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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, 1962-63

Sept. 1, Sat. Beginning of pay period for 9-months staff.
Sept. 3, Mon. Holiday—Labor Day.
Sept. 9, 3:00 p.m., Sun. Convocation for new students and their parents.
Sept. 10-12, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
Sept. 13, Thurs. Classes begin. Late enrollment fee, \$2.50.
Sept. 15, 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. 22, Sat. Last day to enroll without special permission from student's dean (2nd week).
Oct. 3, Wed. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
Oct. 27, Noon, Sat. Deficiency reports due in deans' offices (7th week).
Nov. 20, 10:00 p.m., Tues. Thanksgiving student recess begins.
Nov. 22, Thurs. Holiday—Thanksgiving Day.
Nov. 26, Mon. Classes resume.
Dec. 22, Noon, Sat. Christmas student recess begins.
Dec. 25, Tues. Holiday—Christmas Day.
Jan. 1, Tues. Holiday—New Year's Day.
Jan. 7, Mon. Classes resume.
Jan. 12, Noon, Sat. Last day subject may be dropped before end of semester.
Jan. 19-25, Sat. Begin 1:00 p.m. End Fri. Noon. Semester examinations for all students including candidates for degrees.
Jan. 28, 5:00 p.m., Mon. Grade reports to Registrar for all students including candidates for degrees.
Jan. 30, 8:00 a.m., Wed. Deficiency reports from Registrar to deans' offices.

SECOND SEMESTER, 1962-63

Jan. 31-Feb. 2, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
Feb. 4, Mon. Classes begin. Late enrollment fee, \$2.50.
Feb. 5, 4:00 p.m., Tues. Senate meeting to approve candidates for degrees, fall semester.
Feb. 9, Noon, Sat. Regular registration closes for University staff, elementary and secondary teachers.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Feb. 16, Sat. Last day to enroll without special permission from student's dean (2nd week).
Feb. 23, Noon, Sat. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
Mar. 23, Noon, Sat. Deficiency reports due in deans' offices (7th week).
Apr. 6, Noon, Sat. Spring student recess begins (Following the 9th week).
Apr. 15, Mon. Classes resume.
May 18, Noon, Sat. Last day a subject may be dropped before end of semester.
May 25-31, Sat. Noon-Fri. Noon. Semester examinations for all students except graduating seniors.
May 27, Noon, Mon. Grades to Registrar for all candidates for degrees.
May 30, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
June 2, 2:00 p.m., Sun. Commencement, Fieldhouse.
June 3, 5:00 p.m., Mon. Grade reports to Registrar.
June 6, 8:00 a.m., Thurs. Deficiency reports from Registrar to deans' offices.

8-WEEK SUMMER SESSION, 1963

June 10, 8:00 a.m., Mon. Registration of all students including physical examinations, testing, and orientation for new students.
June 11, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
June 15, Noon, Sat. Regular registration closes for University staff, elementary and secondary teachers.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Last day to enroll without special permission from student's dean.
June 21, 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, Thurs. Holiday—Independence Day.
July 5, 5:00 p.m., Fri. Deficiency reports due in deans' offices (4th week).
July 30, 4:00 p.m., Tues. Last day subject may be dropped before end of session.
Aug. 2, 5:00 p.m., Fri. Last day for examinations.
Aug. 3, 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.

CALENDAR (Continued)

FIRST SEMESTER, 1963-64

Sept. 1, Sun. Beginning of pay period for 9-months staff.
 Sept. 2, Mon. Holiday—Labor Day.
 Sept. 8, 3:00 p.m., Sun. Convocation for new students and their parents.
 Sept. 9-11, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
 Sept. 12, Thurs. Classes begin. Late enrollment fee, \$2.50.
 Sept. 14, 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. 21, Noon, Sat. Last day to enroll without special permission from student's dean (2nd week).
 Oct. 2, Wed. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
 Oct. 26, Noon, Sat. Deficiency reports due in deans' offices (7th week).
 Nov. 26, 10:00 p.m., Tues. Thanksgiving student recess begins.
 Nov. 28, Thurs. Holiday—Thanksgiving Day.
 Dec. 2, Mon. Classes resume.
 Dec. 21, Noon, Sat. Christmas student recess begins.
 Dec. 25, Wed. University holiday for Christmas Day.
 Jan. 1, Wed. University holiday for New Year's Day.
 Jan. 6, Mon. Classes resume.
 Jan. 11, Noon, Sat. Last day subject may be dropped before end of semester.
 Jan. 18-24, 1:00 p.m., Sat.-Fri. Noon. Semester examinations for all students.
 Jan. 27, 5:00 p.m., Mon. Grade reports to Registrar.
 Jan. 29, 8:00 a.m., Wed. Reports of failures from Registrar to deans' offices.

SECOND SEMESTER, 1963-64

Jan. 30-Feb. 1, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
 Feb. 3, Mon. Classes begin. Late enrollment fee, \$2.50.
 Feb. 8, 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. 15, Sat. Last day to enroll without special permission from student's dean (2nd week).
 Feb. 22, Sat. Last day for dropping courses without a Wd or failure being recorded (18th class day), except for new students.
 Mar. 21, Noon, Sat. Deficiency reports due in deans' offices (7th week).
 Mar. 21, Noon, Sat. Spring student recess begins.
 Mar. 30, Mon. Classes resume.
 May 16, Noon, Sat. Last day a subject may be dropped before end of semester.
 May 23-29, Sat., 1:00 p.m.-Fri. Noon. Semester examinations for all students except graduating seniors.
 May 25, Noon, Mon. Grades to Registrar for all candidates for degrees.
 May 28, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
 May 31, 2:00 p.m., Sun. Commencement, Fieldhouse.
 June 1, 5:00 p.m., Mon. Grade reports to Registrar.
 June 4, 8:00 a.m., Thurs. Reports of failures from Registrar to deans' offices.

8-WEEK SUMMER SESSION, 1964

June 8, 8:00 a.m., Mon. Registration of all students including physical examinations, testing, and orientation for new students.
 June 9, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
 June 13, Noon, Sat. Regular registration closes for University staff, elementary and secondary teachers.
 End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
 Last day to enroll without special permission from student's dean.
 June 19, 5:00 p.m., Fri. Last day for dropping courses with a Wd or failure being recorded (9th class day), except for new students.
 July 3, 5:00 p.m., Fri. Deficiency reports due in deans' offices (4th week).
 July 4, Sat. Holiday—Independence Day.
 July 28, 4:00 p.m., Tues. Last day subject may be dropped before end of session.
 July 31, 5:00 p.m., Fri. Last day for examinations.
 Aug. 1, 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.

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 180 acres carefully landscaped, while beyond the campus there are 3,856 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 capacities, 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 inter-relations 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 September 1, 1960, and all who graduate after June, 1966, 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 1.7 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 School 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 School 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 the senior year for a student who completes curricular 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 partici-

pate in the following spring commencement exercises but attendance is not required.

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 12.

IN THE SCHOOL OF AGRICULTURE

- (E) Agriculture, B. S. in Agriculture, B. S. in Agricultural Journalism, page 55.
 - (Agricultural Economics major), page 56.
 - (Agricultural Journalism major), page 59.
 - (Agronomy major), page 56.
 - (Animal Husbandry major), page 57.
 - (Dairy Science major), page 57.
 - (Entomology major), page 58.
 - (Horticulture major), page 58.
 - (Poultry Science major), page 59.
- (E) Agricultural Education (Teachers), B. S. in Agriculture, page 64.
- (E) Dairy Manufacturing, B. S. in Agriculture, page 60.
- (E) Feed Technology, B. S. in Feed Technology, page 61.
 - (Administration option), page 61.
 - (Chemistry option), page 61.
 - (Operation option), page 61.
- (E) Landscape Architecture, B. S. in Landscape Architecture, page 63.
- (E) Milling Technology, B. S. in Milling Technology, page 62.
 - (Administration option), page 62.
 - (Chemistry option), page 62.
 - (Operation option), page 62.

IN THE SCHOOL OF ARTS AND SCIENCES

- (A) Applied Music, Bachelor of Music, page 104.
- (E) Biological Science (except Pre-veterinary), Bachelor of Science, page 95.
- (A) Education, B. S. in Elementary Education, B. S. in Music Education, B. S. in Physical Education, B. S. in Secondary Education, page 97.
- (D) General (Biological Sciences major), Bachelor of Arts, pages 101-102.
- (E) General (Physical Sciences, Pre-medicine, Pre-dentistry majors), Bachelor of Arts, pages 101-102.
- (A) General (Social Sciences, Humanities majors), Bachelor of Arts, pages 101-102.
- (A) Humanities, Bachelor of Arts, page 103.
- (D) Pre-veterinary (Biological Science), page 95.
- (E) Physical Sciences, Bachelor of Science, page 95.
- (B) Social Sciences, Bachelor of Arts, page 106.

IN THE SCHOOL OF COMMERCE

- (B) Business Administration,* B. S. in Business Administration, page 188.

IN THE SCHOOL OF ENGINEERING AND ARCHITECTURE

- (F) Agricultural Engineering, B. S. in Agricultural Engineering, page 196.
- (F) Architectural Engineering, B. S. in Architectural Engineering, page 197.
- (F) Architecture (five years), Bachelor of Architecture, page 198.

* Effective September 1, 1964, admissions requirement will be one and one-half units of algebra and one unit of plane geometry.

- (F) Chemical Engineering, B. S. in Chemical Engineering, page 199.
- (F) Civil Engineering, B. S. in Civil Engineering, page 200.
- (F) Electrical Engineering, B. S. in Electrical Engineering, page 201.
 (Power option), page 201.
 (Communication and Electronics option), page 201.
 (In connection with second degree in Business Administration),
 page 205.
- (F) Industrial Engineering, B. S. in Industrial Engineering, page 202.
- (F) Mechanical Engineering, B. S. in Mechanical Engineering, page 203.
 (Aeronautical option), page 203.
 (Design option), page 203.
 (Petroleum Production option), page 203.
- (F) Nuclear Engineering, B. S. in Nuclear Engineering, page 203.
 (Option I), page 205.
 (Option II), page 205.

IN THE SCHOOL OF HOME ECONOMICS

- (C) Home Economics with options. B. S. in Home Economics, page 243.
 (Art, Costume Design, Interior Decoration, Teaching Art,
 Crafts), page 245.
 (Clothing Retailing, Designing, Textiles Research), page 246.
 (Family and Child Development with Community Services,
 Nursery School Teaching), page 246.
 (Family Economics, Homemaking, Family Economics and Fi-
 nance, Household Equipment, Housing, and Home Manage-
 ment), page 247.
 (Foods and Nutrition, Research, Foods Demonstrating), page
 248.
 (Home Economics Agent in Extension), page 244.
 (Home Economics Secondary Education—Vocational), page 244.
 (Home Economics Secondary Education, Non-vocational only),
 page 244.
- (C) Dietetics and Institutional Management, B. S. in Home Economics,
 page 250.
- (C) Home Economics and Journalism, B. S. in Home Economics and
 Journalism, page 252.
- (C) Home Economics with Liberal Arts, B. S. in Home Economics, page
 249.
- (C) Home Economics and Nursing, B. S. in Home Economics, page 253.
- (C) Restaurant Management, B. S. in Restaurant Management, page 251.

IN THE SCHOOL OF VETERINARY MEDICINE

- Veterinary Medicine, D. V. M., page 266.
 (For completion of six-year combination of pre-veterinary cur-
 riculum and veterinary medicine curriculum)
 (See School of Arts and Sciences for B. S. degree in connection with
 School 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 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 records indicate that he is capable of doing successful college work.

Anyone interested in attending Kansas State University as an undergraduate student should write to the Dean of Admissions, who will be glad to send the appropriate application form. The student should complete the 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) One unit of algebra and one unit of either geometry, general mathematics, applied mathematics, business arithmetic, or book-keeping.
- (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 School of Engineering and Architecture.

Advanced Credit by Special Examination

Advanced credit may be granted by 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, and a small fee is charged. A special examination may be given only to a currently enrolled student. (See page 18.)

However, a first semester freshman at Kansas State University may take a test to receive credit in Written Communications I, 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 Written Communications 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 individual circumstances, outstanding students are 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 school 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

Students presenting transcripts of record of work done in other accredited institutions of collegiate level are allowed hour-for-hour credit on courses in this University insofar as the credits can be applied to the student's curriculum. A student who cannot furnish an acceptable transcript of record of work for which he has advanced credit may be examined in subjects that he has studied under competent instructors.

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 record 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 received by 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.

In general, no student will be admitted to the University unless he is eligible to return to the institution last attended.

Junior Colleges

Credit earned in an accredited junior college is accepted by Kansas State University and applied hour for hour 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 School 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 one not 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 courses they wish to take, and present transcripts of record of their preliminary education. In some cases a special student may present a statement of good standing from another college in lieu of a transcript of record.

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 an 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 regularly 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 is traditionally held on Sunday afternoon 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

The University will carefully consider the individual needs of each student whose education was interrupted by a call into the armed forces. Those who lack high school graduation or a full list of high school prerequisites will be given an opportunity to prove equivalent ability and knowledge by taking entrance examinations, or by other means. For certain technical curriculums, high school prerequisites, especially in mathematics, must be made up.

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.

Correspondence courses taken from accredited institutions through the United States Armed Forces Institute will be accepted from veterans, subject to the regular rules covering the acceptance of advanced credit by correspondence.

Correspondence courses, United States Armed Forces Institute courses, and other courses taken by men and women while in the armed forces are applicable toward the student's curriculum. No credit is given for General Educational Development Tests, College Level. No credit is given for service schools in the School of Engineering and Architecture.

Services for Veterans

Each veteran attending Kansas State University under the Federal educational benefits program must have V. A. authorization. Applications for benefits under Public Law 346 or Public Law 550 are available in the University Veterans Service Office or any Veterans Administration Center. To obtain benefits under Public Law 16 or Public Law 894, contact the Veterans Administration Center at Wichita 8, Kansas.

The Office of Admissions, Housing Office, Comptroller's Office, the Counseling Center, and other University-wide service offices are located in Anderson Hall. Correspondence concerning veterans' educational benefits should be addressed to the Veterans Service Office, 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 at the time he enrolls. Checks for reasonable amounts are acceptable. Those receiving scholarships or grants must be prepared to substantiate these awards 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. In accordance with a vote of the student body and with Kansas laws, each student pays a 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, Staff Members, or Foreign Students</i>	<i>Non-residents of Kansas</i>	
		<i>Under-graduate</i>	<i>Graduate</i>
Incidental Fee			
All except Veterinary Medicine students	\$ 70.00	\$225.00	\$120.00
Veterinary Medicine students	80.00	235.00	120.00
Student Health	10.00	10.00	10.00
Student Union Building	4.00	4.00	4.00
Student Union Annex	3.50	3.50	3.50
Student Activities (incl. Union operations)	16.50	16.50	16.50
Totals—All except Veterinary Medicine students	<u>\$104.00</u>	<u>\$259.00</u>	<u>\$154.00</u>
Totals—Veterinary Medicine students	<u>\$114.00</u>	<u>\$269.00</u>	<u>\$154.00</u>

For students enrolled in six semester credit hours or less.

	<i>Residents of Kansas, Staff Members, or Foreign Students</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	\$ 5.00	\$16.00	\$ 8.00
Veterinary Medicine students	6.00	17.00	8.00
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 (incl. Union operations)	2.00	2.00	2.00

For staff members enrolled in Graduate School.

Incidental Fee per semester credit hour	\$ 5.00
Campus Privilege Fees:	
A. If enrolled in more than six semester credit hours:	
Student Health	10.00
Student Union Building	4.00
Student Union Annex	3.50
Student Activities (incl. 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 (incl. 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, Staff Members, or Foreign Students</i>	<i>Non-residents of Kansas</i>	
		<i>Under-graduate</i>	<i>Graduate</i>
For students enrolling in more than six semester credit hours at one time, the <i>total</i> fee shall be	\$56.00	\$141.00	\$86.00
For students enrolling in six semester credit hours or less at one time, the <i>per semester credit hour</i> fee shall be	\$ 8.00	\$ 19.00	\$13.00

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: Pro-

vided 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: Graduate Fellows, 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 a temporary (non-immigrant) visa.

Private Music Lessons. Students majoring in Applied Music or Music Education are given the required number of private lessons without additional charges. The schedule for all other students who wish to enroll for private music lessons shall be as follows: (Subject to refund policy outlined below.)

<i>Non-Music Majors</i>		
	<i>Students paying total incidental fee</i>	<i>Students not paying total incidental fee</i>
Two lessons a week for 16-18 weeks	\$35.00	\$42.00
One lesson a week for 16-18 weeks	17.50	23.00
Two lessons a week for 8-10 weeks	17.50	23.00
One lesson a week for 8-10 weeks	8.75	11.50
Separate individual lessons, each	1.50	2.00

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, staff members, and foreign students on a temporary visa; \$7.50 per semester credit hour for undergraduate non-residents of Kansas and \$5.50 for graduate students who are non-residents of Kansas. 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 service is available only to students who are or have been regularly enrolled. This fee must be paid before taking the examination and is not subject to refund.*

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 286.

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 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 classed as a freshman. He is advanced to a higher classification when he has met all fixed admission requirements

for the curriculum in which he is enrolled and has credit in hours as listed below:

<i>School</i>	<i>Sophomore class</i>	<i>Junior class</i>	<i>Senior class</i>
Agriculture	24	59	94
Arts and Sciences	23	55	86
Engineering and Architecture*	25	61	97
Home Economics	23	55	82
Veterinary Medicine	Students enrolled in the professional curriculum in the School of Veterinary Medicine are classified as First Year, Second Year, Third Year, and Fourth Year students. The First Year students are so classified following admission and assignment to the School, after completion of the two-year Pre-veterinary curriculum (68 hours). To advance to a higher classification, a student must complete satisfactorily the requirements as listed in the professional curriculum for the previous year or years. Exceptions are granted only in meritorious cases by the Dean of the School of Veterinary Medicine and shall not exceed nine credit hours of deficiencies.		

* Students enrolled in the five-year Curriculum in Architecture are classified according to the following requirements in hours: Second Year, 22; Third Year, 55; Fourth Year, 87; Fifth Year, 119.

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 255,320 catalogued volumes, plus periodicals, newspapers, maps, and other printed materials. They are housed in the Farrell Library building and in three branch libraries: the Willard Library for chemistry and physics, 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 4,275 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 school 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 school 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 reported until the reason for such absence has been learned; the instructor reports to the Registrar a mark of Inc. If the student's absence is not excused by his dean, a semester grade is reported on the basis of zero for the final examination; but if the absence is excused, a reasonable time, usually not over one month, is allowed within which the examination may be taken.

Instructors leave all class books in the proper department when semester grade cards have been made out. The head of the department keeps all grade books as a permanent file of the department.

Points

For each semester hour of work a student gets points, according to the grades he makes, as follows: A, 4; B, 3; C, 2; D, 1; F, 0. (See page 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 School of Veterinary Medicine) is placed on probation or is dismissed if he falls below the averages listed for his classification.

	<i>Probation</i>	<i>Dismissal</i>
Freshman	1.5	1.3
Sophomore	1.5	1.4
Junior	1.7	1.5
Senior	1.7	1.6

Students are notified by their academic deans of their status from information supplied to the deans by the Registrar in early March and July. There are no dismissals for academic reasons at the close of the fall semester except for those students who do not re-enroll second semester.

Students placed on probation remain on probation until they achieve an average above the probation threshold for their classification.

Dismissed students may not be readmitted until approved for readmission by the Reinstatement Committee. To receive such consideration the student must petition in writing for reinstatement.

CREDITS WHILE INELIGIBLE

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

ABSENCES

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

Health Center supplies a weekly statement to the faculty showing the names of students hospitalized and the dates of hospitalization.

ABSENCES FOR ACTIVITIES PARTICIPATION

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

EXCESSIVE ABSENCES

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

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 school 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

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 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.

Housing for Women

The Associate Dean of Students has responsibility for the housing of women students. 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.

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 and a cooperative living unit that house over 1,000 women students. The program within the halls is designed to contribute to the academic, social and personal growth of the students. A competent director is in charge of each hall.

Halls. Boyd, Putnam, and Van Zile Halls house 620 women students and are reserved for freshmen. Waltheim Hall is reserved for upperclass women and houses 80 students. A New Hall for 300 women will be

opened in the fall of 1962, providing facilities for both upperclass and freshman women. All of these halls rent for \$330.00 per semester for board and room if paid in advance; \$337.00 per semester if paid in three installments of \$155.00, \$91.00, and \$91.00. 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 twenty 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.

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 eleven 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 \$80.00 to \$90.00 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 \$80.00 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.

Office of Director of Housing

FOR MEN

The University has two residence halls and two scholarship houses that house 840 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 has accommodations for 600 students while West Stadium has accommodations for 150 students. The rent in Goodnow is \$330.00 per semester for board and room if paid in advance; \$337.00 per semester if paid in three installments of \$155.00, \$91.00, and \$91.00. In West Stadium Hall the rent is \$270.00 per semester for board and room if paid in advance; \$275.00 per semester if paid in three installments of \$95.00, \$90.00, and \$90.00. 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 twenty 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 \$47.00 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 Dean of Students, 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 \$290.00 a semester. This includes 17 meals per week.

FOR FAMILIES

Jardine Terrace. In Jardine Terrace there are 456 apartments available for married students. These are University-operated apartments costing \$62.50 for a one-bedroom apartment and \$67.50 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 three and a half story structure includes a cafeteria, a snackbar, a beautiful ballroom, twenty-five meeting areas, banquet and party rooms, game facilities (bowling, billiards, table tennis, etc.), a little theater, and the Student Activities Center. In addition, there are lounges, a browsing library, and an information desk. A new \$900,000 addition to be completed by January, 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 school carnival.

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 Cabinet. The Union Committees are: Dance, Movies, Sports and Recreation, Hospitality, Browsing Library, Art, Campus Entertainment, Coffee Hours, International Students, Flash Cards,

Personnel and Research, 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 and part-time 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 schools 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.

Assistance is given students in finding part-time employment in the Manhattan community and on the campus. Information and opportunities for summer employment in camps, resorts, 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 help students and alumni in meeting and communicating with employers more effectively.

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 small 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 campus there are two beautiful memorial chapels—All-Faith Chapel and Danforth Chapel. 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, to counsel students in their personal religious problems, and to promote religious knowledge by securing scholarly speakers for convocations and lectures and by teaching courses in religion in the Department of History, Political Science, and Philosophy.

The Religious Council, a committee of the Student Council, is constituted of members from each of the organized student religious groups on campus. This council is responsible for the several interdenominational emphases on religion which are presented each year. Among other things this Council sponsors the programs of Religious Emphasis when outstanding religious leaders are brought to the campus for lectures and discussions on student religious and moral problems.

The Council of Religious Advisers is constituted of the denominational chaplains, religious workers, and sponsors of student religious organizations. This Council meets regularly to advise and promote student religious activities on campus.

Students are welcomed and find fellowship in the many fine congregations of the Manhattan community: Seventh-day Adventist, Central Baptist, Grace Baptist, First Baptist, Pilgrim Baptist, Seven Dolors Catholic Church, Church of Christ, Christian, Christian Science, Congregational, St. Paul's Episcopal, Assembly of God, Church of God, Church of God in Christ, Hillel Services, Jehovah's Witnesses, First Lutheran, St. Luke's Lutheran, Bethel African Methodist, First Methodist, Free Methodist, Shepard Chapel Methodist, Wesleyan Methodist, Church of the Nazarene, First Presbyterian, United Presbyterian, Society of Friends and the Latter Day Saints.

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.

University Organizations

The Student Governing Association

Every undergraduate student who has paid the activity fee is a member of the Student Governing Association, which is charged with the responsibility of student government.

The Student Council comprises the legislative branch of the association and is composed of a student representative for each 300 students in each

academic school. In addition to the all-University Student Council, each academic school has its own school council. The executive branch of student government consists of the student body president, elected directly by all the students; the vice-president, who is chosen by and who serves as Chairman of the Student Council; and various administrative officers appointed by the President. The President is responsible for the execution of legislation passed by the Council. He has veto power but may be overruled by a two-thirds vote of the Council.

The judicial branch of student government is the Tribunal. This body consists of six student justices and three faculty justices. The chancellor of the Tribunal is appointed by the president from among the student justices. The Tribunal is concerned with student discipline cases.

Student government representatives, both elective and appointive, are responsible to the student body and to the President of the University. The Student Governing Association, through its representatives, coordinates the activities of other student organizations and cooperates with other organizations in the promotion of interest and participation in student activities. It participates in the administration of funds from student activity fees.

The Student Governing Association acts in the belief that student government contributes to a keener sense of cooperation and responsibility among students as members of the University community.

Religious Organizations

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION

All women students are invited to become members of the University YWCA, which offers an excellent opportunity for leadership, fun, and fellowship through its active participation in campus and community affairs. The YWCA program, based on faith in action, includes study groups, service projects, worship services, and social affairs. This program is a flexible one, developed from the needs and interests of the members and carried out by a student cabinet and committees. A director and an advisory board, composed of faculty and town women, give support and guidance to the work of the Association. The YWCA Director is glad to correspond with prospective students.

THE NEWMAN CLUB

The national organization of Newman Clubs for secular colleges and universities is represented by a local unit of the Catholic students in Kansas State University. The Newman Club is an organization of Catholic culture and Catholic fellowship which fosters the spiritual, intellectual, and social interests of the Catholic students under the direction of the Newman Club Chaplain. There are regular monthly educational meetings, including a communion breakfast and a social program.

THE HILLEL COUNSELORSHIP

The B'nai B'rith Foundation sponsors a counselorship for Jewish students. One of the faculty members serves as part-time director of the program. In addition to sponsoring religious services, the Hillel program includes group discussions of broad social and cultural interests, as well as social and recreational events.

PROTESTANT GROUPS

The following student groups meet either at student centers located adjacent to the campus, or in the local churches which sponsor them. Many of them have full-time directors. Activities of these student religious groups include worship services, study groups, social and recreational programs which seek to encourage the Christian growth of students.

Alpha Iota is the youth group of the Church of Christ.

Baptist Student Union is the fellowship of Southern Baptist students.

Canterbury Association is a fellowship of Episcopalian students, the activities of which center in St. Paul's Episcopal Church in Manhattan.

Christian Science Organization meets weekly with a program for students of that faith.

Church of Jesus Christ of Latter Day Saints has a student organization on campus which meets weekly.

Disciple Student Foundation of the Christian Church has a student center and sponsors Kappa Beta sorority girls.

Evangelical United Brethren Fellowship meets weekly and offers a variety of activities for students of this denomination.

Gamma Delta is an organization for Lutheran students sponsored by Lutherans of the Synodical Conference.

Grace Baptist Student Fellowship is the student group of the Grace Baptist Church. Theta Epsilon is offered for college women.

Kansas State Christian Fellowship, associated with the Inter-varsity Christian Fellowship, is open to students of any denomination.

Kappa Beta is sponsored by the Christian Church for women students.

Lutheran Student Association is an organization for Lutheran students sponsored by the First Lutheran Church (United).

Mennonite Fellowship and Reorganized Latter Day Saints are student groups sponsored by the respective organizations.

Roger Williams Fellowship is an affiliate of the American Baptist Convention and also sponsors Theta Epsilon, a service sorority for Baptist girls.

United Presbyterian Youth Fellowship is for students of the United Presbyterian Church.

United Student Fellowship is sponsored primarily for those students of the Congregational and Evangelical and Reformed denominations. Sigma Eta Chi is offered for college women.

Wesley Foundation student center is sponsored by the Methodist Church. In addition, the group sponsors Kappa Phi and Sigma Theta Epsilon.

Westminster Foundation is the student program for Presbyterian students. Phi Alpha, a service organization for men, is sponsored by this group.

RELIGIOUS COUNCIL

The Religious Council of Kansas State University, a committee of the Student Governing Association, is composed of representatives from all of the student religious groups that wish to cooperate. Each year the Council sponsors the programs of Religious Emphasis when outstanding religious leaders are brought to the campus. This council is responsible for initiating, directing, coordinating and evaluating all campus-wide religious programs.

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.

