	59	3	46	1	7		16	9	210	219

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	7	1	3						1		11	1	12
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SUMMARY

Net Total Undergraduates ..	274	253	207	156	245	158	218	110	72	99	1016	776	1792
Graduate School											737	346	1083
Evening on Campus											47	8	55
GRAND TOTAL											1800	1130	2930

NEW AND DIFFERENT STUDENTS ENROLLED AT KANSAS STATE UNIVERSITY

First, Second, Summer Semesters 1962-63

Freshmen	2775
Sophomores	1986
Juniors	1625
Seniors	1482
5th and 6th Year	167
Special and Provisional	378
Graduate	1845
TOTAL	10,258

Record of Enrollment and Degrees Conferred, 1863-1963

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											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			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	288	261	44	81	2523	236
1912-'13	282	175	11		289		129		654		444	432	355	288	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	401	76	219	3314	359
1916-'17	586	103	14		228	191	172			422	693	471	378	282	68	279	3839	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

RECORD OF ENROLLMENT AND DEGREES CONFERRED, 1863-1963—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
1932-'33..	995						72				666	596	552	590	518	630	3359	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
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	383	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	.....	7736	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	.....	10,258	1628

* 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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