Student Organizations

Departmental

Agricultural Association
Agricultural Economics Club
Agricultural Education Club
Agricultural Education Wives
Arnold Air Society
Block and Bridle (Animal Husbandry)
Chancery Club (Pre-Law)
Dairy Science Club
Entomology Club
Extension Club

Graduate Students Association
Home Economics Art Club
Home Economics Clothing and Textiles Club
Home Economics Extension Club
Home Economics Journalism Club
Home Economics Nursing Club
Home Economics Teaching Club
Horticulture Club
Klod and Kernel Klub (Agronomy)
Mathematics Club

Departmental (Continued)

Milling Association
Phems
Plow and Pen Club
Pre-Veterinary Medical Club

Professional Food Club
Psychology Club
Student Education Association

Student Government

Arts and Sciences Council
Associated Women Students
Board of Student Publications
Engineering Association Council
Games and Rallies Committee
Interdorm Council
Interfraternity Council
Interfraternity Pledge Council

International Relations Board
Panhellenic Council
Social Coordinating Council
Student Activities Board
Student Council
Student Governing Association
Union Governing Board

Professional

American Chemical Society
American Guild of Organists
American Institute of Architects
American Institute of Architecture Auxiliary
American Institute of Chemical Engineers
American Institute of Electrical Engineers
American Institute of Physics
American Nuclear Society
American Society of Agricultural Engineers
American Society of Civil Engineers

American Society of Mechanical Engineers
American Veterinary Medical Association
Clinic Club
Institute of Aerospace
Institute of Radio Engineers
Phi Delta Kappa
Phi Mu Alpha
Phi Upsilon Omicron
Steel Ring
Student Society of Industrial Engineers

Honorary

Blue Key (Senior Men)
Chi Epsilon (Civil Engineering Honors Committee)
Chimes (Junior Women)
Delta Phi Delta (Art)
Delta Sigma Rho (Debate)
Gamma Theta Upsilon
Kappa Delta Pi (Education)
Mortar Board (Senior Women)

Mu Phi Epsilon (Women, Music)
Order of Artus
Pershing Rifles (Military)
Phi Delta Gamma (Graduate Women)
Phi Sigma Chi (Women's Physical Education)
Pi Epsilon Delta (Dramatics)
Scabbard and Blade (Cadet ROTC Officers)
Sigma Alpha Eta (Speech Therapy)

Scholastic Honorary

Alpha Delta Theta (Medical Technology)
Alpha Epsilon Rho (Radio-TV)
Alpha Kappa Psi (Business Administration)
Alpha Lambda Delta (Freshman Women)
Alpha Mu (Mining)
Alpha Zeta (Agriculture)
Eta Kappa Nu (Electrical Engineering)
Omicron Nu (Home Ec)
Phi Alpha Mu (Arts & Sciences)
Phi Alpha Theta (History)
Phi Epsilon Kappa (Men's Physical Ed)
Phi Eta Sigma (Freshman Men)

Phi Kappa Phi (All-College)
Phi Lambda Upsilon (Chemistry and Chemical Engineering)
Pi Mu Epsilon (Mathematics)
Pi Tau Sigma (Mechanical Engineering)
Putnam Scholarship Association
Sigma Delta Chi (Journalism—Men)
Sigma Gamma Epsilon (Geology)
Sigma Tau (Engineering)
Tau Sigma Delta (Architecture)
Theta Sigma Phi (Women Journalists)

Interest Groups (Membership Open)

Alpha Phi Omega (Scouting)
Amateur Radio Club
Angel Flight
Arab-American Club
Astronomy Club
Chaparajos Club
Collegiate 4-H
Cosmopolitan Club
Dames Club
Flying Club

Forensic League
Independent Student Association
X-State Players
Masonic Club
Off-campus Women
Publius
Sports Car Club
Young Democrats
Young Republicans

Interest Groups (Membership Selected)

Cheerleaders
Frog Club
Future Farmers of America
India Association
Iraqi Students Society

Orchesis
Touchstone
Varsity Rifle Team
Whi-Purs

Religious

Alpha Iota
B'nai B'rith Hillel Foundation
Canterbury Association
Chinese Christian Fellowship
EUB Student Fellowship
Gamma Delta
Grace Baptist Student Fellowship
K-State Christian Fellowship
Kappa Phi
Latter Day Saints

Lutheran Students Association
Mennonite Fellowship
Newman Club
Religious Council
Roger Williams Fellowship
Sigma Theta Epsilon
United Campus Christian Fellowship
United Student Fellowship
Wesley Foundation
YWCA

SORORITIES AND FRATERNITIES

There are 22 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, Clovia, Delta Delta Delta, Gamma Phi Beta, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Pi Beta Phi.

FRATERNITIES

Acacia, Alpha Gamma Rho, Alpha Kappa Lambda, Alpha Tau Omega, Beta Sigma Psi, Beta Theta Pi, Delta Sigma Phi, Delta Tau Delta, Delta Upsilon, Farm House, 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.

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.

The Graduate Students Association

All students enrolled in the Graduate School are members of the Graduate Students Association. Objectives of the organization are to promote acquaintance and fellowship among those enrolled in graduate work, to have representatives elected and authorized to speak and act for graduate students and to carry out the requirements of the Student Governing Association constitution. Graduate students are represented by members on the all-University Student Council.

Agricultural Societies

The Agricultural Association meets regularly once a month. All students enrolled in the School of Agriculture are members. The objectives of the association are to encourage and support agricultural activities; to correlate the work of various clubs and other organizations of students within the School; and, in general, to have leaders elected and authorized to speak for the student body of the School at all times.

Departmental clubs of the School are the Agricultural Economics Club, Agricultural Education Club, Block and Bridle Club (animal husbandry), Dairy Club, Horticulture Club, Klod and Kernel Klub (agronomy), Milling Industry Association, Plow and Pen Club (agricultural journalism), Popenoe Entomological Club, and the Poultry Club. Membership in these clubs is open to students and faculty of the School who are especially interested in the fields represented by the respective clubs.

The object of the clubs is to expand the interest and familiarity of the students in the fields and industries most closely related to the department in which they are majoring. Meetings and social affairs further the acquaintance of faculty and students. Student officers preside at the meetings and plan the programs, many of which are presented by students, though frequently faculty members or other speakers participate. Usually a student belongs to the club representing the department in which he is majoring, while many belong to more than one.

Engineering Societies

All students enrolled in the School of Engineering and Architecture are members of the Engineering Association. The governing body of this association is called the Engineering Council. The students in agricultural, chemical, civil, electrical, industrial, mechanical, and nuclear engineering are organized as student branches of the American Society of Agricultural Engineers, American Institute of Chemical Engineers, the American Society of Civil Engineers, the American Institute of Electrical Engineers or the Institute of Radio Engineers, Society for Advancement of Management, the American Society of Mechanical Engineers and the American Nuclear Society, respectively.

Those students interested in aeronautics may join the student chapter of the Institute of Aeronautical Science. Students in architecture and architectural engineering are organized as a student branch of the American Institute of Architects.

The purpose of these various societies is to acquaint the students with the latest developments in engineering and architecture, to give them more definite ideas as to the opportunities and the requirements for success in their professions, to promote acquaintance and fellowship among the students, and to further the interests of the School of Engineering and Architecture in the University and in the state.

Societies in the School of Arts and Sciences

The Kansas State University section of the American Chemical Society arranges during the school year for monthly meetings which are usually addressed by visiting chemists.

The Kansas State University chapter of the Student Affiliates of the American Chemical Society affords an opportunity for undergraduate students to actively participate in various projects in the field of Chemistry and to consider problems of general professional interest. Regular monthly meetings are held during the school year.

The Chancery Club holds regular meetings which frequently are addressed by men of the law profession. Pre-law students who are interested in learning about the opportunities and responsibilities in the field of law are eligible for membership.

The Williston Geology Club builds up a professional spirit among the students majoring in geology.

The Medical Technicians Club meets twice a month and is frequently addressed by men of the medical profession and practicing medical technicians. The club members learn about the opportunities and responsibilities in this field.

The Mathematics Club meets monthly to listen to talks of mathematical interest.

All students who are interested in the field of physics are eligible for membership in the Kansas State University Student section of the American Institute of Physics. This organization meets monthly to discuss recent trends, new areas of research, and other topics of general interest to physicists.

The Clinic Club for pre-medicine and pre-dentistry meets each month. Medical students and professionals in the various fields discuss interesting problems and annual visits are made to local hospitals.

Membership in the Political Science Club is open to all majors in political science and, on application, to other students who demonstrate a constructive interest in public affairs. The Club is the University chapter of the Kansas Students Citizenship Clearing House. It sponsors the appearance on campus of local, state, and national politicians and public leaders, and periodically assists in such all-University projects as the Mock Political Convention (quadrennial) and the Little UN Assembly.

Cosmopolitan Club

There is in the University a chapter of the Association of Cosmopolitan Clubs in Universities and Colleges of America. The active membership consists of foreign and American students, both men and women. The

objective of the club is to promote international understanding through friendship among students of various nationalities.

Home Economics Club

Membership in the Margaret Justin Home Economics Club is open to all students in the School of Home Economics. Its purpose is to promote professional interest by means of contacts and activities of many types. The Club is affiliated with the American Home Economics Association and leads to continued membership in that organization after graduation.

Veterinary Medical Association

The Junior Chapter of the American Veterinary Medical Association is a student organization in affiliation with the American Veterinary Medical Association. The object of the chapter is to promote interest and knowledge in veterinary science. The organization meets on the first and third Tuesdays of each month; students present papers, and members of the faculty and outside speakers also appear on the program.

Collegiate 4-H Club

Former 4-H Club members now in college make up the membership of the Collegiate 4-H Club, one of the largest service and social organizations at Kansas State University. The group participates actively in worthwhile University activities; sponsors a radio program; assists in publication of a monthly 4-H Club magazine; assists at Round-up; has contributed to the building of the State 4-H Club Center and the K-State Union and to the alumni loan fund.

Normal membership of more than 300 former 4-H boys and girls enables the Collegiate 4-H Club to maintain a strong and effective service program, train and develop leadership, and promote the good of 4-H work and the entire Extension program. The value of this group is not confined to the Kansas State University campus; the contacts have caused many former 4-H members to seek a college education.

The University Extension Club

This club is for students interested in the Cooperative Agricultural Extension Service. The program of the club will especially interest students in agriculture or home economics who want to become county agricultural extension agents, home economics agents, 4-H club agents, or those who expect to participate in the activities of the county extension program as lay leaders or cooperators. The purposes of the club are to help members become better acquainted with the University's Extension program and its personnel, to learn about extension work as a profession, and to get acquainted with other students of like interests. The club meets in Umberger Hall, the new home of the University's Extension Service.

The University Bands

The three University bands, the Concert Band, the Varsity Band, and the Football Band, are student organizations, membership in which is voluntary. The Football Band includes all qualified players from both Concert and Varsity bands. The Concert and Varsity bands do not function until the end of the football season, when the Football Band is divided into two units. The Football Band—an all-male band—plays for all home games and rallies, and takes one trip each year for an important conference game. The Concert Band, which is open to men and women, plays frequent public concerts and provides music for other formal campus ceremonies. The Varsity Band plays for home basketball games and rallies.

Membership in the bands is determined by competitive tryout. Students may enroll in the Football Band, Varsity Band, or Concert Band for one semester hour of credit.

The University-Civic Orchestra

The University-Civic Orchestra is an organization the personnel of which comprises college students, faculty staff, and musicians in Manhattan

and surrounding communities. Membership is voluntary and is open to all qualified musicians. The orchestra is conducted by the head of the Department of Music. The orchestra library is large and includes standard symphonic works and lighter classics.

The orchestra plays two formal concerts each season, appears on and off campus, and joins with the vocal organizations to present traditional Christmas and Easter music.

Opportunity is given to appear as soloists with the orchestra.

One credit hour a semester is given to college students.

The University Choral Organizations

The A Cappella Choir is an all-University organization. Membership is voluntary and is open to graduate and undergraduate students. The choir meets three times a week. The best in the unaccompanied choral literature, both sacred and secular music, is sung by the choir. Several performances a year including special Christmas and Easter Vespers are given by this organization. Off-campus concerts are also planned. Credit of one hour a semester is given to students.

The Varsity Men's Glee Club is open by tryout to all male undergraduate and graduate students. This organization presents three concerts a year and sings at various meetings and conventions on the K-State campus. The very best in music literature ranging from the classics to the favorite "pop" tunes is performed. The Varsity Men's Glee Club also joins with other K-State Choral groups in presenting the Messiah during the Christmas season. This group meets twice a week for one-hour credit.

The Women's Glee Club is a popular organization for K-State women students. This group meets twice a week for one-hour credit and presents three concerts a year. The repertoire of this group is the very best found for women's voices. The Women's Glee Club sings for various conventions held on campus plus joining with the other K-State Choral groups in the presentation of the Messiah during the Christmas season. Membership is open by tryout.

The K-State Singers is a chorale of 12 singers performing both vocal and instrumental music of popular origin. In great demand, they tour widely, singing for business and professional associations. Membership is by tryout.

The Madrigal Ensemble is a vocal ensemble of 16 singers performing the works of the early periods of English, French, and Italian music. Their most important function during the school year is to perform in costume at the Feast of Carols at the Christmas season. Membership is by tryout.

It is advised that students who have not had considerable training in high school choral groups enroll in the University Mixed Chorus. This is an all-University organization conducted by a member of the music staff. Membership is voluntary. This group meets twice a week. Credit of one hour a semester is given to students. In addition to performing at college functions throughout the year this organization presents a concert once a year. At various times during the college year the chorus and the A Cappella Choir are joined to present one extended choral work with orchestral accompaniment.

Kansas State Players

Membership in the Kansas State Players is open to all students, both men and women, through tryouts and participation. The object of the Players is to afford its members an opportunity to become acquainted with good drama and to take part in various activities connected with the producing of plays. Regular meetings are held the second Tuesday of each month.

The presentation of several plays a season as part of the drama program of the Department of Speech gives the members of the Players opportunity in practical training and interesting experience in the various phases of dramatic production. When a player reaches his junior year, he is eligible to try for membership in Pi Epsilon Delta, the national dramatics honorary fraternity.

Intercollegiate Forensics

The Kansas State debate squad, discussion, oratory, and other forensic activities are open to all students, regardless of the particular school in which enrolled. The student may participate in intramural forensic activities, and when qualified in intercollegiate competition.

Any student may become a member of the Forensics Union by being elected to represent an organized house or campus group. This Union plans and develops intramural forensic activities.

Qualified upperclass students can become members of Delta Sigma Rho, national forensics honorary fraternity.

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.

Radio and Television Workshops

The radio workshop consists of a regularly licensed FM station, KSDB-FM, operated and programmed by students. Through a complete program schedule of music, news, special events, interviews, sports, drama, and women's programs, the station gives practical experience in all aspects of radio broadcasting. KSDB-FM broadcasts a minimum of 40 hours weekly when school is in session.

The television workshop consists of studio, control room, projection room and classroom, tied together in closed-circuit operation. It is equipped for two camera-chain and projection unit programming.

KSDB-FM and the TV workshop are open to all students enrolled at Kansas State; participation is possible on either a curricular or extra-curricular basis. Qualified upperclass students can become members of Alpha Epsilon Rho, national honorary radio-television fraternity.

Aids and Awards

LOAN PROGRAMS

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 Loan Fund.

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

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. 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 400 scholarships are awarded annually to both underclassmen and incoming students.

Students desiring application blanks or information relative to scholarships should write to the Aids and Awards Officer, General Scholarship Committee, Kansas State University. The deadline for submitting completed applications is March 1 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.

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.

GENERAL DESCRIPTION OF The Graduate School

HISTORY AND ORGANIZATION OF THE GRADUATE SCHOOL

The Land-Grant College Idea

In early America, higher education had little to do with the practical arts and sciences and often inculcated attitudes of contempt toward those engaged in agriculture, trade, and industry. A conscious revolt against this kind of education in the 1850's, expressed in a movement to democratize higher education by establishing agricultural and industrial colleges, culminated in a bill introduced in Congress a decade later by Senator Justin S. Morrill of Vermont.

By the terms of this bill, 30,000 acres of federal land for each senator and representative were to be granted to each state for "the endowment, support, and maintenance of at least one college where the leading object shall be, 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." Passed by Congress in 1862, the bill was promptly signed into law by Abraham Lincoln. A few months later the provisions of the act were accepted by the Kansas legislature, and 90,000 acres of land became the federal endowment of the Kansas State Agricultural College.

The location of the new college was largely determined by the fact that, some years earlier, citizens of Manhattan, Kan., had established near their town an institution known as the Bluemont Central College, whose aims were almost identical with those of the Morrill Act. The facilities of this College, consisting of a stone building on a 100-acre tract a mile and a half northwest of the present campus, were offered free to Kansas for use by the new land-grant institution. The offer was accepted, and the act locating the site of the College was approved on February 16, 1863. On September 2, 1863, Kansas State College opened its doors for the first term.

Graduate Study at Kansas State: Its Beginnings and Development

The year 1886 was a significant date for graduate study at Kansas State College. 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—as early as 1871—a few masters' degrees were granted, but some 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 masters' 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 school) 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 fac-

ulty 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 nine Graduate Faculty members who are elected by the Graduate Faculty to represent each academic 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 several 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 23 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 all schools 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 School of Arts and Sciences are departments in the Bureau, and departments in other schools 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 and the Dean of the Graduate School.

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 for Men
Bacteriology	Foods and Nutrition	Physical Science Teaching
Biochemistry	General Home Economics	Physics
Botany and Plant Pathology	Genetics	Physiology
Business Administration	Geography	Poultry Science
Chemical Engineering	Geology	Psychology
Chemistry (Analytical, Inorganic, Organic, Physical)	Home Economics Education	Statistics
Civil Engineering	Horticulture	Surgery and Medicine
Clothing and Textiles	Industrial Education	Technical Journalism
Dairy Manufacturing	Industrial Engineering	Zoology
	Institutional Management	

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	

In addition to the masters' degrees listed above, the degrees Master of Architecture and Master of Regional Planning also are offered.

Minor graduate work is offered in all of the departments or fields listed above and in Library Service and Physical Education for Women.

Specialist in Education Degree

The Specialist in Education (Ed. S.) degree is an advanced one involving a year of study beyond the Master's degree and is designed to help the individual to become a more competent member of the educational profession. It is particularly designed to provide the student with additional professional competencies needed for each of the following school positions: classroom teacher; curriculum consultant; director of elementary education; director of secondary education; guidance counselor;

superintendent; elementary school principal; secondary school principal; and other specialized personnel.

Major Fields for Doctor of Philosophy

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

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

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: Agricultural Economics, Agricultural Engineering, Agronomy, Animal Husbandry, Applied Mechanics, Architecture and Allied Arts, Art (Home Economics), Bacteriology, Biochemistry, Botany and Plant Pathology, 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, Geology and Geography, History, Horticulture, Industrial Engineering, Institutional Management, Journalism, Mathematics, Mechanical Engineering, Modern Languages, Music, Nuclear Engineering, Parasitology, Pathology (Veterinary Medicine), Philosophy, Physical Education for Men, Physics, Political Science, Poultry Science, Psychology, Sociology, Speech, Statistics, and Zoology.

Applications should be made annually before April 1, 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 REGULATIONS

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.

Students who do not plan to work for an advanced degree may be admitted to the Graduate School as Special 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. Special Students must maintain a B average, this average to be calculated after nine or more hours of course work have been completed. 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.

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 one month before the time the student expects to enroll.

Registration and Assignment. Students who have been admitted to the Graduate School register and pay their fees during the regular registration periods. (See the Graduate Calendar.) Courses to be taken are determined by consultation with the adviser, and this assignment must be signed by the adviser or the department head before the student begins the registration procedure. All new students, including graduate students, are required to take a physical examination at the University prior to their initial enrollment.

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 not eligible to pursue work *in absentia* except during periods when school is not regularly in session. 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, 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 courses offered is contained in the Summer School number of the Kansas State University Bulletin, which may be obtained upon application to the Admissions and Registrar's 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 re-determined 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) The Department of Speech will automatically certify any graduate candidate for oral proficiency if the candidate's own department is satisfied that he is proficient and so indicates, (3) If the department directing the student's program feels that it does not have adequate information, or is unwilling to judge the competence of the graduate candidate in oral English usage, the Department of Speech will provide a testing program aimed at determining the status of the student's proficiency.

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 of Science or Master of Arts 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. (See Graduate Calendar for dates on which thesis or report must be submitted.)

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. Three copies of the report or thesis for the Master's degree or the Educational Specialist degree shall be submitted to the Dean of the Graduate School at least one week before Commencement. All reports and theses will be bound in cloth in accordance with specifications for Class A bind-

ing of the Library Binding Institute. To cover the cost of binding the student must deposit with his report or thesis a check or money order made out to an approved bindery. The University Library will forward manuscripts to the bindery for the candidate. A list of approved binderies is maintained in the Graduate Office. 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.

Specialist in Education. Candidates for the degree Specialist in Education (Ed. S.) are required to hold an acceptable Master's degree or its equivalent. A minimum of one and one-half semesters or three summer sessions of full graduate work must be spent in residence. The exact amount and nature of the work that must be done by each student will be determined by the adviser and the supervisory committee in view of his education, experience, and objectives. However, the aggregate of graduate courses beyond the Master's degree will amount to at least 30 semester hours. The candidate must pass at least two comprehensive examinations and do a written education project. The comprehensive examinations may include both oral and written sections, but there will be at least two written examinations, (a) a general examination in professional education and (b) an examination in the area of specialization. The candidate will be graded passing or failing on the two examinations, general and area, as a whole. Prior to doing the comprehensive examinations the candidate must present a report in the form of a written description of some substantial educational project. This report will be based on some problem of importance in the candidate's area of specialization which will exhibit either the results of original research or competence in the application of existing knowledge and must be read and approved by the adviser and the supervisory committee.

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 check or money order made out to an approved bindery. The University Library will forward manuscripts to the bindery for the candidate. A list of approved binderies is maintained in the Graduate Office.

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.

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 graduate 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 a new residence hall for men accommodating 600 for board and room. Graduate students who desire to live with undergraduate students will be permitted residence in the hall; however, the contract is for the full nine-month period and may not be broken. The rate is \$330.00 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. There is a Women's Graduate House offering board and room for women graduate students and a Men's Graduate House which offers board and room for men graduate students.

The University operates 456 permanent dormitory apartments for married students. Only those who are married may apply for admission. The rent is \$62.50 for a one-bedroom apartment and \$67.50 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 for married students and single men, 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 variations 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	150.00
Total per semester	<u>\$650.00</u>

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 and those in upper quarter of class will be considered first. These loans bear no interest until one year after graduation or termination of formal education and then three per cent. From this date the student has the next ten years in which to repay the loan. 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 two years after graduation.

Emergency loan funds are available on a short-term basis of thirty days repayment period, maximum \$100, no interest, to meet emergency expenses. If interested in the loan programs, write the Executive Secretary of the Loan Office, Anderson Hall, Room 6B.

K-State Union

The K-State Union, opened in March, 1956, 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.

Agriculture

GLENN H. BECK, *Dean*

As at other land-grant universities, agriculture at Kansas State University has programs in teaching, research, and extension with its county agents, branch experimental stations, experimental fields, experimental flocks, herds, and crops. 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 School of Agriculture

DUANE C. ACKER, *Director and Associate Dean*

FRANK R. CARPENTER, *Director and Assistant Dean*

Instruction in the School of Agriculture aims to give students both a liberal and a practical education. Training for leadership in democratic government and community life is considered as important as training for an occupation.

Modern agriculture is based on applying science, technology, and sound management to producing, marketing, processing, and distributing food and fiber. With equal appropriateness, the School of Agriculture could be called the School of Food and Fiber Production and Distribution. Various curriculums in the school prepare students for responsible positions in agri-business, agriculturally related industries, banks, farms, ranches, feed mills, for foreign assignments, teaching vocational agriculture, university extension work, research, for many different kinds of governmental work and private enterprise.

Used in research and teaching are more than 4,000 acres of land and herds and flocks of dairy and beef cattle, sheep, hogs, horses, and poultry. Special facilities include greenhouses for horticultural and field crops, a feed mill, a flour mill, a dairy manufacturing plant, livestock slaughter and meat-processing facilities, entomological facilities, and many specialized laboratories, including one fully equipped statistical laboratory.

Sixty-five percent of the permanent full-time faculty of the School hold Ph. D. degrees, and nearly all members of the faculty are doing research and publishing regularly in scientific and scholarly journals and in experiment station publications.

Each entering student is assigned a faculty adviser to assist with academic and personal problems.

Students with potential for unusual scholastic attainment are invited to participate in an Honors Program. Performance in high school and an evaluation by a faculty committee are the bases for selection for the Honors Program. Students selected for the Honors Program have programs of study adjusted to their individual abilities which provide them opportunity to develop to their full potential.

CURRICULUMS AND DEGREES AWARDED BY THE SCHOOL OF AGRICULTURE

The School of Agriculture offers six four-year curriculums and a two-year curriculum. The Curriculum in Agriculture is broad and flexible, so, by appropriate electives, one can accommodate a variety of interests. The five remaining curriculums are in specialized fields to accomplish particular objectives. These are: Agricultural Education, Dairy Manufacturing, Feed Technology, Milling Technology, and Landscape Architecture. All six curriculums require the same course in the freshman year. The entering freshman need not choose among the six curriculums until after he has enrolled and been on the campus for a semester. The two-year short-course in floriculture prepares students for work in retail

flower shops. It includes one year as an apprentice in a commercial flower shop.

Curriculums in Agriculture, Agricultural Education, and Dairy Manufacturing lead to the degree Bachelor of Science in Agriculture. The Curriculum in Agriculture may also lead to the degree Bachelor of Science in Agricultural Journalism through the proper choice of electives. The curriculums in Feed Technology and Milling Technology lead to either the degree Bachelor of Science in Feed Technology or the degree Bachelor of Science in Milling Industry. The Curriculum in Landscape Architecture leads to the degree Bachelor of Science in Landscape Architecture.

Each candidate for a degree must have had at least three months of practical experience in farming or in an appropriate industry. A formal statement outlining this experience must be filed in the Dean's office during the last semester of the senior year.

A brief description of each curriculum follows. Pages on which the curriculum outlines may be found are indicated.

Curriculum in Agriculture (Page 55)

The Curriculum in Agriculture is intended to be broad and flexible. It is designed for those preparing for professional work in the field of food and fiber production, for farming and ranching, and for work in industries and governmental agencies related to agriculture. Students choosing this curriculum may major in Agricultural Economics, Agronomy, Animal Husbandry, Dairy Science, Entomology, Horticulture, or Poultry Science in the School of Agriculture, or they may concentrate electives in certain departments outside the School of Agriculture such as Agricultural Engineering, Botany and Plant Pathology, Business Administration, or Technical Journalism. Choice of major should be made not later than the end of the freshman year.

The student, in consultation with his major adviser, will develop his program of study. This will include the choice of electives and the time sequence of the required courses and electives. The program of study for each student must be approved by the head of the major department, and by the Director of the School of Agriculture. A minimum of 39 hours of electives is required. The choice of electives for each student will be determined by the purposes and objectives of that student. Several examples of possible choices of electives in developing programs of study are shown following the Curriculum in Agriculture to illustrate the richness and variety of educational opportunities available through the Curriculum.

Students who are interested in preparing for a career in Agricultural Extension work* should enroll in the Curriculum in Agriculture or the Curriculum in Agricultural Education. The following courses should be taken as non-major electives: Educ. 202 and 605, and Ag. Ec. 100, 180, and 610. This will give the student a broad coverage of agriculture and the social sciences. The student should contact the office of the Director of Extension (Umberger Hall, Room 122) relative to the selection of appropriate electives and for information on job opportunities in extension work.

To concentrate electives in a department outside the School of Agriculture, a student must include in his electives a minimum of 12 hours in one department of the School of Agriculture. All electives must be approved by the head of the department in which he is concentrating his electives, the head of the department in which the student is taking his agricultural specialization, and the Director of the School of Agriculture.

A student concentrating electives in Technical Journalism following this pattern will qualify for the degree Bachelor of Science in Agricultural Journalism.

To aid in evaluation of their credits, all transfer students should indicate their choice of major at the time they submit credits for evaluation.

* See pages 276-294 for description of the Extension Service.

Curriculum in Dairy Manufacturing (Page 60)

The Curriculum in Dairy Manufacturing is offered to students who wish to specialize in one of the various phases of the dairy products industry.

In addition to dairy products processing, students may select various other fields of specialization by using properly chosen electives in their courses of study. For instance, electives in science will prepare students for employment as teachers, research workers, technicians, and regulatory officials. Electives chosen from the field of administration will prepare majors for positions such as dairy plant managers, operators, and sales personnel.

Electives selected by the student must be approved by his adviser, the head of the department, and the Director of the School of Agriculture.

Curriculums in Feed Technology and Milling Technology (Pages 61, 62)

Curriculums in Feed Technology and Milling Technology have options in (a) Operation, (b) Chemistry, and (c) Administration. Students must indicate at the time of assignment for the first semester of the sophomore year their choice of option. In both curriculums the Operation option permits the student to prepare for engineering or plant operations; the Chemistry option permits the student to acquire chemical knowledge for products control and laboratory or research positions; the Administration option provides a business background. Both the flour and the feed milling industries and associated enterprises provide graduates with unusual opportunities for employment.

Students transferring from other institutions to either of these curriculums must designate their option.

Curriculum in Landscape Architecture (Page 63)

This curriculum is designed to prepare students for the field of professional Landscape Architecture. Graduates may be employed by professional firms of Landscape Architects, by State and National Governmental Agencies working with housing, parks, highways, and in other land planning areas. Many graduates later establish their own professional offices. Some enter the teaching field.

Special emphasis is placed upon space organization, land use planning, topographical manipulation, landscape planning and construction, and the role of adapted plant materials in the landscape. The degree Bachelor of Science in Landscape Architecture is conferred upon those who successfully complete the course.

Two-year Technical Training Program in Retail Floriculture (Page 59)

This program combines a year of university training and 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.

Curriculum in Agricultural Education (Page 64)

The Curriculum in Agricultural Education is intended for students who are interested in becoming teachers of vocational agriculture in Kansas high schools participating in federal Smith-Hughes and George-Barden funds. The areas covered in the field of agriculture include courses in agricultural economics, agronomy, animal husbandry, dairying, entomology, horticulture, and poultry science.

The curriculum meets the requirements for the degree Bachelor of Science in Agriculture and, at the same time, meets the requirements for the state certificate to teach vocational agriculture. This curriculum ordinarily may be completed in four years.

A total of 20 semester hours in the Department of Education is required as follows:

Educational Psychology I	3
Educational Psychology II	3
Vocational Education	3
Principles of Secondary Education	3
Methods of Teaching Agriculture	3
Teaching Participation in Agriculture	5

A total of 16 semester hours in the School of Engineering and Architecture is included to provide mechanical training necessary to handle farm shop problems. The mechanical courses, together with semester hours, follow:

Farm Mechanics	2
Farm Power	3
Farm Machinery Repair	3
Farm Building Construction	3
Agricultural Engineering Applications	2
Farm Mechanics Methods	3

Upon completion of the Curriculum in Agricultural Education, a person qualifies for the three-year Kansas state teacher's certificate, valid in any high school or other public school in the state. This certificate is valid for three years and may be renewed.

Curriculum in Agriculture**B. S. in Agriculture****FRESHMAN YEAR**

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	100	Agr. in Our Society	2	Chem.	230	Chemistry II	3
Chem.	210	Chemistry I	5	Ec. So.	110	Economics I	3
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Math.	100	College Algebra	3	Math.	150	Plane Trig.	3
Psych.	110	Gen. Psychology	3			Elect. or Required	4
		Air or Mil. Sci.	1			Air or Mil. Sci.	1
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Physical Education	0
Total			17	Total			17

(Listed below are additional requirements beyond freshman year.)

AGRICULTURE				BIOLOGICAL SCIENCE			
Agron.	270	Soils	4	Bot.	200	Gen. Botany	4
Agron. Hort.	200	Plant Science	4	Zool.	200	Gen. Zoology	4
A. H.	200			Bact.	220	Gen. Microbiology	4
Dy. Sc.	200	Nutr. & Mgt. Fm. An. ¹ ..	4	A. H.	400	Genetics	3
Pl. Sc.	200			Entom.	200	Gen. Ec. Entom.	3
Ag. Ec.	200	Prin. of Agr. Econ.	4				
Ag. E.	300	Engg. in Agr.	4				
Gn. Ag.	003	Agr. Seminars	0				
PHYSICAL SCIENCE				COMMUNICATIONS			
Chem.	190	El. Org. Chemistry ²	3	Spch.	105	Oral Comm. I	2
Gl. Gg.	100	Gen. Geology	3	Journ.	350	Agr. Journalism ³	3
Phys.	211	Gen. Physics I	4	Engl.	090	Engl. Prof.	0
SOCIAL SCIENCE				HUMANITIES			
P. Sci.		Political Science ⁴	3			Credit Hours ⁵	6
MILITARY				ELECTIVES			
		Air or Mil. Sci.	2			Credit Hours ⁷	35
STATISTICS							
Stat.	320	El. of Statistics ⁶	3				

Number of hours required for graduation, 136.

1. Students in floriculture or ornamental horticulture may substitute courses in their field.
2. Students taking Chemistry II Lab. as freshman elective may take General Organic Chemistry.
3. Students may substitute Reporting I, Business Letter Writing, or Scientific Report Writing, depending on their special interests.
4. Students may choose the following courses to meet this requirement: Modern Democracy, American Government.
5. Students may choose among the courses listed under Humanities Electives listed on page 206 of the General Catalog.
6. Students may substitute Stat. 620, Statistical Methods I, depending on their special interests.
7. A minimum of 12 semester hours shall be in the student's major department. These electives may be taken in any of the departments of the School of Agriculture. In certain cases, a department outside the school may be selected for a concentration of electives; e. g., Botany, Chemistry, Bacteriology, Agricultural Engineering, Business Administration.

The remaining elective credits required for graduation are to be approved by the head of the department in which the student may be majoring, with the requirement that at least 12 of the student's elective credits shall be taken outside his major department.

Examples of Electives for Various Programs of Study in the Curriculum in Agriculture

(Electives are suggestive and may be varied to meet the needs of individual students)

MAJOR IN AGRICULTURAL ECONOMICS

Program of study in Agricultural Administration

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Farm Management	3	Econ. II	3
Prin. Agri. Mktg.	3	Prin. Acctg.	3
Land Econ.	3	Money & Banking	3
Ag. Policy	3	Livestock Prod.	3
Ag. Econ. Summary	2	Forage Crops	3
Ag. Econ. Statistics	3	Landscape Design	3
		Intro. to Philosophy	3
		History of U. S. since 1877	3

Program of study in Agricultural Business and Industries

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Farm Management	3	Econ. II	3
Prin. Agri. Mktg.	3	Prin. Acctg.	3
Econ. Prin. Ag. Bus. Firms	3	Money & Banking	3
Ag. Policy	3	Administration	3
Ag. Econ. Summary	2	Personnel Admin.	3
Land Econ.	3	Bus. Law I	3
		Intro. to Philosophy	3
		History of U. S. since 1877	3

Program of study in Technical Agricultural Economics

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Production Econ.	3	Econ. II	3
Prin. Agri. Mktg.	3	Prin. Acctg.	3
Ag. Prices & Mkt. Structure	3	Money & Banking	3
Ag. Policy	3	Intro. to Econometrics	3
Ag. Econ. Summary	2	Intro. to Philosophy	3
		Anal. Geom. & Calc. I	4
		Anal. Geom. & Calc. II	4
		History of U. S. since 1877	3

MAJOR IN AGRONOMY

Program of study in Applied Agronomy and Soil Conservation

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Soil Management	3	Production Economics	3
Dev. & Class. of Soils	3	Chem. II Lab.	2
Soil Fertility	3	Plant Physiology	4
Farm Crops	4	El. Org. Chem. Lab.	2
Forage Crops	3	Livestock Prod.	3
Crop Ecology	3	Farm Org.	3
		Drain. & Eros. Control	3

Program of study in Soil Science

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Soil Physics	3	Chem. II Lab.	2
Dev. & Class. of Soils	3	Anal. Geom. & Calc. I & II	8
Soil Fertility	3	Gen. Quant. Anal.	4
Chem. Prop. of Soils	3	Gen. Phys. II	4
Crop Ecology	3	Plant Physiology	4
		El. Org. Chem. Lab.	2

Program of study in Crop Science

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Farm Crops	4	Gen. Plant Biochemistry	3
Crop Ecology	3	Principles of Feeding	3
Crop Improvement	2	Chem. II Lab.	2
Weed Control	3	Plant Ecology	3
Pasture Management	3	Plant Physiology	4
Soil Management	3	Tax. Bot. of Fl. Plts.	3
		Plant Pathology	3
		El. Org. Chem. Lab.	2

MAJOR IN ANIMAL HUSBANDRY**Program of study in Livestock Production and Management****MAJOR ELECTIVES**

Prin. of Feeding	3
Animal Nutrition	3
Beef Cattle, Swine, or Sheep Production, any two	6
Elem. of Meat Proc.	3
Animal Breeding	3
Prin. Livestock Selection	3

NON-MAJOR ELECTIVES

Anat. & Physiology	3
Forage Crops	3
Feed Mfg. Processes	3
Livestock Marketing	3
Milk Production	3
Business Law	3

Program of study in Meats**MAJOR ELECTIVES**

Beef Cattle, Swine, or Sheep Production, any two	6
Animal Nutrition	3
Elem. Meat Processing	3
Prin. Livestock Selection	3
Meat Practicums	2
Class. & Grading Meats	1
Tech. Prin. of Meat Proc.	2
Meat Pkg. Plant Operation	2

NON-MAJOR ELECTIVES

Anat. & Physiology	3
Livestock Marketing	3
Prin. of Accounting	3
Chem. II Lab.	2
Organic Chem. Lab.	2
Quantitative Analysis	4
Salesmanship	2

Program of study in Fundamental Animal Husbandry**MAJOR ELECTIVES**

Beef Cattle, Swine, or Sheep Production, any two	6
Animal Nutrition	3
Population Genetics	3
Animal Breeding	3
Prin. Livestock Selection	3
El. of Meat Processing	3
An. Husb. Lit.	2
Tech. Prin. of Meat Proc.	2

NON-MAJOR ELECTIVES

Chem. II Lab.	2
Org. Chem. Lab.	2
Endocrinology	3
Milk Secretion & Reprod.	3
Histology I	3
Cytology	3

MAJOR IN DAIRY SCIENCE**Program of study in Dairy Production****MAJOR ELECTIVES**

Dairy Cattle Nutrition	3
Dairy Cattle Management	2
Dairy Cattle Breeding	3
Dairy Cattle Judging	2
Milk Secretion & Reprod.	3
Market Milk & Dairy Inspec.	4
Dairy Seminar	1

NON-MAJOR ELECTIVES

Principles of Feeding	3
Feed Manufacturing Processes	3
Livestock Production	3
Animal Breeding	3
Elements of Meat Processing	2
Farm Crops	4
Farm Power	3

Program of study in Dairy Management**MAJOR ELECTIVES**

Dairy Cattle Nutrition	3
Dairy Cattle Management	2
Dairy Cattle Breeding	3
Dairy Cattle Judging	2
Milk Secretion & Reprod.	3
Market Milk & Dairy Inspec.	4
Dairy Seminar	1

NON-MAJOR ELECTIVES

Business Law	3
Production Economics	3
Business Finance	3
Dairy Marketing	3
Personnel	3
Principles of Accounting	3
Money & Banking	3
Salesmanship	2

Program of study in Dairy Science**MAJOR ELECTIVES**

Dairy Cattle Nutrition	3
Dairy Cattle Management	2
Dairy Cattle Breeding	3
Dairy Cattle Judging	2
Milk Secretion & Reprod.	3
Market Milk & Dairy Inspec.	4
Dairy Seminar	1

NON-MAJOR ELECTIVES

Chemistry II Lab.	2
Organic Chemistry Lab.	2
Biochemistry	5
Animal Nutrition	3
Anatomy & Physiology	3
Qualities of Feed Ingrid.	3
Statistical Methods II	3

MAJOR IN ENTOMOLOGY**Program of study in Applied Entomology****MAJOR ELECTIVES**

Insect Morphology & Physiology	3
Adv. General Entomology	3
Insect Ecology	2
Prin. of Taxonomy	1
Taxonomy of Insects I	2
Adv. Applied Entomology I	3
Adv. Applied Entomology II	3
Bee Culture	2

NON-MAJOR ELECTIVES

Chem. II Lab.	2
Plant Pathology	3
Animal Parasitology	3
Spraying	3
Weed Control	3
Hort. Food Crops	3
Small Business Operations	3

Program of study in Professional Entomology**MAJOR ELECTIVES**

Advanced Gen. Entomology	3
Insect Ecology	2
Adv. External Insect Morph.	3
Adv. Internal Insect Morph.	3
Prin. of Taxonomy	1
Taxon. of Insects I	2
Entom. & Zoological Lit.	2
Bee Culture	2

NON-MAJOR ELECTIVES

Chemistry II Lab.	2
Plant Pathology	3
Zoological Technique	2
Foreign Language	12

MAJOR IN HORTICULTURE**Program of study in Fruit and Vegetable Production****MAJOR ELECTIVES**

Horticulture Food Crops	3
Vegetable Crops I	3
Systematic Olericulture & Pomology	3
Spraying	3
Storage	3
Prin. of Fruit Growing I	3
Plant Science Lit.	2
Forestry Practices	3
Preservation of Horticultural Products	3
Intro. to Floriculture & Orn. Hort.	3

NON-MAJOR ELECTIVES

Plant Physiology	3
Plant Pathology	3
Soil Fertility	3
Hort. Crop Diseases	3
Chemistry II Lab.	2
Organic Chem. Lab.	2
A Course in Agronomic Crops	4

Program of study in General Horticulture**MAJOR ELECTIVES**

Landscape Design	3
Horticulture Food Crops	3
Plant Propagation	3
Plant Science Lit.	2
Spraying	3
Prin. of Fruit Growing I	3
Vegetable Crops II	3
Prin. of Floriculture	3
Forestry Practices	3
Preservation of Horticultural Products	3
Intro. to Floriculture & Orn. Hort.	3

NON-MAJOR ELECTIVES

Plant Pathology	3
Plant Physiology	3
Chemistry II Lab.	2
Organic Chem. Lab.	2
Plant Ecology	3
Soil Fertility	3
A Course in Agronomic Crops	4

Program of study in Floriculture & Ornamental Horticulture**MAJOR ELECTIVES**

Floral Arrangement	2
Plant Materials I	3
Greenhouse Constr. & Mgt.	3
Prin. of Floriculture	3
Nursery Management	3
Arboriculture	3
Plant Science Lit.	2
Plant Propagation	3
Forestry Practices	3
Preservation of Horticultural Products	3
Intro. to Floriculture & Orn. Hort.	3

NON-MAJOR ELECTIVES

Taxonomic Botany	3
Prin. of Accounting	3
Plant Ecology	3
Plant Physiology	3
Plant Pathology	3
Soil Fertility	3

MAJOR IN HORTICULTURE (Continued)**Two-year Short Course in Floriculture****FALL SCHEDULE**

Art	100	Elementary Design	2
Engl.	100	Engl. Comp. I	3
Hort.	130	Floral Arrangement	2
Bot.	200	General Botany	4
Hort.	250	Introd. Flor. & Orn.	
		Hort.	3
B. A.	341	Salesmanship	2
			16

SPRING SCHEDULE

Hort.	130	Floral Arrangement	2
Art	395	Window Display	3
Hort.	200	Plant Science	4
Spch.	105	Oral Comm. I	2
B. A.	110	Personal Finance	2
B. A.	515	Credits & Collections	2
B. A.	500	Small Business Operation	3
			18

SUMMER SCHEDULE

B. A.	170	Prin. of Acctg.	3
Art	240	Interior Decoration	2
L. A.	100	Landscape Design	3
			8

Summary :

Horticulture & L. A.	14 credits
Business Adm.	12 credits
Home Economics Art	7 credits
Botany	4 credits
English	3 credits
Speech	2 credits
	42

MAJOR IN POULTRY SCIENCE**Program of study in Poultry Industry****MAJOR ELECTIVES**

Poultry Seminar	1
Poultry Judg.	3
Poultry Management	3
Poultry Products Tech.	3
Nutr. of Fowl	3
Poult. Genetics	3
Avian Metab.	3

NON-MAJOR ELECTIVES

Anatomy & Physiology	3
Poultry Sanitation	3
Prin. of Acctg.	3
Egg & Poult. Mktg.	3
Salesmanship	2
Rural Sociology	3
Farm Bldg. Constr.	3

Program of study in Poultry Science**MAJOR ELECTIVES**

Poultry Seminar	1
Poult. Judging	3
Poult. Mgt.	3
Poult. Prod. Tech.	3
Nutr. of Fowl	3
Poult. Genetics	3
Avian Metab.	3

NON-MAJOR ELECTIVES

Biochemistry	5
Zool. Technique	2
Foreign Lang.	6
Chem. II Lab.	2
Organic Chem. Lab.	2
Avian Anatomy	2
Social Behavior of Invertebrates	2

PROGRAM OF STUDY IN AGRICULTURAL MECHANIZATION**ELECTIVES IN AREA OF
CONCENTRATION**

Farm Power	3
Agricultural Machinery	3
Farm Bldg. Constr.	3
Electricity in Agriculture	3
Drain. & Eros. Control	3
Irrig. Practices	3

AGRICULTURE ELECTIVES

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

Program of study for Bachelor of Science in Agricultural Journalism**TECHNICAL JOURNALISM**

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	3

AGRICULTURE

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. Feed and Flour Milling Industries
7. Horticulture
8. Poultry Science

Curriculum in Dairy Manufacturing*B. S. in Agriculture***FRESHMAN**

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	100	Agr. in Our Society	2	Chem.	230	Chem. II Rec.	3
Chem.	210	Chemistry I	5	Chem.	250	Chem. 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
Psych.	110	Gen. Psychology	3	Math.	150	Plane Trig.	3
		Air or Military Science ..	1	Spch.	105	Oral Comm. I	2
Ph. Ed.	011	Physical Education	0			Air or Military Science ..	1
				Ph. Ed.	011	Physical Education	0
Total			17	Total			17

SOPHOMORE

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Bact.	220	Gen. Microbiology	4	Dy. Sc.	400	Mkt. Milk & Dy. Insp.	4
Zool.	200	Gen. Zoology	4	Bact.	615	Dairy Bacteriology	4
Chem.	350	Gen. Org. Chem.	3	Bot.	200	Gen. Botany	4
Chem.	351	Gen. Org. Chem. Lab.	2			Elective—Humanities	3
		Elective—Humanities	3			Air or Military Science ..	1
		Air or Military Science ..	1				
Total			17	Total			16

JUNIOR

Ag. E.	455	Dairy Mechanics	3	Engl.	205	Bus. Letter Writing	3
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Dy. Sc.	210	Dairy Technology	3	Ag. Ec.	160	Mkt'g Dairy Prod.	3
Phys.	211	Gen. Physics I	4	Dy. Sc.	220	Dairy Prod. Eval. I	1
Engl.	090	English Proficiency	0	Dy. Sc.	690	Ice Cream & Cond. Milk ..	5
		Elective—Political Sci. ..	3			Elective	5
		Elective	5				
Total			18	Total			17

SENIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Dy. Sc.	460	Dairy Prod. Eval. II	1	Dy. Sc.	205	Milk Production	3
Dy. Sc.	680	Butter and Cheese	5	Dy. Sc.	500	Dairy Seminar	1
Stat.	320	El. of Statistics	3	Dy. Sc.	660	Dairy Plant Mgt.	2
		Elective	8	Dy. Sc.	670	Quality Cont. Dairy	
						Prod.	3
						Elective	8
Total			17	Total			17

Number of hours required for graduation, 136.

Suggested programs of study for Dairy Manufacturing**SCIENCE ELECTIVES**

Quantitative Analysis	4	Analytic Geometry & Calculus II	4
Organic Chemistry	5	Analytic Geometry & Calculus III	4
Biochemistry	3	Microbiology of Foods	5
General Physics II	4	Bact. of Human Diseases	5
Analytic Geometry & Calculus I	4		

ADMINISTRATION ELECTIVES

Introductory Accounting	5	Sales Management	3
Principles of Accounting	3	Business Finance	3
Managerial Accounting	3	Personnel Administration	3
Business Law I	3	Business Policy	3
Marketing	3	Small Business Operation	3
Economics II	3	Money & Banking	3

Dual Degree in Dairy Manufacturing and Business Administration

Students enrolled in Dairy Manufacturing may qualify for a dual degree in Dairy Manufacturing and Business Administration by taking additional work to include the following courses:

Economics II	3	Marketing	3
Introductory Acctg.	5	Personnel	3
Managerial Accounting	3	Business Finance	3
Business Law I, II	6	Money & Banking	3
Administration	3	Business Elective	9
Business Policy	3		

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>
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	100	Agr. 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
Psych.	110	Gen. Psychology	3	Math.	150	Plane Trig.	3
		Air or Military Science ..	1	M. E.	211	Engg. Graphics I	2
Ph. Ed.	011	Physical Education	0			Air or Military Science ..	1
				Ph. Ed.	011	Physical Education	0
Total			17	Total			17

SOPHOMORE

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Millg.	100	Prin. of Milling	3	Millg.	210	Flow Sheets	2
Bot.	121	Biology I	4	Bot.	122	Biology II	4
		Air or Military Science ..	1			Air or Military Science ..	1
Millg.	010	Milling Seminar	0	Millg.	010	Milling Seminar	0
		Option A, B, or C	9			Option A, B, or C	10
Total			17	Total			17

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Millg.	410	Feed Technology I	4	Millg.	660	Qual. of Feed Ingred.	3
A. H.	200			Ec. So.		Social Science	3
Dy. Sc.	200	Nutr. & Mgt. Fm. An.	4	Millg.	010	Milling Seminar	0
Pl. Sc.	200			Spch.	105	Oral Comm. I	2
Engl.	090	English Proficiency	0			Option A, B, or C	9
Millg.	010	Milling Seminar	0				
		Option A, B, or C	9				
Total			17	Total			17

SENIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Hist.	115	Civilization I	3	Hist.	130	Civilization II	3
Millg.	010	Milling Seminar	0	Entom.	100	Milling Entomology	4
		Option A, B, or C	14	Millg.	010	Milling Seminar	0
						Option A, B, or C	10
Total			17	Total			17

Number of hours required for graduation, 136.

OPTION A (Administration)

Chem.	350	Gen. Org. Chem.	3	Phys.	212	Gen. Physics II	4
Chem.	351	Gen. Org. Chem. Lab.	2	B. A.	410	Bus. Finance	3
Chem.	300	Gen. Quan. Analysis	4	Stat.	320	El. of Stat.	3
B. A.	170	Prin. of Accounting	3	Stat.	510	Stat. Qual. Control	3
B. A.	325	Business Law I	3	Engl.	205	Bus. Letter Writing	3
Millg.	450	Fl. & Feed Anal.	4	Ag. Ec.	130	Grain Marketing	3
B. A.	542	Sales Management	3	Ec. So.	430	Money & Banking	3
Millg.	680	Feed Tech. II	4			Electives	9
Phys.	211	Gen. Physics I	4				

OPTION B (Chemistry)

Chem.	300	Gen. Quant. Analysis	4	Chem.	660	Biochemistry Rec.	3
Chem.	511	Organic Chem. I Rec.	3	Chem.	661	Biochemistry Lab.	2
Chem.	512	Organic Chem. I Lab.	2	Math.	220	Anal. Geom. & Calc. I	4
Chem.	516	Organic Chem. II Rec.	3	Math.	221	Anal. Geom. & Calc. II ..	4
Chem.	517	Organic Chem. II Lab.	2	Math.	222	Anal. Geom. & Calc. III ..	4
Chem.	585	Phys. Chem. I	5	Bact.	220	Gen. Microbiology	4
Millg.	450	Fl. & Feed Anal.	4			Electives	9
Phys.	211	Gen. Physics I	4				
Phys.	212	Gen. Physics II	4				

OPTION C (Operation)

Math.	220	Anal. Geom. & Calc. I	4	E. E.	400	Elec. Engg. C Rec.	2
Math.	221	Anal. Geom. & Calc. II ..	4	E. E.	402	Elec. Engg. C Lab.	1
Math.	222	Anal. Geom. & Calc. III ..	4	Millg.	680	Feed Tech. II	4
M. E.	216	Engg. Graphics II	2	Millg.	610	Fl. & Feed Mill Constr. ..	3
M. E.	310	Engg. Graphics III	2	Millg.	600	Adv. Fl. & Fd. Tech.	3
Chem.	350	Gen. Org. Chem. Rec.	3	Ap. M.	305	Statics	3
Chem.	351	Gen. Org. Chem. Lab.	2	Ap. M.	415	Mech. of Materials	3
Phys.	310	Engg. Physics I	5			Electives	11
Phys.	311	Engg. Physics II	5				

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>
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	100	Agr. in Our Society	2	Chem.	230	Chem. II Rec.	3
Chem.	210	Chemistry I	5	Chem.	250	Chem. 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
Psych.	110	Gen. Psychology	3	Math.	150	Plane Trig.	3
		Air or Military Science ..	1	M. E.	211	Engg. Graphics I	2
Ph. Ed.	011	Physical Education	0			Air or Military Science ..	1
				Ph. Ed.	011	Physical Education	0
Total			17	Total			17

SOPHOMORE

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Millg.	100	Prin. of Milling	3	Millg.	210	Flow Sheets	2
Bot.	121	Biology I	4	Bot.	122	Biology II	4
		Air or Military Science ..	1			Air or Military Science ..	1
Millg.	010	Milling Seminar	0	Millg.	010	Milling Seminar	0
		Option A, B, or C	9			Option A, B, or C	10
Total			17	Total			17

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Millg.	400	Milling Tech. I	4	Millg.	650	Qual. Wht. & Flour	3
Agron.	260	Mkt. Grading of Cereals ..	3	Millg.	010	Milling Seminar	0
Millg.	010	Milling Seminar	0			Social Science	3
Engl.	090	English Proficiency	0	Spch.	105	Oral Comm. I	2
		Option A, B, or C	10			Option A, B, or C	10
Total			17	Total			17

SENIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Hist.	115	Civilization I	3	Hist.	130	Civilization II	3
Millg.	630	Exp. Baking	4	Entom.	100	Milling Entomology	4
Millg.	010	Milling Seminar	0	Millg.	010	Milling Seminar	0
		Option A, B, or C	10			Option A, B, or C	10
Total			17	Total			17

Number of hours required for graduation, 136.

OPTION A (Administration)

B. A.	170	Prin. of Accounting	3	Ec. So.	430	Money & Banking	3
B. A.	325	Business Law I	3	Ec. So.	620	Labor Econ.	3
B. A.	405	Business Finance	3	Ag. Ec.	130	Grain Marketing	3
B. A.	542	Sales Management	3	Engl.	205	Bus. Letter Writing	3
Chem.	350	Gen. Org. Chem. Rec.	3	Stat.	320	El. of Stat.	3
Chem.	351	Gen. Org. Chem. Lab.	2	Stat.	510	Stat. Qual. Cont.	3
Chem.	300	Gen. Quant. Analysis	4	Millg.	450	Fl. & Fd. Analysis	4
Phys.	211	Gen. Physics I	4			Electives	8
Phys.	212	Gen. Physics II	4				

OPTION B (Chemistry)

Chem.	300	Gen. Quant. Analysis	4	Math.	220	Anal. Geom. & Calc. I	4
Chem.	511	Organic Chem. I Rec.	3	Math.	221	Anal. Geom. & Calc. II ..	4
Chem.	512	Organic Chem. I Lab.	2	Math.	222	Anal. Geom. & Calc. III ..	4
Chem.	516	Organic Chem. II Rec.	3	Bact.	220	Gen. Microbiology	4
Chem.	517	Organic Chem. II Lab.	2	Millg.	450	Fl. & Fd. Analysis	4
Chem.	585	Physical Chemistry I	5	Millg.	620	Adv. Wht. & Flr. Test. ..	3
Chem.	660	Biochemistry	3			Electives	4
Chem.	661	Biochemistry Lab.	2				
Phys.	211	Gen. Physics I	4				
Phys.	212	Gen. Physics II	4				

OPTION C (Operation)

Math.	220	Anal. Geom. & Calc. I	4	Phys.	310	Engg. Physics I	5
Math.	221	Anal. Geom. & Calc. II ..	4	Phys.	311	Engg. Physics II	5
Math.	222	Anal. Geom. & Calc. III ..	4	Millg.	670	Milling Technology II	4
M. E.	216	Engg. Graphics II	2	Millg.	640	Adv. Flow Sheets	2
M. E.	310	Engg. Graphics III	2	Millg.	610	Fl. & Fd. Mill Constr.	3
Ap. M.	305	Statics	3	Millg.	600	Adv. Fl. & Fd. Tech.	3
Ap. M.	415	Mech. of Materials	3	E. E.	400	Elec. Engg. C Rec.	2
Chem.	350	Gen. Organic Chem. Rec.	3	E. E.	402	Elec. Engg. C Lab.	1
Chem.	351	Gen. Organic Chem. Lab.	2			Electives	7

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

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	100	Agr. in Our Society	2	Bot.	200	Gen. Botany	4
Chem.	210	Chemistry I	5	Engl.	120	Engl. Comp. II	3
Engl.	100	Engl. Comp. I	3	Math.	150	Pl. Trigonometry	3
Psych.	110	Gen. Psychology	3			Air or Military Science ..	1
Arch.	207	Arch. Graphics I	2	Ph. Ed.	011	Physical Education	0
		Air or Military Science ..	1	Arch.	202	Basic Drawing	2
Ph. Ed.	011	Physical Education	0	Arch.	208	Arch. Graphics II	2
				Arch.	216	Introduction to Arch.	1
Total			16	Total			16

SOPHOMORE

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Hort.-Agron.	200	Plant Science	4	Hort.	270	Plant Materials II	3
L. A.	110	Landscape Design	3	Ec. So.	110	Economics I	3
Hort.	260	Plant Matis. I	3	Spch.	105	Oral Communication I	2
Arch.	211	Sketching	2	L. A.	781	Hist., Theory of Land.	
Arch.	235	Elem. of Arch. Des.	4			Des.	3
		Air or Military Science ..	1	Arch.	235	Elem. of Arch. Des.	4
				C. E.	220	Surveying I	2
						Air or Military Science ..	1
Total			17	Total			18

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
L. A.	721	Landscape Construction ..	3	L. A.	401	Landscape Seminar	0
L. A.	401	Landscape Seminar	0	L. A.	420	Community Planning	3
L. A.	441	Planting Design	2	L. A.	441	Planting Design	2
L. A.	761	Elem. Land. Arch.	4	L. A.	761	Elem. Land. Arch.	4
Arch.	222	Water Color Painting	2	L. A.	721	Landscape Construction ..	3
Arch.	200	Appreciation of Arch.	3	Gl. Gg.	100	General Geology	3
Arch.	450	Sculpture	2	Arch.	300	Bldg. Matls. & Constr.	3
		Elective	2				
Engl.	090	English Proficiency	0				
Total			18	Total			18

SENIOR

Entom.	200	Gen. Econ. Entomology ..	3	Bot.	605	Plant Pathology I	3
Agron.	270	Soils	4	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	003	Agr. Seminar	0	L. A.	401	Landscape Seminar	1
L. A.	401	Landscape Seminar	0	L. A.	731	Professional Practice	1
L. A.	771	Landscape Architecture .	4	L. A.	771	Landscape Architecture .	4
Ec. So.	608	Urban Sociology	3			Elective	8
		Elective	4				
Total			18	Total			17

Number of hours required for graduation, 138.

Suggested Electives

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		C. E.	225	Surveying II	3
		& Sculpture	3	Hort.	610	Turf Management	2
Arch.	310	Working Drawings	3	Hort.	640	Hort. Problems	cr. arr.
Arch.	530	City Planning	3	L. A.	771	Land. Des.	4
Arch.	430	Inter. Arch. Des.	5	Psych.	465	Psychology of Art	3
Ag. E.	421	Drainage & Erosion Con.	3	Hort.	630	Forestry Practices	3
Ag. Ec.	670	Land Use & Resource					
		Conservation	4				

Suggested electives for students pursuing special training for landscape nurserymen.

B. A.	325	Business Law I	3	Hort.	600	Nursery Management	3
B. A.	400	Administration	3	Hort.	610	Turf Management	2
B. A.	440	Marketing	3	Hort.	620	Arboriculture	3
B. A.	541	Salesmanship	2	Hort.	640	Hort. Problems	cr. arr.
Engl.	205	Bus. Letter Writing	3	Hort.	680	Spraying	3
Hort.	220	Plant Propagation	3	Hort.	790	Plant Sci. Lit.	2
Hort.	230	Greenhouse Cons. &		Hort.	850	Horticulture Seminar	1
		Management	3	Hort.	630	Forestry Practices	3
Hort.	250	Intro. to Flor. & Orn.					
		Hort.	3				

Curriculum in Agricultural Education**B. S. in Agriculture**

(For Vocational Agriculture Teachers)

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gn. Ag.	100	Agr. in Our Society	2	Bot.	200	Gen. Botany	4
Chem.	210	Chemistry I	5	Chem.	230	Chem. II Rec.	3
Engl.	100	Engl. Comp. I	3	Ec. So.	110	Economics I	3
Math.	100	College Algebra	3	Engl.	120	Engl. Comp. II	3
Psych.	110	Gen. Psychology	3	Math.	150	Plane Trig.	3
		Air or Military Science ..	1			Air or Military Science ..	1
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Physical Education	0
Total			17	Total			17

SOPHOMORE

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Agron. Hort.	200	Plant Science	4	Agron.	270	Soils	4
Chem.	190	Organic Chem.	3	A. H.	200	Nutr. & Mgt. Fm. An.	4
Educ.	202	Educ. Psych. I	3	Dy. Sc.	200		
Zool.	200	Gen. Zool.	4	Pl. Sc.	200		
Ag. E.	210	Farm Mechanics	2	Ag. Ec.	200	Prin. of Ag. Econ.	4
		Air or Military Science ..	1	Spch.	105	Oral Comm. I	2
						Elective—Agriculture	3
						Air or Military Science ..	1
Total			17	Total			18

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Educ.	400	Educ. Psych. II	3	Ag. E.	220	Farm Power	3
Educ.	702	Voc. Education	3	Journ.	350	Agr. Journalism	3
Ag. E.	415	Agr. Engg. Applic.	2			Elective—Animal Sci.	5
Engl.	090	English Proficiency	0			Lit. or Language	3
		Elective—Animal Sci.	3			Elective—Plant Sci.	3
		Lit. or Language	3				
		Elective—Social Science .	3				
Total			17	Total			17

SENIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Educ.	201	Prin. Sec. Educ.	3	Ag. E.	215	Farm Mach. Repair	3
Educ.	500	Meth. Tchg. Agr.	3			Elective—Agriculture	3
Educ.	501	Tchg. Partic. Agr.	5			Elective—Plant Sci.	3
Ag. E.	405	Farm Mech. Meth.	3			Elective—Social Sci.	4
Ag. E.	410	Farm Bldgs. Constr.	3			Elective—Basic Sci.	3
Total			17	Total			16

Number of hours required for graduation, 136.

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.

AGRICULTURAL ECONOMICS

JOHN A. NORDIN,* *Head of Department*

Professors Hodges, Hoover,* Kelley, Manuel,* McCoy,* Montgomery,* Nordin,* Pine* and Schruben;* Associate Professors Bortfeld,* Knight,* Koudele,* Orazem,* Otto* and Sjo;* Assistant Professors Bevins, Gicseman,* McKinney* and Sorenson; Instructor Reed; Emeritus: Dean Call* and President Farrell**

Instruction in agricultural economics and rural sociology is offered in the School of Agriculture. Instruction in economics and sociology is offered in the School of Arts and Sciences.

Research in agricultural economics and rural sociology provides information concerning the economic and social problems of rural life. This information and inspection trips 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 additional understanding of economic problems and relationships. Students have an opportunity to learn of the principles and economic forces involved in farm management, marketing, taxation, land utilization, agricultural finance, economic cooperation, and rural life.

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered in Agricultural Economics. Fields of specialization are marketing, farm organization, agricultural credit, conservation, land economics, prices, taxation, agricultural policy, agricultural industries, and general agricultural economics.

Prerequisite to major graduate work in Agricultural Economics is acceptable undergraduate credit in Economics, including Agricultural Economics.

Graduate students majoring in Agricultural Economics take courses in Agricultural Economics in the School of Agriculture and also courses in general economics offered by the Department of Economics and Sociology in the School of Arts and Sciences.

The research in agricultural economics conducted as a part of the work of the Kansas Agricultural Experiment Station provides abundant materials for studies of various economic problems affecting agriculture. Cooperation with other states and with federal agencies further aids in providing a wealth of data suitable for graduate studies. The University's research facilities available to Agricultural Economics students include an IBM-1620 and other electronic computers.

COURSES IN AGRICULTURAL ECONOMICS

FOR UNDERGRADUATE CREDIT

- 100. Farm Organization.** (3) I, II. Economic forces affecting the organization and operation of the farm business. Two hours rec. and three hours lab. a week. Pr.: Ec. So. 110, Agron. 270, A. H. 230. (Not to be offered after the 1962-63 academic year.)
- 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. Livestock marketing services, functions, and prices. Three hours rec. a week. Pr.: Ec. So. 110.
- 180. Rural Sociology.** (3) I, II. Social and cultural life of rural people, principal groups, institutions and organizations and their functioning in communities.
- 200. Principles of Agricultural Economics.** (4) I, II, S. The application of economic principles to agricultural production and marketing problems; combination of resources; costs and revenue; the roles of producers and consumers in the establishment of prices; the function of agricultural prices in the economy. Four hours rec. a week. Pr.: Ec. So. 110, Math. 150.
- 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. Pr.: Ag. Ec. 200.

- 222. Farm Planning Laboratory.** (1) I, II. 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. 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, and the role of rural banks in the U. S. banking system. Pr.: Ag. Ec. 200 or consent of instructor.
- 241. Principles of Agricultural Marketing Lec.** (2) I, II. A study of the principles underlying functions, institutions, market organization, and costs and margins involved in marketing farm products. Although specific commodity illustrations will be used, special emphasis will be devoted to principles which will be common to all farm commodities. Pr.: Ag. Ec. 200 or consent of instructor. Conc. registration in 242 or 243 or 244 required.
- 242. Principles of Agricultural Marketing Rec.** (1) I, II. Application of the principles underlying functions, institutions and market organization to specific problems and procedures in the marketing of agricultural products. Pr.: Ag. Ec. 241 or conc. registration.
- 243. Egg and Poultry Marketing Rec.** (1) I. Economic and technological trends; market organization, marketing functions and costs; efficiency of marketing; prices. Pr.: Ag. Ec. 241 or conc. registration.
- 244. Dairy Marketing Rec.** (1) II. Economic and technological trends; market organization; marketing functions and costs; efficiency of marketing; prices. Pr.: Ag. Ec. 241 or conc. registration.
- 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 the population and agriculture of the world, with emphasis on economic development. Attention will be directed toward principles of economic growth and national and international policies that will stimulate development. Individual study will be encouraged to meet student interests, i.e., Foreign Agricultural Service, technical assistance, missionary, exchange programs. Pr.: Ec. So. 110.
- 411. Consumption Economics in Agriculture.** (3) I. A critical review of concepts and empirical studies of demand. Particular emphasis is given to demand factors relevant to changing market structures. Pr.: Ag. Ec. 241.
- 421. Agricultural Prices and Market Structures.** (3) I. An analysis of forces affecting prices under different market structures in the industry of agriculture. Identification of structural relationships based on models of the industry. Methods of price analysis. 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. 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, leading, easements, and other means. Social controls over land resources including regulation, zoning, and taxation. Evaluation and marketing of land resources. 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. Pr.: Ag. Ec. 200.
- 470. Principles of Cooperation.** (3) I. Principles underlying successful cooperative activities. Three hours rec. a week. Pr.: Ec. So. 110.
- 480. Agricultural Economics Statistics.** (3) I, II. A study of the principles and methods involved in the collection, analysis, interpretation, and presentation of statistical materials, with special reference to agricultural economics data. 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. Pr.: Ec. So. 110.
- 620. Production Economics.** (3) I, S. Principles underlying the combination of elements of production, with particular reference to agriculture. 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. 520.)

- 650. Agricultural Economics Problems.** Credit arranged. I, II, S. Pr.: Consult instructor.
- 660. Advanced Rural Sociology.** (3) II. The development of rural sociology; comparative rural life in the United States and other countries through the use of case studies of rural social organization and cultures. Pr.: Ag. Ec. 180.
- 670. Land and Resource Conservation.** (3) II. 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. Pr.: Ec. So. 110; junior standing.

FOR GRADUATE CREDIT

- 800. Economics of Agriculture I.** (3) I. 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. 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) II. 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. Individual research problems which may be used for a master's degree. Pr.: Consult instructor.
- 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. Three hours rec. a week. Pr.: Consent of instructor.
- 870. Research in Rural Sociology.** Credit arranged. I, II, S. Pr.: Ec. So. 220, Ag. Ec. 660.

AGRONOMY

RAYMOND V. OLSON,* *Head of Department*

Professors K. L. Anderson, Bidwell,* Chepil,* Ellis,* Heyne,* Hobbs,* Olson,* Pittenger* and Smith;* Associate Professors L. E. Anderson,* Barnett,* Jacobs,* Mader,* Pauli,* Stickler* and Wassom;* Assistant Professors Braum, Moore, Overley, Peterson, Russ, Sloan, Walter and Wright; Instructors Azelton, Lundquist, Morin, Raney, Swallow, 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.

COURSES IN FARM CROPS

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. 200. Taught in cooperation with the Department of Horticulture.
- 210. Farm Crops Laboratory.** (1) I, II. 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. 200 or 122.
- 220. Farm Crops.** (4) I, II. 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. 200 or 122.
- 221. Grain and Industrial Crops.** (3) I, II. Study of the fundamental principles of production of wheat, corn, sorghums, soybeans, and other im-

portant 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.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

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.

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 1963-'64 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.

740. Range Management II. (3) II. 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.

FOR GRADUATE CREDIT

- 800. Methods of Plant Breeding.** (3) II. Offered in 1963-64 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 1962-63 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. 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 1963-64 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.
- 930. Developmental Genetics.** (3) II. Offered in 1962-63 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.)

COURSES IN SOILS

FOR UNDERGRADUATE CREDIT

- 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, Gl. Gg. 100.
- 280. Soil Management.** (3) I. Nitrogen maintenance, crop rotations, water erosion control, and use of lime, manure, and commercial fertilizers under high rainfall conditions in Kansas. Three hours rec. a week. Pr.: Agron. 200, 270.
- 290. Dryland Soil Management.** (2) I. Water conservation, wind erosion control, soil management and soil use under low rainfall conditions in Kansas. Two hours rec. a week. Pr.: Agron. 200, 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.: Agron. 270 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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.
- 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. 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.
- 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. 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.

FOR GRADUATE CREDIT

- 810. Agronomy Seminar.** (1) I, II. A discussion of agronomic developments. Pr.: Graduate standing.
- 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) II. 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 1963-64 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. Theories of soil formation processes. Two hours rec. a week. Pr.: Agron. 400.

ANIMAL HUSBANDRY

RUFUS F. Cox,* *Head of Department*

Professors Cor, Good,* Mackintosh,* Richardson* and E. F. Smith;* Associate Professors Koch,* Kropf and Wheat;* Assistant Professors Boren,* Menzies, W. H. Smith,* Spies* and Tsien;* Instructors Hillman and McKee; Emeritus: Professors Aicher, Aubel,* Bell* and McCampbell**

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, where the animal can be studied from the standpoint of the breeder, the feeder, and the packer.

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

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 Department of Dairy Science and the Department of Poultry Science.
- 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) I. 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, 1962-63, 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,* Hall* and Ruliffson;* Assistant Professors Gawienowski and* Nordin;* Emeritus: Professors Hughes and Whitnah,* 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 72).

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 to 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 1963-'64 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 1963-'64 and in alt. years. Chemistry of plant and animal lipids, their occurrence, metabolism and industrial uses. Pr.:* Biochem. 660.
- 705. Vitamins.** (2) II. 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.
- 725. Advanced Biochemistry Laboratory.** (2) II. Specialized laboratory techniques for advanced biochemical investigations. Pr.:* Biochem. 661.
- 745. Hormones.** (2) I. 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.

* 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, 340, 345, 516, 517, 595, 598. Other students may enroll with the consent of the instructor.

- 810. Survey of Agricultural and Biological Chemistry.** (1) I, II, S. Independent study and reading followed by a comprehensive written examination. Pr.:*
- 812. Proteins.** (2) I. Offered 1963-'64 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 1962-'63 and in alt. years. Lectures and readings on structural chemistry of 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 1962-'63 and in 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 1963-'64 and in 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.

DAIRY SCIENCE

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

Professor Bartley, Marion,* Martin* and Norton;* Associate Professors Claydon,* Huston* and Ward;* Assistant Professors Bassette* and Farmer; Instructor Mickelsen*

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 is offered in dairy manufacturing that emphasizes the chemical and bacteriological aspects of dairy products processing, development, and control.

* 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, 340, 345, 516, 517, 595, 598. Other students may enroll with the consent of the instructor.

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.
- 196. Dairy Cattle Judging.** (2) II. Six 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 Department of Animal Husbandry and Department of Poultry Science.
- 205. Milk Production.** (3) II. Dairy farm operations, including feeding, management, breeding, selection, milk secretion, managed milking, housing, and requirements for producing Grade A milk. Three hours rec. a week. Not open to students majoring in dairy production. Pr.: Either Zool. 200 or Bot. 121.
- 220. Dairy Products Evaluation I.** (1) II. Three hours lab. a week.
- 300. Artificial Breeding.** (2) I. A study of techniques employed in the artificial breeding of cattle. One hour lec. and three hours lab. a week. Pr.: Junior standing.

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. Cont. of Dy. Sc. 196; 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. Cont. of Dy. Sc. 220. Three hours lab. a week.
- 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 1963-64 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

- 600. Milk Secretion and Reproduction.** (3) II. Study of the physiology of the processes involved in milk secretion and reproduction and the related internal secretions; managed milking studies, types of milking machines, mastitis preventive practices, breeding efficiency studies, breeding records, systems, and artificial breeding practices. Two hours rec. and three hours lab. a week. Pr.: Senior standing in dairy science or 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.
- 621. Dairy Cattle Management.** (3) II. Offered in 1963-64 and in 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.

- 630. Dairy Cattle Breeding.** (3) I. Genetics of qualitative and quantitative traits of dairy cattle. Theoretical and applied selection methods, systems of mating, pedigree writing and analysis. Two hours rec. and three hours lab. a week. Pr.: Dy. Sc. 180 and 190, or 200; A. H. 400; Stat. 320; Physi. 131, or consent of instructor.
- 640. Dairy Production Problems.** Cr dit 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 1962-63 and alt. years thereafter. Two hours rec. a week. Pr.: Dy. Sc. 510.
- 670. Quality Control of Dairy Products.** (3) II. Offered in 1963-64 and alt. years. Coordination of the role of the dairy control laboratory in maintaining constant check on quality of dairy products and ingredients most commonly used in their manufacture; plant sanitation. One hour rec. and five hours lab. a week. Required of all students pursuing the Curriculum in Dairy Manufacturing. Pr.: Bact. 615, Dy. Sc. 400, or graduate standing.
- 680. Butter and Cheese.** (5) I. Offered in 1963-64 and alt. years. Principles of processing treatments and equipment; factory operations; chemical, biological, and physical factors affecting quality and deterioration. Four hours rec. and three hours lab. a week. Pr.: Bact. 615.
- 690. Ice Cream and Concentrated Milk.** (5) II. Offered in 1962-63 and alt. years. The theory and practice of ice cream making and milk condensing and drying. Four hours rec. and one three-hour lab. a week. Pr.: Bact. 220.
- 710. Dairy Fermentations.** (3) I. 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 lec. and six hours lab. a week. Pr.: Bact. 220 and 615.

FOR GRADUATE CREDIT

- 800. Research in Dairy Science.** Credit arranged. I, II, S. Special investigation in dairy production or manufacturing which may be used as a basis for 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.

Dairy Mechanics. (See Ag. E. 455.)

Dairy Bacteriology. (See Bact. 615.)

Marketing of Dairy Products. (See Ag. Ec. 160.)

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

ENTOMOLOGY

HERBERT KNUTSON,* *Head of Department*

Professors Knutson, Painter,* Roan* and Wilbur;* Assistant Professors Burkhardt, DePew, Doune,* Elzinga,* Eshbaugh, Harvey, Hopkins,* Rettenmeyer,* Thompson* and Whitney; 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, 630, 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 is 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. Facilities for research include three field insectaries; an air-conditioned, well-equipped toxicology and stored-grain insect building with attached steel bins; a house trailer converted into a mobile laboratory; greenhouses; a programmed environmental control laboratory of the walk-in type; temperature- and humidity-controlled rooms for rearing insects; air-conditioned laboratories for insecticide testing and rearing, insecticide investigations including radioisotopes, chemical and bioassay determination of insecticidal residues, shade tree and ornamental plant insects, stored-products insects, physiology laboratory, toxicology and fumigant laboratory; and living colonies of experimental insects, a departmental library, and a good regional insect collection. All laboratories and offices are air conditioned.

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 being conducted on stored-products pests.

Field research laboratories also are available at Wathena for the study of insects attacking fruit and vegetable crops; at the Fort Hays Branch Station for the study of alfalfa insects and certain wheat and sorghum insects, and at the Garden City Branch Station for the study of wheat and sorghum pests. The staff is engaged in work on numerous federal, state, commercial, and special research projects including projects supported by the National Science Foundation, the U. S. Public Health Service, and the Atomic Energy Commission.

During each of the previous five years, the department has had approximately 30 graduate students; and 32 Ph. D.'s and 34 M. S. degrees have been awarded. The Kansas State Entomology Club is student-managed and has a membership of about 45, including faculty. The department actively supports 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. General 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 1962-63 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.

430. Insect Morphology and Physiology. (3) II. Offered in 1962-63 and alternate years. Study of the basic principles of insect morphology and physiology. One hour rec. and six hours lab. a week. Pr.: Entom. 200 or 211, or Zool. 200, or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Advanced General Entomology. (3) S. 1963. 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 1962-63 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. (2) II. Offered in 1962-63 and alt. years. Influence of biotic, physical and edaphic factors of environments on insects. Pr.: Entom. 200 or 211 and Zool. 200.

640. Entomological Methods. (3) S. 1964 and alt. summers. 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) I. Offered in 1963-64 and alt. years, or on demand. Resistance of varieties of crop plants to insect attack and their utilization in insect control; insect habits and physiology in relation to the cause of resistance and methods of breeding resistant varieties of crops. Pr.: Entom. 200 or 211, and a course in either plant or animal genetics.

660. Advanced 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. Advanced Internal Insect Morphology. (3) II. Offered in 1963-64 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.

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. 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) I. Offered in 1962-63 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) I. Offered in 1962-63 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 1963-64 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 1963-64 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.
- 830. Insect Toxicology Laboratory.** (2) I. 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) I, II. Intensive study of a selected group of insects. Pr.: Entom. 660, 690, 700, and consent of instructor.
- 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 Johnson, McMasters,* Pfost* and Shellenberger;* Associate Professors Farrell* and Ward; Assistant Professors Deyoe, Linko,* and G. D. Miller;* Instructor D. Miller*

The Department of Flour and Feed Milling Industries offers two curricula leading to a Bachelor of Science degree in Feed or Flour Milling, each with options in Administration, Chemistry and Operation.

Major work leading to the degrees Master of Science and Doctor of Philosophy is offered in the specialized administration, chemical and engineering fields related to flour and feed 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: pilot feed mill, flour mill and bakery, and associated facilities for the study of the physical, chemical, and biochemical properties of the related products.

Graduates are prepared for positions of responsibility in the flour and feed industries, such as plant managers, engineers, chemists, nutritionists, administration, and sales manager. Those graduating with advanced degrees are especially qualified for positions in research, development, teaching and related fields.

FOR UNDERGRADUATE CREDIT

- 010. Milling Industry Seminar.** (0) Required. I, II. Discussion of problems of interest to all students in flour and feed milling industries. One lec. each month.
- 100. Principles of Milling.** (3) I, II, S. Introduction to flour and feed milling processes. Two hours lec. and three hours lab. a week.
- 210. Flow Sheets.** (2) I, II, S. The construction and assembly of a flow sheet. Six hours lab. a week. Pr.: Millg. 100, M. E. 211.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 400. Milling Technology I.** (4) I. 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.: A. H. 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.** (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.
- 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) II. 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, II. 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 application of enzymes to food industries. Two hours lec. a week. Pr.: Chem. 350 and 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*

- 003. Agricultural Seminar.** (0) Required. I, II. Four meetings each semester. Programs presented by students, members of faculty, and invited speakers.
- 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 School 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 AND LANDSCAPE ARCHITECTURE

ROBERT P. EALY,* *Head of Department*

Professors Campbell, Ealy,* Filinger,* Keen,* Pickett and Quinlan,* Associate Professors Carpenter,* Greig* and Hall,* Assistant Professors Abermeyer, DeDeurwaerder,* Hadle; Instructor Roth; 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 vegetable production, fruit production, turf management, nursery management, and both the growing and retailing phases of floriculture. A Bachelor of Science degree in Agriculture with a major in Horticulture is granted. Three programs of study are available, (1) General Horticulture, (2) Fruit and Vegetable Production, and (3) Floriculture and Ornamental Horticulture.

A Bachelor's degree in Landscape Architecture is granted to those completing the professional curriculum in Landscape Architecture.

A technical two-year short course in retail floriculture is available for those students interested in floral arrangement and retail flower shop management, but not desiring an academic degree.

The department has a variety of facilities for study and research including the horticultural farm, turf plots, greenhouses, cold storage units, orchards, and research laboratories equipped for anatomical and physiological studies.

Graduate study at the Master's level is available in all areas of Horticulture and in Landscape Architecture. The Bachelor's degree in an undergraduate program substantially equivalent to that required at this University in the appropriate field is a necessary prerequisite to graduate study.

The Ph. D. degree in Horticulture is offered to those who desire more advanced work in the various areas of horticulture.

COURSES IN GENERAL HORTICULTURE

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. 200. Taught in cooperation with the Department of Agronomy.
- 220. Plant Propagation.** (3) I. Principles and practices of propagating horticultural plants. Two hours rec. and three hours lab. a week. Pr.: Bot. 200.
- 240. Horticulture Food Crops.** (3) II. 1963. A basic study of the underlying principles of growing and harvesting of fruit and vegetables. Two hours lec. and three hours lab. a week. Pr.: Hort. 200 or consent of instructor.
- 250. Introduction to Floriculture and Ornamental Horticulture.** (3) I. Principles, practices, and techniques of floriculture and ornamental horticulture. Two hours rec. and three hours lab. a week. Pr.: Hort. 200 or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 605. Preservation of Horticultural Products.** (3) I. Offered 1962-63 and alt. years. Selection and preservation of perishable foods by canning, fermentation, dehydration, freezing, radiation, and other methods. Quality control and judging of preserved foods. Two hours rec. and three hours lab. a week. Pr.: Chem. 350 and Bact. 220 or equiv.
- 630. Forestry Practices.** (3) II. Offered 1963-64 and alt. years. 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, landscape architecture, olericulture, ornamental horticulture and pomology. Pr.: Advanced undergraduate standing and consent of instructor.
- 670. Systematic Olericulture and Pomology.** (3) I. Offered 1962-63 and alt. years. Technical study of fruits and vegetables, including classification and elements of judging. Two hours rec. and three hours lab. a week. Pr.: Hort. 240.
- 675. Storage.** (3) I. Storage structures, harvesting and handling in relation to storage; physiological changes associated with the storage of flowers, fruits, nursery stock, and vegetables. Three hours rec. a week. Pr.: Junior standing and consent of instructor.
- 680. Spraying.** (3) II. 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.
- 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, ornamental horticulture, or landscape architecture. 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.
- 850. Horticulture Seminar.** (1) I, II. A discussion of investigational works in the various branches of horticulture. Pr.: Hort. 790 and graduate standing.

COURSES IN FRUIT CROPS

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 650. Principles of Fruit Growing I.** (3) II. Offered 1962-63 and alt. years. Pruning, soil management, marketing, grading and packing, and variety identification by tree characteristics. Two hours rec. and three hours lab. a week. Pr.: Hort. 200 or equiv.
- 660. Principles of Fruit Growing II.** (3) I. Offered 1963-64 and alt. years. Moisture relations, nutrition, fruit setting, and temperature effects. Two hours rec. and three hours lab. a week. Pr.: Hort. 200 or equiv.

FOR GRADUATE CREDIT

- 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.

COURSES IN VEGETABLE CROPS

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 690. Vegetable Crops I.** (3) I. Offered 1962-63 and alt. years. Competitive areas, market requirements, harvesting, grading, packing, sources of market supplies and prices. Two hours lec. and three hours lab. a week. Pr.: Hort. 200.
- 700. Vegetable Crops II.** (3) I. Offered 1963-64 and alt. years. Major vegetable crops grown as cash crops and the underlying principles of production. Three hours lec. a week. Pr.: Hort. 200.

FOR GRADUATE CREDIT

- 820. Advanced Vegetable Crops.** (1-3) I, II, S. A specialized study related to the physiological development or handling of selected vegetable crops. Pr.: Hort. 690 or 700 and consent of instructor.

COURSES IN FLORICULTURE**FOR UNDERGRADUATE CREDIT**

- 130. Floral Arrangement.** (2) I, II. Floral arrangement and design for the home, commercial flower shop, care and uses 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.
- 230. Greenhouse Construction and Management.** (3) II. Greenhouse construction, heating, air conditioning, and crop planning. Two hours rec. and three hours lab. a week.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 710. Principles of Floriculture.** (3) I. Offered 1962-63. Study of environmental conditions governing the culture of greenhouse crops, special emphasis being placed upon the culture of the rose, carnation, and chrysanthemum. Two hours rec. and three hours lab. a week. Pr.: Hort. 200.

FOR GRADUATE CREDIT

- 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.

COURSES IN ORNAMENTAL HORTICULTURE**FOR UNDERGRADUATE CREDIT**

- 260. Plant Materials I.** (3) I. Perennials, annuals, and evergreens for general ornamental planting. Planting plans. Two hours rec. and three hours lab. a week. Pr.: Bot. 200.
- 270. Plant Materials II.** (3) II. Trees, shrubs, vines for ornamental planting; and reports. Two hours rec. and three hours lab. a week. Pr.: Bot. 200.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. Nursery Management.** (3) II. Offered in 1963-64 and alt. years. Fundamental principles of layout and management of the modern nursery. Two hours rec. and three hours lab. a week. Annual field trip required. Pr.: Hort. 220.
- 610. Turf Management.** (2) I. Offered in 1962-63 and alt. years. Methods and principles of establishing and maintaining special purpose turf. Pr.: Agron. 270, Bot. 605.
- 620. Arboriculture.** (3) II. Principles and practices of caring for ornamental plantings; transplanting, pruning, tree surgery, fertilizing, diagnosis of pests. Two hours rec. and three hours lab. a week. Pr.: Bot. 200, Agron. 270; consult instructor.

FOR GRADUATE CREDIT

- 860. Advanced Ornamental Horticulture.** (1-3) I, II, S. Intensive study of a special phase of ornamental horticulture. Pr.: Hort. 600, 610 or 620.

Landscape Architecture

See page 83 for the requirements for the professional degree Bachelor of Science in Landscape Architecture.

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.

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.
- 761. Elementary Landscape Architecture.** (4) I, II. Graphic expression and the study of small and large home grounds 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 twelve credit hours.) Twelve hours lab. a week. Annual field trip required. Pr.: L. A. 761.
- 781. 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 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.

POULTRY SCIENCE

THOMAS B. AVERY,* *Head of Department*

Professors Avery, Craig* and Sanford;* Assistant Professors 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. 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 Department of Dairy Science and Department of Animal Husbandry.
- 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 1963-64 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 1962-63 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.
- 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 gradu-

ate 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.

670. Poultry Genetics. (3) II. Offered in 1962-63 and alt. years. An advanced genetics course directed primarily toward an understanding of the mode of inheritance of quantitative traits. Methods of utilizing information for maximum rates of improvement in poultry studied. Three hours rec. a week. Pr.: One semester each of elementary genetics and statistics.

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. Conferences 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; and the 1955 act to consolidate previous acts pertaining to state agricultural experiment stations.

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 \$3 million and many positions for graduate research assistants make the Kansas Agricultural Experiment Station a strong ally of the Graduate School. The Experiment Station has research projects in all schools of the University. Interested graduate students are encouraged to seek graduate research assistantships to supplement their graduate study programs.

More than 300 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 594 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. 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-Thayer, Scandia, Newton, Powhattan, and Wathena.

The School of Arts and Sciences

WILLIAM BEVAN, *Dean*

WARREN W. BRANDT, *Associate Dean*

ORVAL EBBERTS, *Assistant Dean*

MARJORIE ADAMS, *Assistant Dean*

JOHN P. MURRY, *Academic Adviser*

The School of Arts and Sciences through its 21 departments of instruction 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 School 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, businessmen, and writers.

Students who enter the School 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 School of Arts and Sciences who have demonstrated outstanding scholastic achievement may also be invited to participate in the Honors Program.

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

Biological Science

Education

General

Humanities

Music

Physical Science

Social Science

A list of the areas in which a student may major in each of these curriculums together with the degree received is given in the following table. The specific requirements for a degree in the various curriculums are indicated on pages 95-106.

"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) Humanities (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 :	Biological Science	Physical Science	Humanities	Social Science	General	Education	Music
DEGREE :	B. S.	B. S.	B. A.	B. A.	B. A.	B. S. in Ed.	B. Music
MAJORS AND PRE- PROFESSIONAL PROGRAMS :	Bacteriology	Chemistry	Art	Economics	Area	Elementary Education	Applied Music
	Biogeography	Geography	English	Geography	Biological Science	Music Education	
	Botany	Geology	History	History	Humanities	Physical Education	
	Entomology	Geophysics	Mathematics	Political Science	Physical Science		
	Psychology	Mathematics	Modern Languages	Psychology	Social Science	Secondary Education ¹	
	Speech	Physics	Music	Sociology		Art Education	
	Technical Journalism	Statistics	Philosophy	Speech	Pre-Professional		
	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. 108)	Speech (p. 174)
Biogeography (p. 137)	Technical Journalism (p. 181)
Botany (p. 111)	Wildlife Conservation (p. 96)
Entomology (p. 80)	Zoology (p. 184)
Psychology (p. 170)	

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 124): Social science, eight hours; Humanities, eight hours.

IV. Mathematics (except Pre-veterinary students): College Algebra, three hours; Trigonometry or Elementary Logic, three hours.

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	5
Botany ⁶	3	General Entomology ⁸	3
Bacteriology ⁷	5	General Entomology Laboratory ⁸	1
General Geology or Geography elective	3	Bacteriology ⁶	3
General Zoology	5	Physics (Introductory courses) ⁵	3-8

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. 251, 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 School of Veterinary Medicine. Pre-veterinary students will fulfill the requirements of the Curriculum in Biological Science, except for the mathematics requirement (Category IV), and will substitute for the biological and physical science requirements of that curriculum (Category V) the following courses: Chem. 210, 230, 250, 350; Zool. 200, 410; A. H. 100, 110, 400; Dy. Sc. 180, 190; Pl. Sc. 100, 101; Phys. 111; one semester hour of free elective. Upon satisfactory completion of these requirements and those of two years in Veterinary Medicine School, the student will be eligible to apply for a B. S. degree in the School 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. 405 and 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.

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 wildlife conservation majors.

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

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 Agr. 410; 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
Elective	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Social Science elective	4	Social Science elective	4
Total	15 or 16	Total	16 or 17

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 64, and Home Economics Teaching, page 131.

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 124):

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 19 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. One of the following three courses: Educational Sociology, Extra-class Activities, or Principles and Practices of Guidance, 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, 270; 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. 176; 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 or 110; B. A. 170; P. Sci. 220; Soc. 220; Stat. 320; six hours of history; three hours of sociology; 12 hours of courses numbered 400 or above in

economics, agricultural economics, or business administration, to be selected with 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. 115, 130, 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; Stat. 320; and nine hours of mathematics, including Math. 570 and 611 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. 115, 130, 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	
Course	Hours	Course	Hours
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	
Course	Hours	Course	Hours
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	
Course	Hours	Course	Hours
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	
Course	Hours	Course	Hours
English Composition I	3	English Composition II	3
Applied Nutrition	2	Phys. Ed. Orientation	1
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**

Biological Science
Physical Science
Humanities
Social Sciences

Pre-professional Majors

Physical Therapy¹
Pre-Medicine
Pre-Dentistry²
Pre-Law³

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 Approved Philosophy Course.⁵

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 and II, General Geology, Plane Trigonometry, and General Physics I and

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.

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	
Course	Hours	Course	Hours
English Composition I	3	English Composition II	3
Civilization I	3	Civilization II	3
Biological or Physical Science	4	Biological or Physical Science	4
Elective or Major	6	Oral Communication I	2
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. 254)	Music (p. 156)
English (p. 131)	Philosophy (p. 147)
History (p. 141)	Speech (p. 174)
Mathematics (p. 149)	Statistics (p. 179)
Modern Languages (p. 154)	

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 Approved Philosophy Course, three hours.

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

V. General Education (see page 124): 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 p. 158.

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 124): 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 Elective. For major requirements, see catalog statement for Department of Music, p. 158.

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. 113)	Mathematics (p. 149)
Geography (p. 136)	Physics (p. 167)
Geology (p. 136)	Statistics (p. 179)
Geophysics (p. 136)	Technical Journalism (p. 181)

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, 11 hours.¹

IV. General Geology, three hours.

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

VI. General Education (see page 124): Biological science, eight hours; social science, eight hours; humanities, eight hours.

VII. Physical Education (two semesters) and Air or Military Science, 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, geophysics, 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. 120)	Psychology (p. 170)
Geography (p. 136)	Sociology (p. 122)
History (p. 141)	Speech (p. 174)
Political Science (p. 145)	Technical Journalism (p. 181)

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 Approved Philosophy Course, three hours.

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

V. General Education (see page 124): 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	
Course	Hours	Course	Hours
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

GEORGE ROBERT SMITH, *Head of Department*

Assistant Professors Hetland, Jashinski, McKusker, Schlatter, and Smith

Kansas General Statutes, 1949, 76-436, as amended by the 1957 Legislature, 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 services.

Non-veteran men who matriculate with 25 semester hours of advanced academic credit are excused from the second year of military training; those with 59 hours are excused from both years, using other subjects to replace the hours involved. Any exemption from the Basic Course may bar the students from enrollment in the voluntary Advanced Course ROTC normally offered to selected juniors and seniors.

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 uniform, 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 a four-year program in Air Force ROTC. The first two years constitute the Basic Course, and successful completion of this work meets the requirements of Kansas State Law. The third and fourth years constitute the Advanced Course in which enrollment is selective and voluntary. The student should consult the Department of Air Science for conditions which govern selection for the Advanced Course in Air ROTC.

Students enrolled in the Advanced Course may sign a Deferment Agreement which exempts them 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 upon call by the Secretary of the Air Force for a designated period in accordance with the needs of the Department of the Air Force at that time.

Under present regulations, a student enrolled in the second-year Basic Air ROTC may also sign a Deferment Agreement and accept conditional enrollment in Advanced Air Force ROTC which will exempt him within established quotas from selective service induction so long as he satisfactorily pursues his academic college work.

Under present regulations, freshmen in the first-year Basic Air 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 give best promise as potential officer material may be enrolled subsequently in the Advanced Course, if college attendance in good standing is continued through the sophomore year.

In the Advanced Air ROTC, junior courses are three semester hours each, and senior courses are one semester hour each; however, seniors earn six additional hours by enrolling in Political Science 640 and Geography 645. These hours are accepted as electives for degrees except where curricular limitations prevent their full use, in which case the remaining hours appear as electives in excess of requirements for graduation.

SENIOR DIVISION, AF ROTC

BASIC COURSES

113. Air Vehicles 1A. (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. One hour a week.

114. Air Vehicles 1B. (1) II. A survey of the constituent elements of air power, basic aeronautical science, and the organization and opera-

tion of the military arm of the Federal Government. Discussion of the professional opportunities offered by the United States Air Force. Four hours a week.

123. Air Operations 2A. (1) I. A survey of air power governing evolution and development of air forces, elements of aerial warfare, employment of air forces, and the problems and possibilities associated with operations in space. Four hours a week.

124. Air Science 2B. (1) II. Leadership training designed to develop proficiency as an instructor for freshman cadets in such subjects as military formations, customs and courtesies of the service, and the fundamentals of military discipline; develop capability to assume the Flight Commander leadership position in the Air Force organization. One hour a week.

ADVANCED COURSES

131. Problem Solving 3A. (3) I. Scientific problem-solving techniques, based on command and staff concepts, communicative skills, the principles of learning, and techniques of instructional procedures. Four hours rec. and one hour leadership lab. a week.

132. Leadership and Management 3B. (3) I. A study based on the primary professional responsibility of Air Force officers—handling people within a framework of management principles. A study of the sense of mission based on the biological and psychological nature of man. Four hours rec. and one hour leadership lab. a week.

141. Weather and Navigation 4A. (1) Introduction to weather and navigation equiv. to that required for a private pilot's license. Conc. registration in P. Sci. 640, International Relations, required. One hour rec. and one hour leadership lab. a week.

142. Briefing for Air Force Commissioned Service 4B. (1) Conc. registration in Geog. 645, Political Geography, required. One hour rec. and one hour leadership lab. 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 Haylett, Lee, and Winter; Assistant Professors Knorr and Shannon; Instructor Morgan; Coach Weaver; Assistant Coaches Dissinger, Hailey, Kadlec, LaRue and Taylor; Administrative Assistant 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, 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;* Instructor Vera; Emeritus: Professor Gainey**

UNDERGRADUATE

Students majoring in bacteriology should enroll in the Curriculum in Biological Science. (See p. 95.)

For a major (VI, p. 96), the following courses should be completed: Bact. 250 or equiv., 610, 670, 675 (or 710), and eight additional hours which may include Zool. 251 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. 95).

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 technic; microbiology in dairy sanitation and inspection. One hour rec. and six hours lab. a week. For students in School 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 fermentations; 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.
- 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.
- 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

- 810. Virology.** (4) II. Present-day knowledge relative to the role of ultra-microscopic infectious agents, including bacteriophage, in disease. Laboratory diagnosis of virus diseases, isolation, identification, and characterization of specific viruses. Two hours rec. and six hours lab. a week. Pr.: Bact. 610 or equiv.
- 820. Genetics of Microorganisms.** (2) I. Reproduction, heredity, mutation, variation, adaptation, and natural selection in one-celled organisms; relationship of these processes to inheritance and growth in higher organisms. Pr.: Bact. 220 or equiv.; A. H. 400.
- 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.

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.

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, Hansing,* Haymaker,* Johnston* and Pady;* Associate Professors McCracken,* Newcomb* and Sill;* Assistant Professors Barkley,* Dickerson,* Edmunds,* Goss,* Hulbert,* Kainski,* Kramer* and Woodard; Instructor Browder; Emeritus: Professors Bates, Elmer* and Melchers**

UNDERGRADUATE

Students majoring in botany should enroll in the Curriculum in Biological Science. (See p. 95.)

For a major in botany (VI, p. 96), the requirements are Bot. 210 and 20 hours of botany 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 pathology, plant physiology, taxonomy, plant ecology, plant anatomy, plant cytology, cytogenetics and mycology.

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.

122. Biology II. (4) II.

In these courses the fundamental relationships between plants and animals are studied, with particular emphasis on structure of representative plants and animals, metabolic processes, principles of classification, heredity, environmental factors, economic aspects, and finally, a detailed study of man himself. Life is interpreted as an integrative process which results in a dynamic whole.

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 who have credit in Bot. 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.

300. Elementary Plant Physiology. (3) I. A brief survey of the physiological processes of higher plants. Pr.: Bot. 210.

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, II. Detailed consideration of the physiological processes of higher plants. Two hours rec. and six hours lab. a week. Pr.: Bot. 210 and a course in organic chemistry.
- 605. Plant Pathology.** (3) I. Important diseases of crops and the organisms which cause them. Two hours rec. and three hours lab. a week. Pr.: Bot. 210.
- 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.
- 650. General Plant Nematology.** (3) I. The anatomy, physiology, taxonomy, pathogenicity, and control of the nematodes that attack plants. Six hours of combined rec. and lab. work a week. Pr.: Bot. 605.
- 670. Plant Ecology.** (3) II. Structure and dynamics of vegetation. Two hours rec. and three hours field work 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. 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.
- 710. Horticultural Crop Diseases.** (3) II in odd years. Major diseases of fruit and vegetable crops and ornamental plants; their causes, symptoms, and control. One hour rec. and six hours lab. a week. Pr.: Bot. 605.
- 715. Light and Temperature Relations of Plants.** (2) II. 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. 200.
- 730. Field Botany.** (3) S. Identification and classification of seed plants. One hour rec. and six hours lab. a week. Pr.: Bot. 200.
- 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.
- 750. Field Crop Diseases.** (3) II in even years. Diseases of cereal and forage crops; their causes, life histories, symptoms, and control. One hour rec. and six hours lab. a week. Pr.: Bot. 605.
- 760. Principles of Plant Disease Control.** (3) II in odd years. Host-parasite relationships. Methods of control—chemical, cultural, and biological; nature and inheritance of resistance; breeding disease-resistant varieties. Two hours rec. and three hours lab. a week. Pr.: Bot. 605.

781. Virus Diseases of Plants. (3) I in even years. Nature, transmission, symptoms, control, and economic importance of plant virus disease. Two hours rec. and three hours lab. a week. Pr.: Bot. 605.

799. Problems in Botany. Credit arranged. I, II, S. Work is offered in anatomy, cytogenetics, cytology, ecology, microtechnic, morphology, mycology, pathology, 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.

806. Nematode Control. (2) II in odd years. Methods of control of the nematodes that are parasitic on plants. Pr.: Bot. 650.

807. Taxonomy of Nematodes. (3) II in alt. years. Taxonomy of the nematodes associated with plant diseases. Six hours of combined rec. and lab. a week. Pr.: Bot. 650.

810. Virology. (4) II in even years. Present-day knowledge relative to the role of ultra-microscopic infectious agents, including bacteriophage, in disease. Laboratory diagnosis of virus disease, isolation, identification, and characteristics of specific plant and animal viruses. Two hours rec. and six hours lab. a week. Pr.: Consent of instructor. Taught in cooperation with the Department of Bacteriology.

820. Plant Physiological Technic. (2) II. Research methods and technic used in physiological research by botanists, agronomists, and horticulturists; analytical methods for fats, proteins, and carbohydrates. Six hours lab. a week. Pr.: Bot. 600.

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.

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.: Bot. 605.

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. 300 or 600, and 670.

870. Advanced Systematic Botany. (4) II in odd years. Advanced studies in morphology, classification, nomenclature, collecting and identification of vascular plants. Two hours rec. and six hours lab. a week. Pr.: Bot. 690.

980. Botany Graduate Seminar. (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, nematology, pathology, physiology, and taxonomy. Pr.: Sufficient training to carry on the line of research undertaken.

CHEMISTRY

WARREN W. BRANDT, *Head of Department*

Professors Andrews, Brandt,* Lash,* Schrenk,* Searles* and Silker;* Associate Professors Kiser,* Lambert,* Lanning,* McDowell* and Moser;* Assistant Professors Conrow,* Hammaker,* Johnson,* McDonald* and Meloan;* Instructor Crawford; Emeritus: Professor Hughes* and Assistant Professor Smits**

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, Chem. 340, 345, 511, 512, 516, 517, 585, 586, 595, 598, 095 (each year). A minimum of five semester hours must be selected from courses of a number higher than the required courses in the field. One of these courses must include a laboratory. 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.
- 270. Qualitative Analysis.** (3) II. One hour rec. and six hours lab. a week. Pr.: Chem. 230 or conc. enrollment.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 401. Geochemistry.** (2) II. Chemistry and composition of the earth. Chemical reactions in the hydrosphere, atmosphere, and biosphere. Chemistry of the igneous, sedimentary, and metamorphic rocks. Pr.: Chem. 250, Geol. 460, or consent of instructor.
- 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.**

* 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.

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.

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.*

751. Systematic Inorganic Chemistry. (3) II, S. A study of the elements, with emphasis on the periodic table; use of modern theories to interpret the structure and properties of the elements and their compounds. Pr.:*

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.

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 270.

* See page 114.

- 340. Quantitative Analysis I.** (4) I, S. General procedures of gravimetric and colorimetric analyses. Two hours rec. and six hours lab. a week. Pr.: Chem. 250 or 270.
- 345. Quantitative Analysis II.** (4) II, S. General procedures of volumetric analysis. Two hours rec. and six hours lab. a week. Pr.: Chem. 250 or 270.

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.

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.:*
- 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.

* See page 114.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 511. Organic Chemistry I.** (3) I. General principles of organic chemistry; study of the main types of aliphatic compounds, with an introduction to fats, carbohydrates, amino acids, proteins, and aromatic compounds. Required for chemistry curriculum and for entrance to some medical schools. Recommended for others who desire a more thorough course than the preceding ones. Pr.: Chem. 250 or 270. Conc. enrollment in Chem. 512 is recommended.
- 512. Organic Chemistry I Laboratory.** (2) I. Pr.: Chem. 511 or conc. enrollment.
- 516. 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. 511 and 512. Conc. enrollment in Chem. 517 is recommended.
- 517. Organic Chemistry II Laboratory.** (2) II. Pr.: Chem. 516 or conc. enrollment.

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) I and 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 constitution 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 114.

- 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 270, Math. 222 or 232, Phys. 211 or 311.
- 586. Physical Chemistry I Laboratory.** (2) I. Six hours lab. a week. Pr.: Chem. 300 or 340 and 345 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 AND SOCIOLOGYJOHN A. NORDIN, *Head of Department*

Professors Bagley, Fisher,* Hill,* Nordin* and Sweedlun;* Associate Professors Billings,* Dakin,* DeCou,* Hardbeck* and Rohrer;* Assistant Professors Brazelton,* Crawford,* French,* Long* and Taylor;* Instructor Waters; Emeritus: Professors Farrell* and Holtz**

UNDERGRADUATE

(Courses in Agricultural Economics and Rural Sociology are offered by the School of Agriculture; courses in Accounting and Business Administration are offered by the School of Commerce.)

Economics:

Courses in economics will help students understand the principles underlying the production and distribution of income, the factors that cause business prosperity and depression, and the principles governing best use of labor and capital. Students may pursue concentrated study in the fields of economic theory, money and banking, public finance, labor relations, and international trade.

By studying economics, the student may prepare himself for a career in business and industry, in government, or in education. He may also

* See page 114.

acquire the background needed as a citizen for understanding and appraising the economic policies of governments.

Those students preparing for positions in business, labor, government, research organizations, college teaching, and others with a special interest in economics should enroll in the Curriculum in Social Science with a major in economics. (See page 106.) Those students interested in economics who also desire to prepare for teaching in secondary schools should enroll in the Curriculum in Secondary Education with a major in economics. (See page 98.) The sequence of courses should be planned in cooperation with a faculty member of the Department of Economics and Sociology who will be assigned as the student's adviser.

The special requirements in the Curriculum in Social Science with a major in economics (X, page 106) are: Econ. 120, 430, 710; Stat. 320; B. A. 170; and 12 semester hours of courses numbered 400 or above in economics, agricultural economics, business administration, or psychology, selected in consultation with the student's adviser. Math. 147, 100, or 110 should be used to satisfy requirement III, p. 106. Econ. 110 should be taken to satisfy the three hours required in economics (VII, p. 106). Three hours of sociology and three hours of government should be taken to satisfy the Social Science elective requirement (IX, p. 106).

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) may become acquainted with the economic, political, psychological, and social aspects 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; Psy. 515, 625, 600; B. A. 400, 431.

Sociology:

Sociology is the study of the development and the interaction of the individual in society. Some of the principal areas considered are: the origin and development of cultural patterns; the growth, distribution, and characteristics of populations; the major social institutions and their trends; the problems of modern societies; community and organization planning for the orderly development of our society.

The trained sociologist is prepared for professional work with community planning and service agencies, 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 106.) 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 99.)

The requirements in the Curriculum in Social Science with a major in sociology (X, p. 106) are: 21 semester hours of sociology, including Soc. 615, 671, 700 or 705 and 750. Soc. 220 should be taken to satisfy the three hours required in sociology (VII, p. 106). Three hours of economics and three hours of government should be taken to satisfy the Social Science elective requirement (IX, p. 106).

ECONOMICS

GRADUATE

Graduate study leading to the Master of Arts Degree in Economics is offered in this department. (The Ph. D. degree is offered in Agricultural Economics.) Fields of study are economic theory; development of economic thought; econometrics; money and banking; public finance and fiscal policy; labor economics; international trade; and economic systems.

Graduate study in economics is valuable training for certain executive and research positions in business and government and for teaching social science in secondary schools. Graduate degrees are essential for careers as professional economists in higher education, business, or government.

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.

The University's research facilities available to economics students include an IBM-1620 and other electronic computers.

Opportunities for advanced study are also enhanced by close contacts with the Agricultural Economics section of the department, with the School of Commerce, with the Agricultural and Engineering Experiment Stations, and with various state agencies.

SOCIOLOGY

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 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 ECONOMICS

FOR UNDERGRADUATE CREDIT

- 110. Economics I.** (3) I, II, S. Basic facts, principles, and problems of economics, including the problem of economic instability, depressions, inflation; money and the banking system; introductory principles of the allocation of resources; international trade.
- 120. Economics II.** (3) I, II, S. Cont. of Economics I. The allocation of resources by consumers, business firms, and government; problems in the public economy; and economic systems. Pr.: Econ. 110.
- 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 to English socialism, communism, and to the essential characteristics of the free enterprise capitalistic system. Pr.: Econ. 110.

- 681. International Trade.** (3) I, S in even years. 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, S in even years. Development of economic ideas and doctrines and the relation of these to 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 is offered in money and banking, public finance, general economics, international trade, labor relations, transportation. Pr.: Sufficient training to carry on the line of research undertaken.

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.
- 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.

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, some S. Nature, extent, and causes of crime; programs for prevention and treatment. Pr.: Soc. 220.

642. Juvenile Delinquency. (3) II. Nature, extent, and causes of delinquency; characteristics of delinquents; means of prevention and treatment. Pr.: Soc. 220.

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.

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. 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) II, 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.

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) II in even 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.

750. Seminar in Sociology. (2) II. Summarization and integration of courses in sociology. Pr.: Senior standing and nine hours of sociology.

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

FOR GRADUATE CREDIT

997. Research in Sociology. Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

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 enabling 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.

EDUCATION

FINIS M. GREEN, *Head of Department*

Professors Baker, DeMand,* Green,* Moggie,* O'Fallon* and Olson;* Associate Professors Agan,* Hall,* Littrell,* Peterson* and Trent; Assistant Professors Bracken,* Bradley,* Cook, Craig, Drumright,* Hunt,* Kaiser,* Loeb,* McAnarney and Trennepohl;* Emeritus: Professors Davidson,* Rust* and Strickland;* Associate Professor Baxter*

UNDERGRADUATE

The Department 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 department 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 department and 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 department; (6) cooperating in placement services. Implicit in these statements are varying degrees of cooperation between the Department of Education and other University 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 "School of Arts and Sciences."

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

The application for a teaching certificate must be accompanied by the recommendation of the head of the Department 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. Further specialization in these areas is provided in the Specialist in Education program. 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 Department of Education in the fields of adult education, agricultural education, educational administration, guidance and counseling, home economics education, secondary education, and elementary education.

For persons majoring in this department, application for admission to candidacy may be filed upon completion of seven semester hours of graduate work and must be filed before registration for the final 12 semester hours of work toward the master's degree. For admission to candidacy the candidate must be recommended by all of the professors of the department with whom he has enrolled for graduate study. An applicant for admission to candidacy will provide the following information: The proposed program of study, including the major field and courses; the minor field and courses; the proposed problem and the signature of the major professor indicating his approval for the proposed program; a transcript of all undergraduate work and grades and semester credit hours for all completed courses toward the master's degree.

For a major in the department 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 department a minimum of 12 semester hours of undergraduate credit in the field of the minor. All work counted toward a major in this department must average B or better in scholarship. Graduate students majoring in the Department 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.
- 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.
- 416. Teaching Participation in Music.** Credit arranged. I, II, S. Observation and teaching 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; Music 413; English 090; 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.
- 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; English 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.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

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 organizations, 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 is 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.
- 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) II, 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.
- 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.
- 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.
- 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

- 550. Methods of Teaching Home Economics.** (3) I, II, S. The selection, organization, and presentation of courses and lessons in home economics for high school pupils. Pr.: Junior standing in Home Economics or consent of instructor.
- 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; characteristics of the effective reimbursed home economics program in the secondary school; planning and supervising the home experience program and the F. H. A. organization; developing teaching guides for secondary home economics courses. Pr.: Consent of instructor.
- 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.
- 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.

FOR GRADUATE CREDIT

- 827. Organization and Presentation of Home Economics.** Credit arranged. I, II, S.
- 829. Supervision in Home Economics.** (2) II, S. Problems met by a supervisor or director of home economics in the public schools; standardization of work; relation of supervisor to teacher; modernization of plant and equipment; and course of study. Pr.: Teaching experience in home economics and consent of instructor.
- 837. Seminar in Home Economics Education.** (2 or 3) S. Recent trends in home economics education. Pr.: Teaching experience in home economics and consent of instructor.
- 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.

ENGLISH

EARLE R. DAVIS, *Head of Department*

Professors Davis, Hummel,* Matthews,* Moses,* Thornton* and Woolf; Associate Professors Adams,* Berland,* French, Higginson,* Jones,* Langvardt,* Noonan,* Rogerson* and Soellner;* Assistant Professors Ansdell,* Askew,* Eitner,* Glenn,* Koch,* Laman,* Miller,* Newman,* Throckmorton, White* and Wroten;* Instructors Boyle, Chillman, Cohen, 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 in their sixth semester. 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 Ameri-

can 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.

The department offers general education courses aiming at introductory appreciation of literature for non-major students: Engl. 141, 142, 230, 240, 251, 256, 270, 275, 300, 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 schools. 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.

141. Introduction to Humanities I. (4) I, S.

142. Introduction to Humanities II. (4) II, S.

These courses seek to develop a greater understanding, appreciation, and enjoyment of the humanistic resources available in our culture. The first-semester course includes a consideration of the general nature and purposes of the humanities, as distinguished from the natural and social sciences; the basic principles of literature and the visual arts; the nature of some of the major world religions; and selected works in the areas of literature, philosophy, and the visual arts, typical of Greco-Roman, Medieval, and Renaissance cultures. The second semester is devoted to the humanities, including music, of the modern and contemporary world. Pr.: Satisfactory entrance test.

200. English Composition III. (3) I, II, S. Composition and argumentation. Pr.: Engl. 120.

205. Business Letter Writing. (3) I, II, S. Writing of adjustment, credit, collection, and sales letters; principles of effective commercial writing. Pr.: Engl. 120.

230. Introduction to Fiction. (2) I, II. Selected novels from world literature, with emphasis on the present. Pr.: Satisfactory entrance test in English.

240. Introduction to Drama. (2) I, II. Appreciation of great plays. Pr.: Satisfactory entrance test in English.

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.

300. Forms of Literature. (3) I. An introduction to the critical analysis of poetry, drama, and prose fiction. Pr.: Engl. 136, 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. Introduction to great world classics from present to past. Pr.: Engl. 120.

375. Books and Men II. (3) II. 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 interrelationships 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. 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. 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) 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. The colonials to the Civil War. Required of majors with American emphasis program. Pr.: Engl. 120.
- 445. American Survey II.** (3) II. Whitman to the present. Required of majors with American emphasis program. Pr.: Engl. 120. emphasis on Donne and the Metaphysicals. Pr.: Engl. 136, 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) 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) II. An examination required of all majors, based on departmental reading list and the scope of literature covered in the English and American Survey courses. Given in sixth semester of major 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) II. A study of Shakespearean drama, with special attention to the criticism and bibliography. Pr.: Engl. 120 and 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.
- 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.
- 675. American Colonial Literature.** (3) I. American literature from the beginnings 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) II. 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 Brontës. 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.
- 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.
- 850. Shakespeare Seminar.** (3) II in alt. years. Pr.: Engl. 651.
- 870. Milton Seminar.** (3) II in alt. years. Pr.: Engl. 671.
- 890. American Transcendentalism.** (3) II in alt. years. Pr.: Engl. 710.
- 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 Professor Walters;* Assistant Professors Estlow, Rau,* Riseman,* Self,* Siddall, Twiss* and Wingard;* Instructors Clark and Larson; Visiting Assistant Professor Pflug; Emeritus: Professor Sperry**

UNDERGRADUATE

The Department of Geology and Geography offers opportunities for study in geology, geophysics, 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. 105)

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 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. 95)

The requirements for a *major in Biogeography* (VI, p. 106) 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. 106; Econ. 110; sociology or anthropology, 3 hours; and P. Sci. 220 to satisfy the Social Science requirement (III, p. 106).

Curriculum in Social Science (X, p. 106)

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, ground water 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.

400. Engineering Geology. (4) I, II. General principles of geology and their application to engineering problems. Three hours rec. and three hours lab. a week. Pr.: Chem. 210 or equiv.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

410. Geology for Science Teachers. (2) S. Classification and identification of rocks, minerals, and fossils; demonstration methods for teaching geology. One hour rec. and three hours lab. a week. Pr.: Geol. 100 or Geog. 205.

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. 205 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, 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, II. The fundamentals of crystallography and their uses in mineral identification. Two hours rec. and six hours lab. a week.
- 460. Mineralogy.** (4) I, 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, 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, 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, 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, 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.
- 620. Geology of Subsurface Water.** (3) I or II. Three hours rec. a week. Pr.: Geol. 510, 530.
- 630. Geologic Literature.** (3) I or II. Current geologic literature and history of geology. Pr.: Geol. 430, 460.
- 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.
- 650. Conservation of Mineral and Water Resources.** (3) I or II. Pr.: Geol. 100, 460, 570.
- 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 zoology.
- 690. Petrography.** (3) I, 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, II. Structure and the stratigraphy of the major tectonic units of North America. Pr.: Geol. 510, 530.
- 750. Aerial Photogeology.** (3) I, 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, 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.
- 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.
- 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. Em-

phasis 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.

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) II. 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, POLITICAL SCIENCE, AND PHILOSOPHY

PHILIP M. RICE, *Head of Department*

Professors Carey, Doherty,* Douglas,* Miller,* Parrish,* Rice,* Sageser* and Wilcoxon;* Associate Professors Barth,* Hajda,* G. Jones,* Riggs,* Socolofsky,* Tremmel* and Yuan;* Assistant Professors Gallanar,* Gruender,* Gustafson, Hausman,* Nugent* and Turner;* Instructor Caldwell; Emeritus: Professors Correll* and Iles;* Associate Professor Alsop**

Students may elect a major in either history, political science, or philosophy. The general requirement in each is 27 semester hours of which at least 15 should be in courses numbered 400 and above. 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, literature, and in such courses as may be specified by the pre-law adviser. Students who wish to concentrate on international studies should elect their major and minor courses from the prescribed curriculum in international history, international relations, area history and culture, and international economics. In addition, they should provide themselves with a sound background in two modern languages: French, German, Spanish, or Russian.

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

UNDERGRADUATE

Requirements for a major with an A. B. degree in any one of the three divisions of this department consist of a minimum of 27 hours of C or better work either in history, political science, or philosophy. Except for those in the honors program, students shall complete at least six hours of basic work at the 100-399 level before continuing their study in a given field. Courses numbered 400 and above are not open to sophomores except with the consent of the instructor.

GRADUATE

Requirements for the M. A. degree either in history, political science, or philosophy consist of a minimum of 30 semester hours of which ap-

proximately two-thirds shall be in the major field. Candidates for the M. A. degree in history in international studies should take a minimum of 33 semester hours of which six should be in international economics, six to nine in international politics and comparative government, six in international history, and six to nine in foreign areas and cultures. Candidates in any of the preceding four fields 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 available in the vicinity of the University include the Eisenhower and Truman libraries, the Linda Hall Scientific Library in Kansas City, the Library of the State Historical Society and the resources of the State Party Headquarters in Topeka, and the material available through the Kansas Citizenship Clearing House, and through various university and college libraries.

Special Programs: Special undergraduate programs in international studies and in area studies of the Great Plains are available to undergraduate majors and to graduate students in history and political science. Each of the programs is under the direction of a special committee operating within the Department and each is multiple-discipline in its approach.

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. or B. S. 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 School of Arts and Sciences sponsors a Chancery (pre-law) Club to stimulate interest in the legal profession.

UNDERGRADUATE

Requirements for a major in history consist of a minimum of 27 hours including Hist. 115 and 130 and at least 15 hours from courses numbered 600 and above. Students should distribute their upper-division courses so as to cover three of the following four fields:

- I. Ancient, medieval, and early modern Europe
- II. Modern Europe
- III. Russia and Asia
- IV. United States and Latin America

Phil. 640 and 650 may be used as history courses in fields I and II respectively and P. Sci. 605 may be used in field IV. Honors students and students planning on entering graduate school should register for Hist. 790 in their senior year.

GRADUATE

Graduate study leading toward the M. A. degree in history is available in Modern European, Russian, Asiatic, British, American, and Latin American history. Candidates must take at least one seminar in the field of their research and must enroll for Hist. 801 and 802. A special multiple-discipline program leading toward the M. A. degree in History in International Studies is also available.

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.
- 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.

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.
- 631. The Renaissance.** (3) I, 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.
- 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 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 1914.** (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.
- 663. Modern France.** (3) II in alt. years and S. Major trends in the development of the history of France. Pr.: Hist. 111.
- 665. 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.
- 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) II, 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) I, 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.
- 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) I, 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.
- 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.
- 748. History of American Foreign Policy.** (3) II, 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.
- 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, and in the History of Foreign Relations.
- 995. Research in History.** Credit arranged. I, II, S. Work offered in Modern European, American, Latin American, English, Russian, and Asiatic history.

UNDERGRADUATE

Requirements for a major in political science consist of a minimum of 27 hours in political science courses, including P. Sci. 220 and at least 15 hours from courses numbered 400 and above. Upper-division courses must be distributed over at least three of the following:

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

Honors students and students planning on doing graduate work should enroll for P. Sci. 795 during their senior year.

GRADUATE

Graduate study leading toward the M. A. degree is available in any of the four fields given above. Students must take at least one seminar in the field selected for their research.

FOR UNDERGRADUATE CREDIT

- 120. Modern Democracy.** (3) I, II, S. Comparative treatment of modern democracies and their development; introduction to principles 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

- 425. Methodology in Political Science.** (2) I. Use of library and the methods and techniques of political science research.
- 450. Introduction to Public Administration.** (3) I, 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. American Political Ideas.** (3) I, 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. 120 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 P. Sci. and three hours of economics.
- 615. City Government.** (3) I, S. Government and administration of American cities. Pr.: P. Sci. 220.
- 635. Public Personnel Administration.** (3) II in alt. years. 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 and Management.** (2) 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. 120 or 150 (or 120 and 220).
- 650. Constitutional Law.** (3) II, S. Development of the government of the United States through judicial interpretation of the Constitution. Pr.: P. Sci. 220.
- 655. Administrative Law.** (3) II. A study of the development of administration and a study of certain cases involved. Pr.: P. Sci. 380.
- 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.
- 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. 120 and 220.

- 720. Government of Britain and the Commonwealth.** (3) II. Analysis of the government of Great Britain and the Commonwealth. Pr.: P. Sci. 120 and 220.
- 725. Governments of Continental Europe.** (3) I, S. Analysis of the major governments of Continental Europe. Pr.: P. Sci. 120 and 220.
- 735. Far Eastern Government and Politics.** (3) I in alt. years, S. Examination and analysis of the organization and operation and of the political, social, and economic problems of China and Japan. Pr.: P. Sci. 120 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.
- 780. Soviet System.** (3) II. Government and politics of the Soviet Union and other Communist-controlled nations. Pr.: P. Sci. 120 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.

UNDERGRADUATE

Requirements for a major in philosophy in the curriculum in humanities are the equivalent of 27 hours in philosophy and successful completion of comprehensive examinations in the history of philosophy and any two of the following four areas: logic and philosophy and history of science; ethics and aesthetics; social and political philosophy; metaphysics and theory of knowledge.

GRADUATE

Requirements for the Master of Arts degree in philosophy are: completion of the general requirements; passing written comprehensive examinations with fields and choices as indicated in the above paragraph; 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, II, S. A course designed to acquaint the student with the nature of the religious ex-

perience, 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.
- 205. Scientific Methods.** (2) I in alt. years. A study of the common applications of logical processes in the empirical sciences.
- 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) II, S. Theories of conduct; ideas of right and wrong; what makes an act good or bad; the good life.
- 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

- 535. Contemporary World Views.** (3) I and alt. S. Study of existentialism, analytic philosophy, and other current philosophies.
- 545. Philosophy of Religion.** (3) II. An analysis of religion according to its function, reinterpretations, and techniques—to include a critical examination of Fundamentalism, Thomism (Catholicism), Transcendentalism, and Naturalism.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 610. Early Western Philosophy.** (3) I. History of and readings in Western philosophy from Thales to Thomas Aquinas.
- 620. Modern Western Philosophy.** (3) II, S. History of and readings in Western philosophy from Francis Bacon to Hegel.
- 630. American Philosophy.** (3) I, S in alt. years. American philosophical theory from Transcendentalism and Evolutionism to present-day Realism, Idealism, and Pragmatism. Pr.: One course in American literature, or American history, or philosophy.
- 640. History of Science I.** (3) I, S. The growth of scientific thought in earliest times, in Egypt, Mesopotamia, Ancient Greece and Rome, the Moslem world, and Medieval Europe. Pr.: Algebra.
- 650. History of Science II.** (3) II, S. The development of scientific thought from early modern times to the recent past. Pr.: Algebra.
- 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.
- 675. Theory of Knowledge.** (3) II. A comparative and critical examination of leading accounts of the foundations of human knowledge. Pr.: Phil. 165.
- 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.
- 699. Philosophy Tutorials.** (1) I, II. Topics and prerequisites to be determined by the instructor, depending upon the subject of the tutorial. Pr.: Consent of instructor.
- 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) 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. (3) I. Theories about the nature of reality. Pr.: Phil. 165.

740. Philosophical Ideas in Literature. (3) An introduction to philosophical thought through selections from the masterpieces of world literature. Pr.: One course in American or English 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,* Moore, Parker,* Sanger* and Stamey;* Associate Professors Hagen,* Janes and Mossman;* Assistant Professors Poland,* Kinney,* Meux,* Sloat and Yates;* Instructors Goplen, Manuel, M. Miller, Richert and Woldt; Emeritus: Professors Babcock,* Stratton* and White;* Associate Professor Hyde**

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. 105) 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. 103) 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. 103).

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. Not open to students with credit in Math. 110.
- 110. General Algebra.** (5) I, II. Pr.: One unit of high school algebra. Not open to students with credit in Math. 100. For students in School of Commerce.
- 125. Basic Concepts of Mathematics I.** (3) I. A study of logic, sets, truth tables, Venn diagrams, trees, Boolean Algebra, and probability. Primarily for students majoring in the Humanities and Social Sciences. Pr.: $1\frac{1}{2}$ units of high school algebra.
- 126. Basic Concepts of Mathematics II.** (3) II. Examples of postulational systems including a study of natural numbers, the integers, the rational numbers, modular systems, finite geometries, and non-Euclidean geometries. Primarily for students majoring in the Humanities and Social Sciences. Pr.: Math. 125.
- 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.
- 231. Calculus I.** (4) I, II. Pr.: Analytic Geometry.
- 232. Calculus II.** (4) I, II. Pr.: Math. 231.
- 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 or 232.
- 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.
- 355. Differential Equations for Engineers.** (2) I, II. Pr.: Math. 222 or 232.
- 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

- 416. Foundations of Mathematics.** (3) II. Postulates used in development of geometry and algebra. Pr.: Math. 222 or 232.
- 421. Differential Equations.** (3) I, II, S. Pr.: Math. 222 or 232. Only one hour of credit will be given to students who have completed Math. 240.
- 470. History of Mathematics.** (3) II in alt. years. Pr.: Math. 220 or 231.
- 505. Determinants and Matrices.** (3) I. Applications of determinants and matrices to genetics, economics, electronics, and other fields. Pr.: Math. 100 or 110, junior standing.

- 570. Modern Geometry.** (3) II. An introduction to metric methods in the geometries of Euclid, Lobatchevsky, and Riemann. Pr.: Math. 222 or 232, or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 606. Theory of Numbers.** (3) II in alt. years. Pr.: Math. 221 or 231.
- 611. 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 or 232.
- 621. Advanced Calculus I.** (3) I, II, S. Point sets, continuity and properties of continuous functions, definite integrals, improper integrals, convergence of series. Pr.: Math. 240.
- 622. Advanced Calculus II.** (3) I, II, S. Transformations and their inverses, differentiation, functional dependence, length and surface area with applications, extremal problems. Pr.: Math. 621.
- 624. Elementary Partial Differential Equations.** (3) I in alt. years. Solution of partial differential equations; applications to problems of physics and engineering. Pr.: Math. 240 or 355 or 421.
- 630. Fourier Series.** (3) II in alt. years. Pr.: Math. 240 or 355 or 421.
- 651. Differential Equations of Mathematical Physics.** (3) II in alt. years. Solution of Legendre's, Bessel's, and other differential equations including the properties and uses of the solutions. Pr.: Math. 240 or 355 or 421.
- 653. Operational Methods.** (3) I in alt. years. Selected topics from Heaviside's operational calculus, Laplace transforms. Pr.: Math. 240 or 355 or 421.
- 661. Vector Analysis.** (3) II in alt. years. Methods of vector algebra and geometry, with applications, and the elements of tensors. Pr.: Math. 240 or 355 or 421.
- 671. Higher Geometry I.** (3) I in alt. years. An introduction to the projective geometry of one and two dimensions. Pr.: Math. 611.
- 672. Higher Geometry II.** (3) II in alt. years. An introduction to the differential geometry of curves and surfaces. Pr.: Math. 421.
- 701. Theory of Matrices I.** (3) I in alt. years. Pr.: Math. 240, 611.
- 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. 611.
- 716. Theory of Groups.** (3) II in alt. years. Properties of groups, Abelian groups, p-groups, sub-groups, permutation groups, applications. Pr.: Math. 611.
- 717. Rings and Ideals.** (3) I in alt. years. Rings, ideals, Boolean rings and algebra, prime and primary ideals. Pr.: Math. 611.
- 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.
- 745. Advanced Differential Equations I.** (3) On sufficient demand. Special topics such as the equations of Legendre, Bessel, and Riccati, with applications. Pr.: Math. 621.
- 746. Advanced Differential Equations II.** (3) On sufficient demand. Boundary value problems associated with differential equations; their relations to integral equations. Pr.: Math. 745.
- 752. Tensor Analysis.** (3) On sufficient demand. Introduction to theory of tensors, with applications to geometry, relativity, and applied mathematics. Pr.: Math. 621, 661.

- 761. Numerical Methods I.** (3) I in alt. years. 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. 621, 622, 624, 630, 651, 653.
- 762. Numerical Methods II.** (3) II in alt. years. 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 magnetic drum computer. Pr.: Math. 222 or 232, 350 and preferably 761.
- 771. Elementary 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. Elementary 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.
- 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, Greene and Jones; Assistant Professors Coy, Petrenko, Plotkin, Prawl and Yoder; Instructors Barker, Campos, Doner, Dougherty, Kuehnel, Lancaster, Roberts and White

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 selected 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. Branches of the Army; 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. Principles of leadership; military teaching principles, small unit tactics and communications; leadership 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. 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 and Moore; Associate Professors Munro,* Pettis* and Pyle;* Assistant Professors Beeson* and Purczinsky; Instructors Evans, Northup and Reiling; Emeritus: Professor Limper**

UNDERGRADUATE

Students majoring in language should enroll in the Curriculum in Humanities. (See page 103.)

For a minor, 18 hours in a single language should be completed.

For a major (IX, p. 103), 30 hours in a single language should be completed, which includes the 12-hour curricular requirement. In addition, six hours of history beyond curricular requirements are needed.

Students who have had German, French, or Spanish in high school may not duplicate that work for college credit. One year of a language in high school is, as a rule, equivalent to one semester in college. In doubtful cases, the head of the department should be consulted.

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 degree Master of Arts is offered in German, French, and Spanish. The candidate must demonstrate a reading knowledge in an additional foreign language.

FOR UNDERGRADUATE CREDIT

- 105. Technical German I.** (3) I.
111. Technical German II. (3) II. Pr.: Mod. L. 105 or equiv.
121. German I. (3) I, II, S.
126. German II. (3) I, II, S. Pr.: Mod. L. 121 or equiv.
131. French I. (3) I, II, S.
135. French II. (3) I, II, S. Pr.: Mod. L. 131 or equiv.
141. Spanish I. (3) I, II, S.
145. Spanish II. (3) I, II, S. Pr.: Mod. L. 141 or equiv.
151. Italian I. (3) I.
155. Italian II. (3) II. Pr.: Mod. L. 151 or equiv.
161. Russian I. (3) I. Pr.: Six hours of some other foreign language.
165. Russian II. (3) II. Pr.: Mod. L. 161 or equiv.
205. Technical German III. (3) I. Pr.: Mod. L. 111 or 126 or equiv.
221. German III. (3) I, II, S. Pr.: Mod. L. 126 or equiv.
225. German IV. (3) II. Pr.: Mod. L. 221 or equiv.
230. French III. (3) I, II, S. Pr.: Mod. L. 135 or equiv.
235. French IV. (3) II. Pr.: Mod. L. 230 or equiv.
241. Spanish III. (3) I, II, S. Pr.: Mod. L. 145 or equiv.
245. Spanish IV. (3) II. Pr.: Mod. L. 241 or equiv.
261. Russian III. (3) I. Pr.: Mod. L. 165 or equiv.
265. Russian IV. (3) II. Pr.: Mod. L. 261 or equiv.
399. Honors Seminar in Modern Languages. Credit arranged. I, II. Selected topics. Open to non-majors in the Honors Program.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 421. German V.** (3) I or II. Pr.: Mod. L. 225 or equiv.
426. German Composition and Conversation. (3) I or II. Pr.: Mod. L. 225 or equiv.
427. Advanced German Composition and Conversation. (3) I or II. Pr.: Mod. L. 426 or equiv.
430. French V. (3) I or II. Pr.: Mod. L. 235 or equiv.
431. French Composition and Conversation I. (3) I. Pr.: Mod. L. 235 or equiv.
432. French Composition and Conversation II. (3) II. Pr.: Mod. L. 431 or equiv.
433. French Composition and Conversation III. (2) I. Pr.: Mod. L. 432 or equiv.
440. Spanish V. (3) I or II. Pr.: Mod. L. 245 or equiv.
445. Spanish Composition and Conversation. (3) I. Pr.: Mod. L. 245 or equiv.
446. Advanced Spanish Composition and Conversation. (3) II. Pr.: Mod. L. 445 or equiv.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 625. Survey of French Literature.** (3) I or II. Pr.: Eighteen hours college French or equiv.
626. French Poetry. (2) I or II. Pr.: Eighteen hours college French or equiv.
630. French Novel I. (3) I or II. Pr.: Eighteen hours of college French or equiv.
631. French Novel II. (3) I or II. Pr.: Eighteen hours of college French or equiv.
632. French Drama I. (3) I or II. Pr.: Eighteen hours of college French or equiv.

633. French Drama II. (3) I or II. Pr.: Eighteen hours of college French or equiv.
634. Moliere. (3) I or II. Pr.: Twenty-one hours of college French or equiv.
635. Contemporary French Literature. (3) I or II. Pr.: Twenty-one hours of college French or equiv.
680. Spanish Novel I. (3) I or II. Pr.: Eighteen hours of college Spanish or equiv.
681. Spanish Novel II. (3) I or II. Pr.: Eighteen hours of college Spanish or equiv.
682. Spanish Drama I. (3) I or II. Pr.: Fifteen hours of college Spanish or equiv.
683. Spanish Drama II. (3) I or II. Pr.: Fifteen hours of college Spanish or equiv.
684. Spanish-American Literature. (3) I or II. Pr.: Eighteen hours of college Spanish or equiv.
685. Cervantes. (3) I or II. Pr.: Twenty-one hours of college Spanish or equiv.
686. Contemporary Spanish Literature. (3) I or II. Pr.: Twenty-one hours of college Spanish or equiv.
687. Spanish-American Novel. (3) I or II. Pr.: Eighteen hours of college Spanish or equiv.
720. German Drama I. (3) I or II. Pr.: Twenty-four hours of college German or equiv.
721. German Drama II. (3) I or II. Pr.: Twenty-four hours of college German or equiv.
722. Schiller. (3) I or II. Pr.: Fifteen hours of college German or equiv.
723. Goethe. (3) I or II. Pr.: Fifteen hours of college German or equiv.
724. German Lyric Poetry. (2) I or II. Pr.: Fifteen hours of college German or equiv.
725. Survey of German Literature I. (3) I or II. Pr.: Thirty hours of college German or equiv.
726. Survey of German Literature II. (3) I or II. Pr.: Thirty hours of college German or equiv.
750. Introduction to Philology. (2) I or II. Pr.: Thirty hours of modern languages or equiv.
799. Problems in Modern Languages. Credit arranged. I, II, S. Pr.: Consent of head of department.

FOR GRADUATE CREDIT

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

MUSIC

LUTHER O. LEAVENGOOD, *Head of Department*

Professors Leavengood, Steunenber* and Stratton;* Associate Professors Fischer,* Hayes,* Leedham,* Pelton* and Walker;* Assistant Professors Hays,* Jussila,* Painter and Shull; Instructors Sherman, Sloop and B. Walker*

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 104 and 98.

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, and six semester hours elected from Music 626, 632, 650, 654, 656, 658. Additional requirements in the field of theory are: Music 401, 402, 501, 502, 505, 521, eight semester hours of piano, Music 060 through four semesters, 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 060 for four semesters if concentration is in piano), Music 505, 521. Recital attendance through 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.

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 curricula 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 of 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.

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 159 for requirements of 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), four semesters of Piano Ensemble (Music 060). 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), and four semesters of Piano Ensemble (Music 060). If piano or organ is not the major instrument, it must be the minor instrument. Elective courses in areas other than music include Spch. 245 and nine hours of one 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 162.

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 requirement. 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.

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.
- 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.
- 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.
- 621. Workshop in School Music.** (1 to 3) S. Operetta and octavo music, unison to eight-part, sacred and secular, accompanied and unaccompanied; organization and rehearsal of choral groups. Pr.: Music 413 and senior standing.
- 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.: Senior standing.
- 632. Choral Techniques and Literature.** (2) II, S. Study and discussion of basic problems involved in training of choral groups; emphasis upon arranging music for standard vocal groups. Pr.: Senior 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.
- 060. Piano Ensemble.** (0) I, II. One hour rec. a week. Required of students enrolled in the music curriculums.
- 111. A Cappella Choir.** (1) I, II. Membership by tryouts.
- 115. Band.** (1) I, II. Membership by tryouts.
- 120. University Chorus.** (1) I, II. Membership by tryouts.
- 125. Kansas State Singers.** (1) I, II. Membership by tryouts.
- 130. Orchestra.** (1) I, II. Membership by tryouts.
- 135. Varsity Men's Glee Club.** (1) I, II, S. Membership by tryouts.
- 140. Women's Glee Club.** (1) I, II. Membership by tryouts.
- 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

Students Paying Full Semester Incidental Fee

Students majoring in Applied Music or Music Education are exempted from paying fees for private lessons. All other students are charged fees for private lessons according to the following schedule.

Two 30-minute lessons each week for a semester including two hours use of practice room daily—\$35.

One 30-minute lesson each week for a semester including one hour use of practice room daily—\$17.50.

Single lesson rate—\$1.50.

Special and Non-university Students

Two 30-minute lessons each week for a semester—\$42.

One 30-minute lesson each week for a semester—\$23.

Single lesson rate—\$2.

Practice room, one hour daily for a semester—\$3.

Practice room, two hours daily for a semester—\$5.

Practice room, per additional hour daily for a semester—\$2.50.

Organ rent, one hour daily for a semester—\$10.

Lessons scheduled on legal holidays which are observed by the University will not be made up.

Lessons which fall on school holidays will be made up at the convenience of the teacher.

Instructors are not required to arrange to make up lessons missed by students. In cases of illness or other physical disabilities, however, the instructor may arrange for the making up of lessons.

Lessons missed because of the instructor's absence will be made up.

PHYSICAL EDUCATION

THOMAS M. EVANS, *Head of Department*

Professors Evans and Geyer;* Associate Professor Lyman;* Assistant Professors Green, McKinney, Myers, Snyder,* Thompson* and Wauthier;* Instructors Fedosky, Hick, Hodge, Mason and Shroyer; Emeritus: Professor 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 a major, a student should enroll in one of the curriculums in physical education. (See page 100.) For a minor, a student should enroll in the following courses: Ph. Ed. 206, 216,* 230, 235, 356, 450, 455, 481, 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 curricula. 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. Fundamentals of Rhythms. (2) II. Fundamentals of music. Methods of teaching folk, square, and social dance. Four hours lab. a week.

* Option on Ph. Ed. 216 and 241.

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

- 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.
- 370. Methods in Physical Education in Elementary Schools.** (2) S. Methods of teaching and organization of material for a progressive elementary school program.
- 375. First Aid.** (2) I, II, S. Prevention of accidents and the treatment of injuries in an emergency. Upon satisfactory completion of this course, a certificate is awarded by the American Red Cross and the holder is in line for consideration as an instructor in first aid. Not open to students in Physical Education.
- 481. Teaching Health.** (2) II. Materials and methods of teaching health in the junior and senior high schools. Pr.: Ph. Ed. 356; Zool. 210, 425.
- 486. Administration of Health and Physical Education.** (3) I. Policies and procedures in organization and administration, with emphasis on high school health and physical education. Pr.: Junior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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. Physical Education Activities I.** (2) I. Practice and teaching methods of soccer, volleyball, gymnasium games; boxing and wrestling. 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. Physical Education Activities II.** (1) II. Theory and practice of calisthenics, the gymnastic lesson, and tumbling. Three hours lab. a week.
- 241. Physical Education Activities III.** (1) I. Graded exercises on gymnasium apparatus, rhythms, and pyramids. Three hours lab. a week.

- 245. Swimming M.** (1) II, S. Methods of teaching swimming. Water Safety. Theory and practice of "drownproofing," diving, Red Cross swimming strokes. Competitive swimming, its stroke theory and meet organization.
- 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. Public School Program in Physical Education.** (2) II. Educational, health, and recreative significance and content of the school program; types of activities to be used in grades and high school. 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 massage, 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.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 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.

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 100.) 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. Tumb'ing 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. 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. Playground Activities.** (3) I, II, S. Organization and administration of playground activities and equipment; history of the playground movement, types of games suitable for different age periods; practice teaching in elementary schools. Two hours rec. and three 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.
- 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. Teaching and Adaptation of Physical Education.** (3) I. Organization of physical education material for progressive program in elementary, junior, and senior high schools; teaching methods to achieve desired aims of education. Pr.: Ph. Ed. 306, 331, 366, 380, 515.

* Optional.

580. Swimming. (2) II. 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, Dragsdorf,* Ellsworth,* Katz,* Leaf* and Mandeville; Associate Professors Avery, Bark,* Chapin,* Crawford,* Curnutte,* Dale* and Hall;* Assistant Professors Blatt,* Groseclose and McKinley;* Instructors Doty and Green; Emeritus: Associate Professors Brackett, Maxwell and Lyon*

UNDERGRADUATE

The physical science curriculum (p. 105) with a major in physics is designed to provide a broad basic program. By judicious choice of electives this curriculum may be appropriate to the student's ability and goals.

For a major in physics the following courses, in addition to those specified in the core curriculum (VIII, p. 105), are required: 410, 420, 432, 460, 472, 473, 560, 645, 740, and Math. 222, 240, plus three hours in mathematics courses numbered 400 or higher.

For a student interested in graduate study in physics or a career in research or development work in an industrial or governmental laboratory, it is recommended that the following courses be included as electives: Math. 621, 622; Phys. 434, 600, 601, 675, 680.

For a student interested in secondary school science teaching it is recommended that Bot. 200 and Zool. 200 be taken and that the following courses be included as electives: Psych. 110 and Educ. 201, 202, 400, 476, 477, and 601 or 604 or 610. By so doing, a student meets the certification requirements to teach biology, chemistry, general science, mathematics, and physics in high school.

Students interested in such fields as meteorology, biophysics, chemical physics, soil physics, and industrial development and research will choose their electives in consultation with a 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, nuclear physics, theoretical physics, meteorology, and applied physics. Kansas State University is a participating institution in the Argonne National Laboratories. 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.

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 natural science requirement in curricula of the School of Arts and Sciences. Three hours lec. and two hours problem lab. a week. Pr.: Completion of high school mathematics as required for admission to the curriculum in which the student is enrolled. Man's Physical World I 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.

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.

410. Light. (3) I. Pr.: Math. 240 or 421.

420. Light Laboratory. (1) Pr.: Phys. 410 or conc. enrollment.

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.

- 434. Mechanics II.** (2) II. Cont. of Phys. 432. Pr.: Phys. 432.
- 440. Sound.** (3) Pr.: Math. 222 or 231; Phys. 212 or 311.
- 460. Heat Laboratory.** (1) Pr.: Phys. 450 or conc. enrollment.
- 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.
- 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.
- 601. Electronic Physics Laboratory.** (1) Pr.: Phys. 600 or 602 or conc. enrollment in either.
- 602. Electronic Physics II.** (3) Pr.: Phys. 472.
- 603. Advanced Electronic Physics Laboratory.** (1) Pr.: Phys. 601.
- 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.
- 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. 212 or 311; 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.
- 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.
- 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.
- 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.

PSYCHOLOGY

MERRILL E. NOBLE, *Head of Department*

Professors Bevan, Helson,* Langford* and Noble;* Associate Professors Danskin,* Gaito,* Overall,* Phares,* Samelson* and Trumbo;* Assistant Professor Wilkins;* Visiting Professor 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 certain 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, 230 (or 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 Science Curriculum take Math. 100 and A. H. 400; and six hours of Zoology beyond Zool. 205 in addition to curricular requirements (see p. 95). 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, 525, and 600 or 532, as well as Econ. 620 and 625, 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.
- 230. Quantitative Methods in Psychology.** (3) I. An introduction to quantitative concepts and procedures used in psychological research and practice. Pr.: Psych. 110.
- 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) II, 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, 230, or 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, 230, or Stat. 620.
- 415. Psychology of Childhood and Adolescence.** (3) II, S. Survey of behavioral development from birth through adolescence. Pr.: Sophomore standing; Psych. 110.
- 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) I, II. A study of the role of psychological facts and principles in the production and appreciation of art, with emphasis on pictorial art. Pr.: Sophomore standing; Psych. 110 or consent of instructor.
- 505. Consumer Psychology.** (3) II. A survey of consumer interests and behavior as they determine psychologically sound business practice. 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) II, 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. 230 or 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) 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. 230 or Stat. 620.
- 607. Individual Differences.** (2) I. A study of systematic differences in behavior as a function of differences in genetic background, physical status, individual experience, and culture. Pr.: Psych. 600. Offered in odd years.
- 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.
- 714. Physiological Psychology I.** (3) I. Brief survey of data from supportive physical and biological disciplines in order to provide the student with a minimum 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. Pr.: Psych. 110; Zool. 205 or consent of instructor.
- 715. Physiological Psychology II.** (3) II. Consideration of the physiological correlates of learning and intelligence, motivation, emotion, and behavior disorders. Pr.: Psych. 714.
- 716. Comparative Psychology.** (4) I. A study of behavior at different phylogenetic levels as an aid to the clarification of behavioral principles. Three hours rec. and two hours lab. a week. Pr.: Consent of instructor. Offered in even years.
- 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) I. 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. 230 or Stat. 620 or consent of instructor.

- 809. Advanced Experimental Psychology I.** (4) I. 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. Offered in odd years.
- 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. 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. Offered in even years.
- 816. The Evolution of Behavior.** (3) I. 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. Offered in odd years.
- 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. A systematic review of behavior disorders, their etiology, and treatment. Pr.: Psych. 405 and 720 or consent of instructor. Offered in odd years.
- 825. Clinical Testing I: Intelligence.** (3) I, S. 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. Offered in odd years.
- 826. Clinical Testing II. Personality.** (3) II. Theory and techniques of personality assessment, with emphasis on the administration and interpretation of projective tests. Pr.: Psych. 822, 825, and consent of instructor. Offered in even years.
- 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. Survey of the problems and methods of the clinical psychologist. Pr.: Nine hours of psychology and consent of instructor. Offered in even years.
- 844. Counseling Psychology.** (3) I, S. Survey of the problems and methods of the counseling psychologist. Pr.: Psych. 532 or 600, 405 or 720, and consent of instructor.
- 845. Vocational Psychology.** (3) I. Environmental and human factors in occupational adjustment; appraisal of vocational fitness. Pr.: Psych. 844 and consent of instructor. Offered in odd years.
- 846. Advanced Industrial Psychology.** (3) I. Review of current trends in industrial psychology and human engineering, including laboratory demonstrations and field trips. Two hours rec. and two hours practical work a week. Pr.: Psych. 525 and consent of instructor. Offered in even years.
- 847. Performance Theory.** (3) I. 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. Offered in odd years.
- 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. I, S. 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. Offered in even years.
- 854. Seminar in Experimental Psychology.** Credit arranged. I. 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. Offered in odd years.
- 856. Seminar in Psychological Measurement.** Credit arranged. I. 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. Offered in even years.
- 858. Seminar in Personality and Social Psychology.** Credit arranged. II. 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, S. Supervised practical experience in counseling. Pr.: Psych. 844, second-year graduate standing, and consent of instructor.
- 865. Internship in Counseling or Industrial Psychology.** Credit arranged. I, II, S. Pr.: For counseling students: Psych. 826, 852, 861, 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.

SPEECH

NORMA D. BUNTON, *Head of Department*

Professors Bunton, Given* and Howe;* Associate Professor Stephenson;* Assistant Professors Harris, Perego, Saunders, Snyder,* Thorne,* Welden* and Darnell; Instructors Cleary, Denning, Rast, Stout and Taylor; 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, Theater and Interpretation, Speech Therapy, and Radio and Television.

The student may major in any of the above areas or a combination of 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.

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 in 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 Correction minor 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 two fields: General Speech and Radio-Television.

The General Speech degree may include work in speech education, rhetoric, public address, conference, drama, interpretation, and therapy.

A student majoring in either 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 a 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. Prior to the time that the topic for the thesis or project is finally approved, each candidate must appear before a departmental seminar and present his thesis or project plans.

Specific requirements for research, advising and program planning are available in the departmental office.

COURSES IN GENERAL SPEECH AND SPEECH EDUCATION

FOR UNDERGRADUATE CREDIT

- 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.
- 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. Required of all speech majors.

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 communica-

tion behavior within organizations. Pr.: Spch. 616 or consent of instructor.

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.

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.

680. Teaching of Speech. (3) Methods and techniques used in the teaching of speech and directing speech activities. Pr.: Junior standing and consent of instructor.

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

155. Oral Reading. (2) Fundamentals of oral reading. Study and practice in the analysis and presentation of various forms of literature.

245. Acting I. (2) Theory and practice in the fundamentals of acting for the theatre. One hour rec. and three hours lab. a week.

255. Technical Production I. (2) Function, construction and operation of scenery. 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. Pr.: Spch. 155 for majors.

535. Dramatic Production. (2) Theory and practice of play production including techniques of selection, casting, rehearsal, and staging. One hour rec. and three hours lab. a week. Pr.: Spch. 245 or 255 for majors.

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 majors.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Directing. (3) A lecture-laboratory course covering the principles and techniques of directing for theatre; 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 theatre 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.
- 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. 155 for majors.
- 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 majors.
- 667. Stage Lighting.** (2) History and techniques of lighting for the stage and television. Pr.: Junior standing.
- 683. Technical Production II.** (2) Advanced technical problems, including the study of stages, machines, and the planning of theater buildings, incorporating individual projects. Pr.: Spch. 255 for majors.

COURSES IN SPEECH THERAPY

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.** (3) 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 majors.
- 635. Speech Pathology I.** (3) Understanding of types of speech disorders 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 majors.
- 636. Speech Pathology II.** (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.
- 668. Speech Reading.** (3) Methods of instructing the hard-of-hearing and the deaf in the principles and techniques of speech reading (lip reading). 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.
- 760. Clinical Practice.** (3) 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. Pr.: Consent of instructor.

FOR GRADUATE CREDIT

- 802. Aphasia.** (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 majors.
- 160. Survey of Broadcasting.** (2) Survey of the radio industry; economic, political and social significance of broadcasting. Required of majors.
- 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 majors.
- 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 majors.
- 326. Introduction to Television.** (2) Study of the development of TV: its codes and control; its relation to other media; economic and social implications. Required of majors. Pr.: Spch. 160 for majors.
- 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 majors.
- 390. Radio-Television Production I.** (3) Production and direction of individual programs for broadcast, with emphasis on radio. Pr.: Spch. 225 for majors.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 660. Radio-Television Production II.** (3) Cont. of Spch. 390, with emphasis on television. Pr.: Spch. 326 for majors, and consent of instructor for non-majors.

- 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 majors.
- 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 majors.
- 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 Radio-TV majors.
- 685. Radio-Television Writing I.** (3) Study of the principles and the preparation of dramatized, broadcast programs. Pr.: Spch. 225 for majors.
- 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.
- 695. Radio-Television Writing II.** (3) Cont. of Spch. 685. Pr.: Spch. 685 or consent of instructor.
- 705. Radio-Television Speech II.** (2) Advanced commercial announcing; development of individual style; supervised experience in various techniques of delivery, with emphasis on television. Recommended to radio-TV majors and minors only. Pr.: Spch. 150 and junior standing.
- 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 majors.
- 750. Broadcast Research.** (3) Study of research in broadcasting; its literature and methodology. Pr.: Junior standing.

STATISTICS

HOLLY C. FRYER, *Head of Department*

Professor Fryer; Associate Professors Feyerherm* and Wearden;* Assistant Professors Chaddha* 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. 103) and completing Math. 222 or 232, 421, and Stat. 320, 510, and either Stat. 610-611 or Stat. 620-621; or the student may seek a bachelor of science degree by satisfying the requirements of the Curriculum in Physical Science (p. 105) 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. 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.

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

510. Statistical Quality Control. (3) I. 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. Simple probability models; random discrete variates; expected values and moments; normal variates; sampling and the Central Limit Theorem. Pr.: Math. 222 or 232.

611. Theory of Statistics II. (3) II. Simple experimental designs, sampling distributions, estimation, testing hypotheses, multiple regression and correlation, introduction to non-parametric statistics. 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 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 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 alt. years. Analysis of quantitative inheritance; tests of genetic hypotheses; estimation of genetic components of variance. Pr.: Stat. 620 and six hours of genetics.
- 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

- 801. Advanced Theory of Statistics I.** (3) I alt. years. Introduction to stochastic processes; the general decision problem; unbiasedness; measure-theory definition of probability; uniformly most powerful tests. Pr.: Stat. 771.
- 802. Advanced Theory of Statistics II.** (3) II alt. years. Unbiasedness with normal distributions; invariance; the minimax principle; discriminant functions. Pr.: Stat. 801.
- 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 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.

STUDENT HEALTH

HILBERT P. JUBELT, M. D., *Head of Department*

FOR UNDERGRADUATE CREDIT

- 110. Preventive Medicine and Public Health.** (2) I, II. Communicable diseases and their control; factors involved in healthful living. Pr.: Sophomore standing.

TECHNICAL JOURNALISM

RALPH R. LASHBROOK, *Head of Department*

Professors Ellis, Hostetter,* Lashbrook* and Medlin;* Associate Professor Macy; Assistant Professors DeWeese, Eaton and Perry;* Emeritus: 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 School of Arts and Sciences. The Biological Science Curriculum (page 95) and the Physical Science Curriculum (page 105) lead to the bachelor of science degree; the Social Science Curriculum (page 106) 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 95, 105, 106.)

Students interested in Agricultural Journalism should note requirements of page 59; those interested in Home Economics and Journalism should note requirements on page 252.

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 departments of English and education, and the facilities of the library, Illustrations Department, 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 48 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 newspaper 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 advertisement, 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 captions.
- 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 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 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,* Herrick* and Wimmer;* Associate Professors Hansen* and Tiemeier;* Assistant Professors Lockhart* and Robel;* Instructor Larson; Emeritus: Professor Ackert**

UNDERGRADUATE

The requirements in the Curriculum in Biological Science for a major in zoology (VI, p. 96) are at least 19 credit hours chosen from the 400 to 799 group.

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, and parasitology.

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.

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.

Courses 405, 410, 420, 430, and 440 may not be taken by zoology majors.

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.
Zool. 205 or equiv.

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. Bird Study. (3) II or (2) S. Lecture, laboratory, and field studies in identification and adaptations 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, 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, 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. 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. Pr.: Zool. 200 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 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.** (1 or 2) I, II, S. Methods and processes in preparation of microscopical slides; principles of photomicrography. Pr.: Zool. 205.
- 660. Animal Ecology.** (3) II, 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.
- 670. Ichthyology and Herpetology.** (3) II, 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, 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, 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, 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.** (3) I, even years. Physical, chemical, and biotic characteristics of fresh-water environments. Field and laboratory studies on environments. Field and laboratory studies on local lakes, ponds,

and streams. Two hours rec. and three hours lab. a week. Pr.: Zool. 205 and Ent. 200 or 211, 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.

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. One hour rec. and three hours lab. a week. Pr.: Zool. 625 or 627 and consent of instructor.

805. Advanced Endocrinology. (2) II. Presents additional and more detailed subject matter than Zool. 620. Experience in experimental procedures and techniques, methods of assay, and histological study of endocrine tissues. Recent developments are followed in the current literature. One hour rec. and three hours lab. a week. Pr.: Zool. 621 or equiv.

810. Comparative Physiology of Animals. (3) II. 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.

The School of Commerce

C. CLYDE JONES, *Dean*

Professors Clark and Jones;* Associate Professors Bowlin,* Eriksen* and Gugler;* Assistant Professors Amos,* Gilkison, Gudgell, Hobbs, Huneryager, Laughlin, Menzie, Mulanax,* Ridgway and Tuxbury; Instructors Barton-Dobenin, Monroe, Rapp, Reed and Tallent; Emeritus: Professor Williams*

The main objective of the School of Commerce is to provide opportunities for professional study in accounting or business administration. Both undergraduate and graduate programs are designed to facilitate the maximum development of the student into an informed and responsible individual. Specific courses, as well as the total programs, are oriented toward giving the student a knowledge of business fundamentals and an understanding of the environment in which business operates. The school emphasizes analytical and problem-solving techniques.

In addition to its instructional programs, the School of Commerce recognizes its responsibilities and opportunities to work closely with the business community. It provides to business through its general faculty, professional services in accounting, finance, marketing and management, within the limits of its resources. In cooperation with the Division of Extension, the School of Commerce sponsors numerous short courses and conferences for trade and management groups.

UNDERGRADUATE

The undergraduate curriculum in business administration includes a broad background in liberal arts and sciences. During the first three years, students take work in written and oral communications, mathematics and statistics, social, behavioral and natural sciences and the humanities. Required courses in accounting, administration, business law, economics, finance, management, marketing and personnel administration supply the fundamentals of business administration. Except in accounting, only a limited amount of specialization is possible.

Curriculum in Business Administration

Major in Business Administration (page 188)

The major in business administration is developed primarily from the general management viewpoint. In the senior year, students, in consultation with faculty advisers, may elect three or four courses in special areas such as finance, industrial and labor relations, marketing or office management and practice.

Secondary Education—Business Administration. Students preparing to teach commercial subjects in high school enroll through the Department of Education. See p. 98 for specific requirements.

Labor and Industrial Relations Option: Candidates for the Bachelor of Science Degree in Business Administration who are interested in careers in labor and industrial relations should take the following courses, in addition to the required courses listed on page 188: Econ. 620, 626, Soc. 602, Psych. 515, 625, 600, or 532. These courses will fulfill the requirement for nine hours of business electives.

Dual Degree: Students desiring to earn B. S. Degree in Business Administration in addition to another undergraduate degree (see p. 205) should complete the following course work: B. A. 272, 305, 325, 326, 400, 405, 431, 440, 600, Econ. 110, 120, 430 and six hours of approved business electives. Total, 44 hours.

Major in Accounting (p. 189)

Accounting majors have an opportunity to prepare for careers in public, industrial or governmental accounting. The course requirements qualify the graduate to take the examination for certified public accountants. The School has an internship program for qualified seniors

in accounting which gives valuable practical experience with recognized public accounting firms.

GRADUATE

Graduate programs in Commerce lead to the degrees Master of Science in Business Administration and Master of Science in Accounting. For admission to graduate study in Business Administration the applicants must have earned a minimum of 20 hours in Business and Economics with at least one course in each of the following areas: Accounting, Economics, Finance, Management and Marketing. The admission to the Accounting program requires a minimum of 14 hours in Accounting, eight hours in Economics, five hours in Business Law, and three hours in Business Finance.

In addition all applicants must take the Admission Tests for Graduate Study in Business Administration administered by the Educational Testing Service. Applicants should register for the tests direct with the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey. All questions concerning the details of the admission tests, including the time and place at which the tests are given, should be addressed to the Educational Testing Service. The tests should be taken as far in advance of admission as possible. Those taking the tests should notify the Educational Testing Service to report their test scores to the Dean, School of Commerce, Kansas State University, Manhattan, Kansas.

Graduate students enrolled in Business or Accounting will plan their courses in consultation with members of the Graduate Faculty. Generally the program in Business Administration must include the Seminars in Accounting, Administration, Finance, Marketing, and Personnel plus work in Statistics and Economics. The Accounting program must include 20 hours of graduate Accounting courses and the Seminar in Business Finance. Both programs must include course work in a related minor field.

Major in Business Administration

B. S. in Business Administration

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
Hist.	255	Amer. Econ. Hist.	3	Spch.	106	Oral Comm. Ia	3
Math.	110	Gen. Algebra	5	Soc.	220	Intro. to Soc.	3
		Nat. Sci. or Human.* ...	4	Geog.	215	Econ. Geog.	3
		Air or Mil. Sci. 1A	1			Nat. Sci. or Human.	4
Ph. Ed.	011	Physical Education	0			Air or Mil. Sci. 1B	1
				Ph. Ed.	011	Physical Education	0
Total			15 or 16	Total			16 or 17

SOPHOMORE

B. A.	272	Intro. Acctg.	5	B. A.	305	Manag. Acctg.	3
Econ.	110	Econ. I	3	Econ.	120	Econ. II	3
Stat.	320	Elements of Stat.	3	Psych.	110	Gen. Psych.	3
		Nat. Sci. or Human.	4	P. Sci.	220	American Govt.	3
		Air or Mil. Sci. 2A	1			Nat. Sci. or Human.	4
						Air or Mil. Sci. 2B	1
Total			15 or 16	Total			16 or 17

JUNIOR

		Bus. Core Courses**	9			Bus. Core Courses	9
		Nat. Sci. or Human.	4	Engl.	200	Engl. Comp. III	3
		Free Elective	3			or	
Engl.	090	English Proficiency	0	Spch.	200	Oral Comm. II	or 2
						Nat. Sci. or Human.	4
Total			16	Total			15 or 16

* Humanities, 8 hours; natural science, 16 hours, including at least one course in biological science and one course in physical science, but not including more than 4 hours of mathematics; a scientific laboratory must be included in each student's program of study. Total 24 hours.

** Business Core Courses are Administration, Business Finance, Business Law I and II, Marketing, Money and Banking and Personnel Administration. All except Business Law and Money and Banking are prerequisites for Business Policy.

SENIOR

Bus. Core Course	3	B. A.	600	Bus. Policy	3
Bus. and Free Elec.*** ..	12			Bus. and Free Elec. ..	8 or 9
Total	15	Total			11 or 12

Number of hours required for graduation, 124 (120 for women).

*** A minimum of 9 hours must be completed in special business electives.

Major in Accounting

B. S. in Business Administration

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Engl. Comp. I	3	Engl.	120	Engl. Comp. II	3
Hist.	255	Amer. Econ. Hist.	3	Spch.	106	Oral Comm. Ia	3
Math.	110	Gen. Algebra	5	Psych.	110	Gen. Psych.	3
		Nat. Sci. or Human.*	4	P. Sci.	220	American Govt.	3
		Air or Mil. Sci. 1A	1			Nat. Sci. or Human.	4
Ph. Ed.	011	Physical Education	0			Air or Mil Sci. 1B	1
				Ph. Ed.	011	Physical Education	0
Total			15 or 16	Total			16 or 17

SOPHOMORE

B. A.	272	Introd. Acctg.	5	B. A.	371	Intermed. Acctg.	3
Econ.	110	Econ. I	3	B. A.	361	Cost Acctg.	3
Stat.	320	Elements of Stat.	3	Econ.	120	Econ. II	3
		Nat. Sci. or Human.	4			Nat. Sci. or Human.	4
		Air or Mil. Sci. 2A	1			Free Elective	2
						Air or Mil. Sci. 2B	1
Total			15 or 16	Total			15 or 16

JUNIOR

B. A.	472	Valuation Acctg.	3	B. A.	471	Advanced Acctg.	3
B. A.	461	Advanced Cost Acctg.	2	B. A.	480	Tax Acctg.	3
		Bus. Core Courses**	6			Bus. Core Course	3
		Nat. Sci. or Human.	4	Engl.	200	Engl. Comp. III	3
Engl.	090	English Proficiency	0			or	
				Spch.	200	Oral Comm. II	or 2
						Nat. Sci. or Human.	4
Total			15	Total			15 or 16

SENIOR

B. A.	680	Auditing I	3	B. A.	600	Bus. Policy	3
		Bus. Core Courses	9			Bus. Core Course	3
		Elective	3			Electives	7 or 8
Total			15	Total			13 or 14

Number of hours required for graduation, 124 (120 for women).

* Humanities, 8 hours; natural science, 16 hours, including at least one course in biological science and one course in physical science, but not including more than 4 hours of mathematics; a scientific laboratory must be included in each student's program of study. Total 24 hours.

** Business Core Courses are Administration, Business Finance, Business Law I and II, Marketing, Money and Banking and Personnel Administration. All except Business Law and Money and Banking are prerequisites for Business Policy.

Courses in economics are offered by the
Department of Economics and Sociology.

COURSES IN ACCOUNTING AND BUSINESS ADMINISTRATION**FOR UNDERGRADUATE CREDIT**

- 101. 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.
- 110. 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 business administration.
- 170. 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 business administration.
- 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) 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) Instruction and practice covering the various calculators, ten-key adding machines, voice writers and duplicators. One hour per week.
- 272. Introductory Accounting.** (5) I, II, S. The fundamentals of accounting for business administration and accounting majors. Pr.: Sophomore standing.
- 301. Office Management.** (3) 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.
- 312. Insurance.** (3) I, 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.: Sophomore standing.

- 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.
- 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.
- 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

- 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.: Econ. 110 and 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.
- 461. Advanced Cost Accounting.** (2) 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, II. 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) II. Principles and problems of federal income taxation of individuals, partnerships, estates, and trusts and corporations. Pr.: B. A. 305 or 371.
- 505. Investments.** (3) I, II. 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.
- 515. 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.
- 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.
- 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

- 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.
- 605. The American Business Tradition.** (3) II. An analysis of historical change in the non-market environment and the impact of change on business tradition. Pr.: Senior or graduate standing plus nine hours credit in social science courses.
- 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.: Consent of instructor.
- 615. Financial Management.** (3) II. Analysis of problems in advanced financial planning and control. Pr.: B. A. 400 and 405.
- 640. Marketing Analysis.** (3) I. A study of market analysis and research methods. Pr.: B. A. 440 and consent of instructor.
- 670. C. P. A. Problems.** (3) I. A study of problems given 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. 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.
- 798. Problems in Business Administration.** Credit arranged. I, II, S. Pr.: Background of courses needed for the problem undertaken.
- 799. Problems in Accounting.** 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.
- 815. Advanced Accounting Problems.** (3) I. 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. An intensive treatment of problems related to corporation accounting and reporting, with emphasis on income determination and balance sheet valuation. Pr.: Consent of instructor.
- 817. Controllershship.** (3) II. The work of the accounting executive, with emphasis on control of operations, internal and external reporting, and accounting administration. 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 and 600.
- 840. Seminar in Marketing.** (3) II. A study of current literature and research in marketing theory. Pr.: B. A. 440.
- 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.
- 998. Research in Business Administration.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.
- 999. Research in Accounting.** Credit arranged. I, II, S. Pr.: Sufficient training to carry on the line of research undertaken.

The School of Engineering and Architecture

JOHN W. SHUPE, *Acting Dean*

RICHARD H. MORSE, *Assistant to Dean*

A course of study leading to a degree in the School of Engineering and Architecture 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 number of engineers 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 School of Engineering and Architecture 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 School of Engineering and Architecture offers the Bachelor of Science degree in each of the following curriculums:

- Agricultural Engineering—curriculum on page 196
- Architectural Engineering—curriculum on page 197
- Architecture—curriculum on page 198
- Chemical Engineering—curriculum on page 199
- Civil Engineering—curriculum on page 200
- Electrical Engineering—curriculum on page 201
- Industrial Engineering—curriculum on page 202
- Mechanical Engineering—curriculum on page 203
- Nuclear Engineering—curriculum on page 204

A general description of each of these curriculums, including a list of the faculty and departmental course offerings, is presented on pages 207 through 235. 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 except Architecture. In addition, the degrees Master of Architecture and Master of Regional Planning also are offered. To round out the graduate program in the School of Engineering and Architecture, the Doctor of Philosophy degree is offered in four departments: Applied Mechanics, Chemical Engineering, Electrical Engineering, and Mechanical Engineering. Additional information on the graduate program is included in the section on the Graduate School, page 41.

HONORS PROGRAM

The Honors Program in the School of Engineering and Architecture offers the academically gifted student an intellectual challenge consistent with his ability. Based upon his University entrance tests, a student from the top five percent of the entering freshmen in engineering and architecture 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 Director of the Engineering and Architecture Honors Program, with acceptance on the part of the student being 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 take part in a variety of seminars, colloquia, and research problems designed to enrich and challenge the superior student. The Honors Program in Engineering and Architecture is closely integrated with the Honors Programs of the other Schools at K. S. U. and provides an excellent opportunity for interdisciplinary study.

SUMMER SCHOOL

The entering freshman and the transfer student will find that many of the courses appearing in his curriculum, not only in engineering and architecture, but also in the School 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 courses, are urged to investigate the possibility of summer school to remove this mathematics deficiency. Summer work is also offered in freehand drawing, water-color and oil painting and in industrial arts for secondary school teachers.

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
M. E.	211	Engg. Graphics I	2	M. E.	216	Engg. Graphics II	2
Math.	220	Anal. Geom. & Calc. I	4	Math.	221	Anal. Geom. & Calc. II ..	4
C. E.	220	Surveying I	2	Spch.	105	Oral Comm. I	2
		Air or Mil. Sci. 1A	1	I. E.	318	Ind. Production 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			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.	339	Metals & Alloys	2	Ag. E.	310	Agric. Machinery	3
Bot.	190	Nat. & Dev. of Plants	3	Ap. M.	305	Statics	3
Geol.	110	General Geology	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	Econ.	110	Economics I	3
Ap. M.	412	Dynamics	3	E. E.	423	Electronics & Controls	3
M. E.	411	Engg. Thermodynam. I ..	4	E. E.	424	Electronics & Con. Lab. ..	1
E. E.	419	Elec. Circuits & Mach.	4	Ag. E.	446	Tractors	4
Ag. E.	475	Agric. Hydrology	3	Ap. M.	471	Fluid Mechanics	3
Engl.	090	English Proficiency.....	0	Ap. M.	415	Mechanics of Materials ..	3
G. E.	115	Engg. Assembly	0	Ap. M.	418	Mechanics of Matls. Lab. ..	1
				G. E.	115	Engg. Assembly	0
Total			18	Total			18

SENIOR

Ag. E.	435	Design of Farm Mach.	4	Ag. E.	480	Soil & Water Conserv.	4
Ag. E.	465	Farm Structures	4	Ag. E.	500	Rural Electrification	4
Agron.	149	Soils	4			Soc. Science Elective*	4
		Humanities Elective*	4			Elective**	6
		Soc. Science Elective* ..	2	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 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 Architectural Engineering*B. S. in Architectural Engineering***FRESHMAN****FIRST SEMESTER**

	<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	100 English Comp. I	3
Chem.	210 Chem. I	5
Arch.	207 Arch. Graphics I	2
Math.	220 Anal. Geom. & Calc. I	4
Arch.	202 Basic Draw.	2
Arch.	220 Intro. Arch. Engg.	1
	Air or Mil. Sci. 1A	1
Ph. Ed.	011 Physical Education	0
G. E.	110 Engg. Lectures	0

Total 18

SECOND SEMESTER

	<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	120 English Comp. II	3
Chem.	230 Chem. II	3
Arch.	208 Arch. Graphics II	2
Math.	221 Anal. Geom. & Calc. II	4
Arch.	211 Sketching	2
Arch.	200 Apprec. of Arch.	3
	Air or Mil. Sci. 1B	1
Ph. Ed.	011 Physical Education	0
G. E.	117 Arch. Assembly	0

Total 18

SOPHOMORE

Phys.	310 Engg. Physics I	5
Math.	222 Anal. Geom. & Calc. III	4
Arch.	300 Bldg. Matls. & Constr.	3
C. E.	220 Surveying I	2
Econ.	110 Economics I	3
	Air or Mil. Sci. 2A	1
G. E.	117 Arch. Assembly	0

Total 18

Phys.	311 Engg. Physics II	5
Math.	240 Series & Diff. Eq.	4
M. E.	400 Elements of Thermo.	3
Ap. M.	305 Statics	3
Spch.	105 Oral Comm. I	2
	Air or Mil. Sci. 2B	1
G. E.	117 Arch. Assembly	0

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
C. E.	424 Stress Anal. I Lab.	2
Arch.	235 Elem. Arch. Design	4
Bot.	121 Biology I	4
Ap. M.	412 Dynamics	3
C. E.	450 Soil Mechanics I	2
G. E.	117 Arch. Assembly	0
Engl.	090 English Proficiency	0

Total 18

Arch.	424 Theo. Struct. I	2
C. E.	470 Des. Framed Struct.	3
Arch.	235 Elem. Arch. Design	4
	Social Science Elec.*	4
C. E.	428 Stress Analysis II	3
C. E.	460 Foundations	2
G. E.	117 Arch. Assembly	0

Total 18

SENIOR

Arch.	430 Int. Arch. Design	5
Arch.	310 Working Drawings	3
Arch.	434 Building Equip. I	3
C. E.	478 Reinf. Conc. Design	2
C. E.	480 Reinf. Conc. Des. Lab. ..	2
M. E.	406 Air Conditioning A	3
G. E.	117 Arch. Assembly	0
Arch.	390 Inspection Trip	0

Total 18

Arch.	535 Prof. Practice	3
Arch.	436 Building Equip. II	3
E. E.	406 Illumination A	2
Arch.	440 Arch. Engg.	3
	Soc. Sci. or	
	Human. Elec.*	6
G. E.	117 Arch. Assembly	0

Total 17

Number of hours required for graduation, 150.

* 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 Architecture

Bachelor of Architecture

FIRST YEAR

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
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 Draw.	2	Arch.	202	Basic Draw.	2
Arch.	207	Arch. Graph. I	2	Arch.	208	Arch. Graph. II	2
Math.	220	Anal. Geom. & Calc. I	4	Arch.	222	Water Color Paint.	2
Speh.	105	Oral Comm. I	2	Ec. So.	110	Economics I	3
		Air or Mil. Sci. 1A	1	Arch.	216	Intro. to Arch.	1
Ph. Ed.	011	Physical Education	0	Ph. Ed.	011	Physical Education	0
G. E.	110	Engg. Lectures	0	G. E.	117	Arch. Assembly	0
						Air or Mil. Sci. 1B	1
Total			16	Total			16

SECOND YEAR

Phys.	210	Gen. Phys. I	4	Phys.	211	Gen. Phys. II	4
Arch.	235	El. Arch. Des.	4	Arch.	235	El. Arch. Des.	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			Soc. Sci. Elective*	2
		Air or Mil. Sci. 2A	1			Air or Mil. Sci. 2B	1
G. E.	117	Arch. Assembly	0	G. E.	117	Arch. Assembly	0
Total			16	Total			16

THIRD YEAR

Arch.	430	Int. Arch. Des.	5	Arch.	430	Int. Arch. Des.	5
M. E.	406	Air Cond. A	3			Soc. Sci. Elective*	3
Ap. M.	220	Str. of Matls. A	3	Arch.	424	Thry. Str. I	2
Ap. M.	224	Str. of Matls. A Lab.	1	Arch.	425	Thry. Str. I Lab.	2
Arch.	310	Work. Draw.	3	E. E.	406	Illum. A	2
Engl.	090	English Proficiency	0	Arch.	224	Fig. & Port. Drawing	2
G. E.	117	Arch. Assembly	0	G. E.	117	Arch. Assembly	0
Total			15	Total			16

FOURTH YEAR

Bot.	121	Biology I	4	Arch.	436	Bldg. Equip. II	3
Arch.	427	Thry. Str. II	5			Technical Elective**	4
Arch.	430	Int. Arch. Des.	5	Arch.	428	Thry. Str. III	4
Arch.	434	Bldg. Equip. I	3	Arch.	430	Int. Arch. Des.	5
G. E.	117	Arch. Assembly	0	G. E.	117	Arch. Assembly	0
Total			17	Total			16

FIFTH YEAR

Arch.	530	City Planning	3	Arch.	530	City Planning	3
Arch.	525	Arch. Des.	5	Arch.	525	Arch. Des.	5
Arch.	535	Prof. Pract.	3			Socio-Hum. Elective*	7
		Socio-Hum. Elective*	6	G. E.	117	Arch. Assembly	0
Arch.	390	Inspection Trip	0				
G. E.	117	Arch. Assembly	0				
Total			17	Total			15

Number of hours required for graduation, 160.

* 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
M. E.	211	Engg. Graphics I	2	M. E.	216	Engg. Graphics II	2
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I	4	Chem.	250	Chemistry II Lab.	2
Spch.	105	Oral Comm. I	2	Math.	221	Anal. Geom. & Calc. II ..	4
		Air or Mil. Sci. 1A	1	Ch. E.	201	Ch. E. Orientation	1
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			17	Total			16

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
Ch. E.	206	Ch. E. Materials	3	Ch. E.	211	Indust. Stoichiometry	4
Chem.	350	Gen. Organic Chem.	3	Chem.	300	Quant. Analysis	4
Chem.	351	Gen. Organic Chem. Lab. ..	2			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			18

SUMMER

Humanities Elective*	2	Econ.	110	Economics I	3
Soc. Science Elective*	3				

JUNIOR

Ch. E.	411	Ch. E. Measurements	2	Ch. E.	428	Unit Operations II	3
Ch. E.	420	Unit Operations I	3	Ch. E.	425	Unit Operations I Lab.	2
Ch. E.	492	Ch. E. Thermo. I	3	Ap. M.	412	Dynamics	3
Ap. M.	305	Statics	3	Chem.	595	Physical Chem. II	3
Chem.	585	Physical Chem. I	3			Technical Elective**	2
Chem.	586	Physical Chem. I Lab.	2			Humanities Elective*	2
		Humanities Elective*	2			Soc. Science Elective*	3
Engl.	090	English Proficiency	0	G. E.	115	Engg. Assembly	0
G. E.	115	Engg. Assembly	0				
Total			18	Total			18

SENIOR

Ch. E.	435	Unit Operations III	2	Ch. E.	508	Chem. Process Dynamics ..	2
Ch. E.	431	Unit Operations II Lab. ..	2	Ch. E.	502	Ind. Reaction Rates	3
Ch. E.	496	Ch. E. Thermo. II	3	Ch. E.	515	Ch. E. Design II	4
Ch. E.	510	Ch. E. Design I	3	E. E.	423	Electronics & Controls ...	3
Ap. M.	415	Mechanics of Materials ..	3			Soc. Sci. or Hum. Elec.* ..	3
E. E.	419	Elec. Circuits & Mach.	4			Technical Elective**	3
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			17	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>
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.	250	Chemistry II Lab.	2
M. E.	211	Engg. Graphics I	2	Math.	221	Anal. Geom. & Calc. II ..	4
Spch.	105	Oral Comm. I	2	M. E.	216	Engg. Graphics II	2
		Air or Mil. Sci. 1A	1	C. E.	220	Surveying 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			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.	339	Metals & Alloys	2	Ap. M.	305	Statics	3
C. E.	225	Surveying II	3	C. E.	231	Surveying III	3
Econ.	110	Economics I	3			Soc. 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

C. E.	611	Photogrammetry	3	C. E.	421	Stress Analysis I	3
E. E.	400	Elec. Engg. C	2	Bact.	190	Water & Sewage Bact.	3
E. E.	402	Elec. Engg. C Lab.	1	Geol.	110	General Geology	3
Ap. M.	412	Dynamics	3	Ap. M.	420	Hwy., Airpt. Matls. Lab. ..	1
Ap. M.	415	Mechanics of Matls.	3	C. E.	450	Soil Mechanics I	2
Ap. M.	418	Mech. of Matls. Lab.	1	Ap. M.	471	Fluid Mechanics	3
M. E.	400	El. of Thermodynam.	3			Humanities Elective*	3
		Soc. Science Elective*	2	G. E.	115	Engg. Assembly	0
Engl.	090	English Proficiency	0				
G. E.	115	Engg. Assembly	0				
Total			18	Total			18

SENIOR

C. E.	424	Stress Analysis I Lab.	2	C. E.	440	Sanitary Engg.	4
C. E.	428	Stress Analysis II	3	C. E.	456	Hydrology	2
C. E.	451	Transport. Engg.	3	C. E.	470	Design Framed Struct. ..	3
C. E.	453	Transport. Engg. Lab.	2	C. E.	478	Reinf. Conc. Design	2
C. E.	458	Hydraulic Engg.	3	C. E.	480	Reinf. Conc. Des. Lab.	2
C. E.	460	Foundations	2			Soc. Science Elective*	2
		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, 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**

	<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	100 Engl. Comp. I	3
Chem.	210 Chemistry I	5
Math.	220 Anal. Geom. & Calc. I	4
M. E.	211 Engg. Graphics I	2
Spch.	105 Oral Comm. I	2
	Air or Mil. Sci. 1A	1
Ph. Ed.	011 Physical Education	0
G. E.	110 Engg. Lectures	0

Total 17

SECOND SEMESTER

	<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	120 Engl. Comp. II	3
Chem.	230 Chemistry II	3
Math.	221 Anal. Geom. & Calc. II	4
	Humanities Elective*	6
	Air or Mil. Sci. 1B	1
Ph. Ed.	011 Physical Education	0
G. E.	115 Engg. Assembly	0

Total 17

SOPHOMORE

Phys.	310 Engg. Physics I	5
Math.	222 Anal. Geom. & Calc. III	4
I. E.	318 Ind. Production I	2
Econ.	110 Economics I	3
	Soc. Sci. or Hum. Elec.*	3
	Air or Mil. Sci. 2A	1
G. E.	115 Engg. Assembly	0

Total 18

Phys.	311 Engg. Physics II	5
Math.	240 Series & Diff. Equa.	4
E. E.	395 Basic Elec. Engg.	4
I. E.	339 Metals & Alloys	2
	Soc. Science Elective* ..	2
	Air or Mil. Sci. 2B	1
G. E.	115 Engg. Assembly	0

Total 18

JUNIOR

E. E.	460 Electronics I	2
E. E.	426 A-C Circuits	5
E. E.	411 D-C Machinery	3
E. E.	414 D-C Machinery Lab.	1
Ap. M.	305 Statics	3
	Soc. Science Elective*	4
Engl.	090 English Proficiency	0
G. E.	115 Engg. Assembly	0

Total 18

E. E.	464 Electronics II	4
E. E.	468 Electronics II Lab.	2
Ap. M.	412 Dynamics	3
E. E.	430 A-C Machinery I	3
E. E.	490 Elec. Measurements	2
E. E.	494 Elec. Measurements Lab.	1
E. E.	450 Circuit Analysis	3
G. E.	115 Engg. Assembly	0

Total 18

SENIOR

E. E.	439 A-C Machinery II	2
E. E.	437 A-C Laboratory	1
Ap. M.	415 Mechanics of Materials ..	3
M. E.	411 Engg. Thermodynamics I	4
E. E.	539 Networks	3
E. E.	541 Networks Lab.	1
E. E.	550 Electromag. Waves	3
E. E.	554 Electromag. Waves Lab.	1
G. E.	115 Engg. Assembly	0

Total 18

M. E.	531 Mech. Engg. Lab. E	1
E. E.	576 Elec. Engg. Summary	2
E. E.	442 A-C Machinery Lab.	1
E. E.	670 Servomechanisms	3
Phys.	560 Atomic Physics	3
G. E.	115 Engg. Assembly	0

OPTION

M. E.	511 Engg. Thermodynamics II	2
	Technical Elective**	6

OR

E. E.	605 Electronics III	4
E. E.	606 Electronics III Lab.	1
	Technical Elective**	3

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			
		<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
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.	211	Engg. Graphics I	2
		Air or Mil. Sci. 1A	1	I. E.	318	Ind. Production I	2
		Humanities Elective*	3	Econ.	110	Economics I	3
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			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. Equa.	4
B. A.	170	Prin. of Accounting	3	Ap. M.	305	Statics	3
I. E.	418	Ind. Production II	2	I. E.	339	Metals & Alloys	2
I. E.	438	I. E. Techniques I	3	I. E.	448	I. E. Techniques II	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			18	Total			18

JUNIOR

Ap. M.	412	Dynamics	3	Ap. M.	415	Mechanics of Matls.	3
Stat.	610	Theory of Statistics I	3	Stat.	611	Theory of Statistics II ..	3
M. E.	411	Engg. Thermodynam. I ..	4	E. E.	423	Electronics & Controls ...	3
E. E.	419	El. Circuits & Mach.	4	E. E.	424	Electronics & Con. Lab. 1	1
I. E.	406	Ind. Operations I	2	I. E.	398	Ind. Plant Studies	0
I. E.	538	I. E. Techniques III	2	I. E.	518	Ind. Production III	3
G. E.	115	Engg. Assembly	0	I. E.	537	I. E. Controls I	2
Engl.	090	Engl. Proficiency	0	I. E.	547	I. E. Analysis I	3
				G. E.	115	Engg. Assembly	0
Total			18	Total			18

SENIOR

Ap. M.	471	Fluid Mechanics	3	I. E.	556	Ind. Operations III	2
I. E.	506	Ind. Operations II	2	I. E.	695	I. E. Design II	3
I. E.	637	I. E. Controls II	3			Technical Elective**	3
I. E.	647	I. E. Analysis II	3			Humanities Elective*	3
I. E.	655	I. E. Design I	3			Soc. Sci. Elective*	3
		Soc. Sci. Elective*	3			Soc. Sci. or Hum.	
G. E.	115	Engg. Assembly	0			Elective*	3
				G. E.	115	Engg. Assembly	0
Total			17	Total			17

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			
		<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
M. E.	211	Engg. Graphics I	2	M. E.	216	Engg. Graphics II	2
Math.	220	Anal. Geom. & Calc. I	4	Math.	221	Anal. Geom. & Calc. II	4
Spch.	105	Oral Comm. I	2	I. E.	318	Ind. Production I	2
		Air or Mil. Sci. 1A	1			Humanities Elective*	3
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			17	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. Equa.	4
Econ.	110	Economics I	3	Ap. M.	305	Statics	3
M. E.	310	Engg. Graphics III	2	I. E.	339	Metals & Alloys	2
		Soc. Sci. or Hum. Elec.* ..	3			Soc. Science Elective*	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			18	Total			18

JUNIOR

M. E.	411	Engg. Thermodynam. I ..	4	M. E.	511	Engg. Thermodynam. II ..	2
E. E.	419	Elec. Circuits & Mach. ..	4	E. E.	423	Electronics & Controls ..	3
E. E.	420	Elec. Cir. & Mach. Lab. ..	1	E. E.	424	Electron. & Cont'ls Lab. ..	1
Ap. M.	415	Mechanics of Materials ..	3	Ap. M.	418	Mech. of Matls. Lab.	1
Ap. M.	412	Dynamics	3	M. E.	451	Machine Design I	5
		Humanities Elective*	3	Ap. M.	471	Fluid Mechanics	3
Engl.	090	English Proficiency	0	M. E.	560	Engg. Economics	3
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. Development	1
M. E.	551	Machine Design II	3	M. E.	555	Machine Vibration I or ..	3
M. E.	533	Mech. Engg. Lab. I	2	M. E.	525	Air Conditioning	3
M. E.	575	Thermo. Systems Anal. ..	3	Phys.	560	Atomic Physics or	3
		Option	6 or 7	N. E.	450	Intro. to Nuclear Engg. ..	3
G. E.	115	Engg. Assembly	0			Soc. Science Elective*	3
						Option	7 or 8
Total			17 or 18	G. E.	115	Engg. Assembly	0
				Total			17 or 18

Number of hours required for graduation, 142.

* Social Science and Humanities electives must be selected from 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
			7				7

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
			6			Technical Elective**	3
							8

Petroleum Production Option

M. E.	571	Petroleum Production	3	M. E.	583	M. E. Lab. II	2
Gl. Gg.	400	Engg. Geology	4	M. E.	671	Reservoir Engg.	3
			7			Technical Elective**	2
							7

A program of advanced courses in the field of automatic controls, propulsion, machine design, thermodynamics, etc., may be substituted for the above options with the approval of the student's adviser and the department head.

* 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
M. E.	211	Engg. Graphics I	2	M. E.	216	Engg. Graphics II	2
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I ..	4	Chem.	250	Chemistry II Lab.	2
		Air or Mil. Sci. 1A	1	Math.	221	Anal. Geom. & Calc. II ..	4
Ph. Ed.	011	Physical Education	0			Humanities Elective*	3
Spch.	105	Oral Comm. I	2			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			17	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. Equa.	4
N. E.	205	Nc. Rc. Matls. I	2	Ch. E.	211	Indus. Stoichiometry	4
		Social Science Elective* ..	3	Ap. M.	305	Statics	3
		Option	4 or 3			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			19 or 18	Total			17

SUMMER

Econ.	110	Economics I	3
Phys.	560	Atomic Physics	3
Ap. M.	415	Mechanics of Materials ..	3
Total			9

JUNIOR

N. E.	450	Elements of Nc. Engg.	3	Ap. M.	412	Dynamics	3
Chem.	585	Phys. Chem. I Rec.	3	N. E.	611	Rad. App. Engg.	3
		Option	10	Chem.	595	Phys. Chem. II Rec.	3
Engl.	090	English Proficiency	0			Option	5
Phys.	680	Modern Physics Lab.	1	E. E.	419	Elec. Circ. & Mach. Rec. ..	4
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			17	Total			18

SENIOR

E. E.	423	Elec. & Controls Rec.	3	N. E.	690	Nc. Rc. Tech. II	4
E. E.	424	Elec. & Controls Lab.	1	N. E.	605	Nc. Rc. Matls. II	3
N. E.	670	Nc. Rc. Tech. I	3	Phys.	675	Nuclear Physics	3
		Option	10 or 9			Option	6 or 8
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			17 or 16	Total			16 or 18

Number of hours required for graduation, 148.

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

Option I SOPHOMORE

Chem. 300 Gen. Quant. Analysis 4

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.	425	Unit Operations I Lab.	2
Ch. E.	492	Ch. E. Thermo. I	3				
Ch. E.	411	Ch. E. Measurements	2				
			10				5

SENIOR

Ch. E.	431	Unit Operations II Lab.	2			Social Science Elective*	3
		Technical Elective**	2			Social Science or Human-	
Ch. E.	496	Ch. E. Thermo. II	3			ities Elective*	3
		Humanities Elective*	3				
			10				6

Option II SOPHOMORE

Humanities Elective* 3

JUNIOR

M. E.	411	Engg. Thermo. I	4	M. E.	511	Engg. Thermo. II	2
		Social Science Elective* ..	3	Ap. M.	471	Fluid Mechanics	3
		Tech. Elective**	3				
			10				5

SENIOR

M. E.	575	Thermo. Systems Anal. ..	3			Math. Elective***	3
		Tech. Elective**	3			Social Science or Human-	
M. E.	521	Heat Transfer	3			ities Elective*	3
			9	M. E.	533	Mech. Engg. Lab. I	2
							8

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.*

Econ.	120	Economics II	3	B. A.	440	Marketing	3
B. A.	272	Introductory Acctg.	5	B. A.	431	Personnel Admin.	3
B. A.	305	Managerial Acctg.	3	B. A.	405	Business Finance	3
B. A.	325	Business Law I	3	Econ.	430	Money and Banking	3
B. A.	326	Business Law II	3	B. A.	600	Business Policy	3
B. A.	400	Administration	3			Business Elective	6

* 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.

** Technical electives are to be chosen with the advice and approval of the head of the department and the dean.

*** Mathematics elective is to be chosen with the advice and approval of the head of the department and the dean.

Approved Social Science and Humanities Electives for Students Enrolled in the School of Engineering and Architecture

Social Science Electives

B. A.	400	Administration	3	Hist.	252	History of the United States Since 1877	3
B. A.	440	Marketing	3				
Econ.	120	Economics II	3	Hist.	255	American Economic History ..	3
Econ.	430	Money and Banking	3	Hist.	257	American Social History ..	3
Econ.	610	Public Finance	3	Hist.	646	Europe, 1815-1914	3
Econ.	620	Labor Economics	3	Hist.	655	Representative Americans ..	2
Econ.	636	Economic Systems	2	Hist.	663	Modern France	3
Econ.	681	International Trade	3	Hist.	669	Modern Germany	3
Econ.	686	Business Fluctuations and Forecasting	2	Hist.	684	The Russian Empire	3
Geog.	115	World Regional Geography ..	3		708	Civil War and Reconstruction	3
Geog.	645	Political Geography	3	Hist.	711	The United States in the Twentieth Century	3
P. Sci.	120	Modern Democracy	3				
P. Sci.	220	American Government	3	Hist.	712	Frontier America	3
P. Sci.	320	State and Local Government	3	Hist.	719	The South	3
P. Sci.	350	American Foreign Policy ..	3	Hist.	721	The Great Plains	3
P. Sci.	380	Introduction to Public Law	3	Hist.	728	Europe, Since 1914	3
P. Sci.	450	Introduction to Public Administration	3	Hist.	745	American Immigration History	3
P. Sci.	600	American Political Ideas	3	Hist.	748	History of American Foreign Policy	3
P. Sci.	610	Public Policy Toward Business	3	Hist.	751	Colonial Hispanic America ..	3
P. Sci.	615	City Government	3	Psych.	758	Latin American Nations	3
P. Sci.	637	Public Organization and Management	2	Psych.	110	General Psychology	3
P. Sci.	640	International Relations	3	Psych.	435	Social Psychology	3
P. Sci.	715	International Organization ..	3	Soc.	465	Psychology of Art	3
P. Sci.	720	Government of Britain and the Commonwealth ..	3	Soc.	131	Introductory Social Science I	4
P. Sci.	725	Governments of Continental Europe	3	Soc.	132	Introductory Social Science II	4
P. Sci.	740	Political Parties and Pressure Groups	3	Soc.	200	Introduction to Anthropology	3
P. Sci.	765	Constitutional Law	3	Soc.	220	Introduction to Sociology ..	3
P. Sci.	780	Soviet System	3	Soc.	646	Sociology of the Family	3
Hist.	251	History of the United States to 1877	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.	646	Revolutionary Europe, 1760-1815	3
Engl.	141	Introduction to Humanities I	4	Hist.	652	Tudor England	3
Engl.	142	Introduction to Humanities II	4	Hist.	653	Stuart England	3
Engl.	230	Introduction to Fiction	2	Hist.	745	American Intellectual History	3
Engl.	240	Introduction to Drama	2	Hist.	760	Far East	3
Engl.	251	English Literature I	3	Hist.	765	India and Southeast Asia ..	3
Engl.	256	English Literature II	3	Hist.	770	History of Religions	3
Engl.	270	American Literature I	3	Music	250	Modern Language	6
Engl.	275	American Literature II	3	Music	650	Appreciation of Music	2
Engl.	350	Introduction to Shakespeare	3	Phil.	150	Music in History	3
Engl.	370	Books and Men I	3	Phil.	165	Elementary Logic	3
Engl.	375	Books and Men II	3	Phil.	175	Introduction to Philosophy ..	3
Engl.	651	Shakespearean Drama	3	Phil.	210	Philosophy of Religion	3
Hist.	111	History of Western Civilization I	3	Phil.	221	Oriental Philosophy	2
Hist.	112	History of Western Civilization II	3	Phil.	535	Ethics	2
Hist.	201	Ancient Mediterranean Civilizations	3	Phil.	610	Contemporary World Views ..	3
Hist.	202	Civilization of the Middle Ages	3	Phil.	620	Early Western Philosophy ..	3
Hist.	221	History of England to 1660	3	Phil.	630	Modern Western Philosophy ..	3
Hist.	222	History of England from 1660	3	Phil.	640	American Philosophy	3
Hist.	603	History and Culture of Greece	3	Phil.	640	History of Science I	3
				Phil.	545	Philosophy of Religion	3
				Phil.	650	History of Science II	3
				Phil.	680	Philosophy of Science	3
				Phil.	700	Social Philosophy	3
				Phil.	710	Political Philosophy	3
				Phil.	720	Aesthetics	3
				Phil.	740	Philosophical Ideas 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* and Reece; Instructors Manges, Mensch and Robertson; Emeritus: Professor Fenton*

For Curriculum, See Page 196

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 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.

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. (4) 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 six hours lab. a week. Pr.: Phys. 311; Pr. or conc.: Ap. M. 415, Ag. E. 310.

446. Tractors. (4) 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 six hours lab. a week. Pr.: Phys. 311, M. E. 411.

465. Farm Structures. (4) I. Design of farm structures, details and materials of construction; specification and estimates. Two hours rec. and six hours lab. a week. Pr.: Ap. M. 415.

475. 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. 220.

480. Soil and Water Conservation. (4) II. Principles and methods of land drainage, soil and water conservation, and irrigation. Two hours rec. and six hours lab. a week. Pr.: Ap. M. 471, Ag. E. 475, Agron. 270.

- 500. Rural Electrification.** (4) II. Water supply, sewage disposal, lighting, heating, and ventilation of farm buildings; refrigeration; rural electrification. Two hours rec. and six hours lab. a week. Pr.: E. E. 423, Ap. M. 471, M. E. 411.
- 605. Irrigation and Drainage.** (3) I. Design and operation 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. 475.
- 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) I, II. Theory, equipment, and techniques in processing farm products. Application of mechanics, thermodynamics, fluid flow, and heat transfer to problems in size reduction, drying, refrigeration, conveying, and grading products. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 471, M. E. 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. 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 the design, use, and application of machinery and equipment in the development of agriculture. 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, 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. 210.

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. 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 Practice.** (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 Burgess, 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 curricula.

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.

FOR UNDERGRADUATE CREDIT

- 205. Applied Mechanics A.** (3) I, II, S. A study of statics with application to stresses in structures; centers of gravity; moments of inertia. Three hours rec. a week. Pr.: Phys. 210.
- 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 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. Three hours rec. a week. Pr.: Phys. 310; Pr. or conc.: Math. 222 or 232.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 412. Dynamics.** (3) I, II, S. Plane kinematics, Newton's Laws, d'Alembert's principle, the concepts of work and energy, impulse and momentum, and their application to problems of particle and rigid body motion. Three hours rec. a week. Pr.: Ap. M. 305, Math. 222 or 232.
- 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 or 232.
- 418. Mechanics of Materials Laboratory.** (1) I, II, S. Testing of selected specimens of various engineering materials in order to determine their mechanical properties; test procedures; instrumentation; data interpretation. One hour lab. instruction and two hours lab. a week. Pr. or conc.: Ap. M. 415.
- 420. Highway and Airport Materials Laboratory.** (1) I, II. A comprehensive course in the examination and testing of materials used in the construction of highways and airports. Three hours lab. a week. Pr. or conc.: Ap. M. 418.
- 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, thick cylinders and rotating disks, shells, flat plates, 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. 420.
- 604. Cement and Concrete Technology.** (3) I. The raw materials and manufacturing processes of portland cement; cementing components; special cements and their effect on concrete mixes; aggregate requirements; fundamental principles of design, mixing, and placing to meet

- specified strength and durability requirements. Two hours rec. and three hours lab. a week. Pr.: Ap. M. 418.
- 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; an introduction to the energy methods of advanced dynamics. 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.
- 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.
- 715. Mathematical Methods in Engineering Research.** (3) I. The application of the methods of Euler, Lagrange, Ritz, Southwell, Timoshenko, Runge, Heaviside, and Kron to problems in various fields in engineering. Three hours rec. a week. Pr.: Math. 621 or equiv.
- 720. Non-linear Mechanics.** (3) II. Study of mechanical or electrical systems governed by non-linear 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. Bending of prismatic bars and circular plates; stresses around cavities; stresses within soils; thermal stresses. Three hours rec. a week. Pr.: Ap. M. 821.
- 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; vibrations 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.

ARCHITECTURE AND ALLIED ARTS

EMIL C. FISCHER,* *Head of Department*

Professors Chadwick, Fischer,* Heintzelman,* Helm* and Krider;* Associate Professors Beckman, Durgan,* Hodgell,* Thorson, Tomasch* and White;* Assistant Professors Cool, Cotton,* Larmer* and Miller;* Instructors Deibler, Deines, McGraw, Rowland, Strohmeier and Wendi; Emeritus: Professor Weigel*

For Curriculum in Architectural Engineering, See Page 197

The Curriculum in Architectural Engineering particularly emphasizes the structural and mechanical phases of architecture. Students are trained to design in wood, steel and reinforced concrete. Close association with the students in the architectural curriculum encourages proper integration of heating, conditioning of air and mechanical equipment with the structural and aesthetic aspects of buildings.

Graduates enter private practice, associate with professional architects or engineers, superintend building projects, become general contractors or enter one of the many branches of the building industry.

Students should get practical experience during the summer vacation in the building industry, either on construction projects or in the office of a construction engineer, contractor or architect.

For Curriculum in Architecture, See Page 198

The Curriculum in Architecture equips students to design many diversified building types such as residences, governmental and business buildings, schools, factories and places of worship. Design projects also include groups of buildings such as civic centers, housing developments and even entire communities. Students are trained to prepare sketches, contractors' drawings and specifications, structural calculations, supervise construction and correlate the various engineering services related to the building trades.

Graduates enter private practice, public service, one of the many branches of the building industry or associate with architectural firms.

Students should get practical experience during the summer vacation in the building industry, either on construction projects or in an architect's office.

Graduate Work:

Major work leading to the degree Master of Architecture is offered in architectural design, architectural engineering, urban design and structural design, and the degree Master of Arts in drawing, painting and sculpture.

Prerequisite to advanced work in these fields is the completion of an undergraduate curriculum substantially equivalent to that required of

undergraduate students in this department, or in the field of art, or completion of a curriculum including suitable undergraduate training to prepare the student for graduate work in that field.

Facilities for carrying on advanced work in these fields 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 drawings or designs made by the student during the course become the property of the department, to be used or returned at the discretion of the faculty.

FOR UNDERGRADUATE CREDIT

- 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.
- 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 Department of Architecture and Allied Arts.
- 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 to 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 Department of Architecture. 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.
- 424. Theory of Structures I.** (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.
- 425. Theory of Structures I Lab.** (2) I, II. Bar stresses in trusses and framed arches. Mathematical and graphical solutions of stresses and deflections in beams under static and moving loads. Emphasis on timber structures. Six hours lab. a week. Pr.: Ap. M. 224.
- 427. Theory of Structures II.** (5) I, II, S. Cont. of Arch. 426. Three hours rec. and six hours lab. a week. Pr.: Arch. 424, 425.
- 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.
- 434. Building Equipment I.** (3) I. Water supply and sanitation relating to all types of buildings. Two hours rec. and three hours lab. a week. Pr.: Phys. 211 or equiv.
- 436. Building Equipment II.** (3) II. Electrical equipment, vertical transportation and acoustics. Two hours rec. and three hours lab. a week. Pr.: Phys. 211 or equiv.
- 440. Architectural Engineering.** (3) I, II, S. A synthesis of previous course material. Students will collaborate with senior students in architecture on advanced design problems. Nine hours lab. a week. Pr.: C. E. 428, 470, and 480.
- 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.
- 530. City Planning.** (3) I, II. A study of city and regional problems in planning, including those related to population, resource potential, agriculture, and industry. Problems relating to parks, civic and business centers, recreational facilities. May not be taken for more than six credit hours. Nine hours lab. a week. Fourth-year classification.
- 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

- 805. City Planning Principles.** Credit arranged. I, II, S. A study of city planning history and procedures, land uses, economic base, population, resource conservation, urban redevelopment, rural-urban relationships, subdivisions, transportation and street systems, parks and recreation, shopping centers, public buildings, industrial development. Pr.: Approval of instructor.
- 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.
- 815. Advanced Planning Theory.** Credit arranged. I, II, S. Investigations in planning and zoning laws, planning administration, capital budgeting, legislation, and public relations. New concepts and trends in regional planning and development. 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.

CHEMICAL ENGINEERING

WILLIAM H. HONSTEAD,* *Head of Department*

Professors Bates and Honstead,* Associate Professors Fan* and Kyle,* Assistant Professors Hall* and Matthews; Instructor Miller*

For Curriculum, See Page 199

Chemical engineers are concerned primarily with the production of materials. Such products as plastics, steel, pharmaceuticals, food, paper, rubber, petroleum, paint and varnish, soap and detergents, fertilizers, lumber, synthetic and natural fibers, leather and waxes are the result of the applications of chemical engineering. Functions performed for these industries by chemical engineers include research, development, design, construction, operation and technical sales.

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 these 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.

Graduate Work:

The Master of Science and Doctor of Philosophy degrees in Chemical Engineering are granted on the completion of the required work in this field of engineering.

Prerequisite to admission for work towards an advanced degree is the completion of an undergraduate curriculum in chemical engineering similar or equivalent to the course at this University.

Laboratory space and equipment are available for research in fundamental unit operations, thermodynamics, fluidization, heat and mass transfer, phase equilibria, and problems in the development of processes for industrial chemicals and for the utilization of agricultural products and residues.

Excellent shop facilities are available, and the library contains all the common texts, periodicals, and other references in the field.

FOR UNDERGRADUATE CREDIT

- 201. Chemical Engineering Orientation.** (1) II. Fundamentals and standards in chemical engineering computations. One hour rec. a week. Pr.: Chem. 210.
- 206. Chemical Engineering Materials.** (3) I, II. Manufacture, use, and properties of metallic and non-metallic materials of construction. Three hours rec. a week. Pr.: Chem. 230, 250.
- 211. Industrial Stoichiometry.** (4) I, II. Calculation of material and energy balances in industrial processes. Four hours rec. a week. Pr.: Chem. 230, 250.
- 399. Honors Seminar in Chemical Engineering.** Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 411. Chemical Engineering Measurements.** (2) I. Principles and techniques of physical measurements basic to unit operations and chemical engineering thermodynamics. Six hours lab. a week. Pr.: Ch. E. 211, Phys. 311, Math. 222 or 232.
- 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. 222 or 232.
- 425. Unit Operations I Laboratory.** (2) I, II. Laboratory work in fluid flow and heat transfer. 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, 492.
- 431. Unit Operations II Laboratory.** (2) I, II. Laboratory work in mass transfer. Six hours lab. a week. Pr.: Ch. E. 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.
- 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.
- 502. Industrial Reaction Rates.** (3) II. Fundamentals of chemical reaction rates and the application of kinetic data in process design calculations. Three hours rec. a week. Pr.: 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, Math. 240 or equiv.; Pr. or conc.: Ch. E. 502.
- 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.
- 515. Chemical Engineering Design II.** (4) II. Problems in designing processes, equipment, and plants for chemical and allied industries. Three 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.
- 821. Advanced Industrial Reaction Rates and Catalysis.** (3) I, II, S. Theory of kinetics and catalysis in homogeneous and heterogeneous systems, with application to chemical reactor design and process development. Three hours rec. a week. Pr.: Ch. E. 502.
- 825. Distillation.** (3) I, II, S. Advanced study of distillation. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 830. Drying.** (3) I, II, S. Development of drying theory and an analysis 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.
- 840. Evaporation.** (3) I, II, S. Theory of evaporation and design of evaporators. 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. 515 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. On 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

REED FRANKLIN MORSE,* *Head of Department*

Professors McEntyre and Morse;* Associate Professors Kubitz,* Rosebraugh* and Smith; Assistant Professors Funk, Hampton,* Robohn* and Snell;* Emeritus: Professors Conrad, Crawford and Frazier*

For Curriculum, See Page 200

The first and second years are devoted largely to the basic sciences including chemistry, physics, and mathematics. An introduction to the technical work is given through courses in drawing, surveying, and the elementary phases of engineering.

The last two years are chiefly devoted to technical work at the professional level. The graduate is prepared to render professional services in design of reinforced concrete and steel structures, highways, and sanitary systems.

Graduate Work:

Major work leading to the degree Master of Science is offered in structural, transportation, and traffic engineering, and in surveying and mapping.

Facilities for advanced work include well-equipped laboratories in materials, hydraulics, and soils. Special equipment includes a Beggs deformeter, a Kelsh plotter, and numerous precise surveying instruments.

FOR UNDERGRADUATE CREDIT

220. Surveying I. (2) I, II, S. Care and use of engineers' surveying instruments. Six hours lab. a week. Pr. or conc.: Math. 150 or equiv.

225. Surveying II. (3) I, II. Land, topographic, and city surveying. One hour rec. and six hours lab. a week. Pr.: C. E. 220.

231. Surveying III. (3) I, II. Curves and earthwork, surveying pertaining to alignment of highways and railways. One hour rec. and six hours lab. a week. Pr. or conc.: C. E. 225.

399. Honors Seminar in Civil Engineering. Credit arranged. On sufficient demand. Selected topics in engineering. Primarily for honors students.

FOR UNDERGRADUATE AND GRADUATE CREDIT

421. Stress Analysis I. (3) I, II. Stresses in simple beams and framed structures. Three hours rec. a week. Pr.: Ap. M. 415.

- 424. Stress Analysis I Laboratory.** (2) I, II. Graphical and analytical determination of stresses and deflections in beams and framed structures. Six hours lab. a week. Pr. or conc.: C. E. 421.
- 428. Stress Analysis II.** (3) I, II, S. Theory of statically indeterminate structures under static loads. Three hours rec. a week. Pr.: C. E. 421; Pr. or conc.: C. E. 424.
- 440. Sanitary Engineering.** (4) I, II. Design, construction, and operation of water supply and sewerage systems. Three hours rec. and three hours lab. a week. Pr.: Ap. M. 471, Bact. 190.
- 450. Soil Mechanics I.** (2) I, II. The identification and classification of soil types; the physical properties of soil that govern its use as a material of construction and as a support for engineering structures. One hour rec. and three hours lab. a week. Pr. or conc.: Ap. M. 415.
- 451. Transportation Engineering.** (3) I, II. The design, construction, and maintenance of railroads, highways, and airports. Three hours rec. a week. Pr.: C. E. 611, Ap. M. 420, 450; Pr. or conc.: Ap. M. 471.
- 453. Transportation Engineering Laboratory.** (2) I, II. Field and office work pertaining to design, construction, and maintenance of railroads, highways, and airports. Six hours lab. a week. Pr. or conc.: C. E. 451.
- 456. 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.
- 458. 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.: Ap. M. 471.
- 460. Foundations.** (2) I, II. Design and construction of foundations for pavements, bridges, and buildings. Two hours rec. a week. Pr.: Ap. M. 415; Pr. or conc.: C. E. 450.
- 470. Design of Framed Structures.** (3) I, II, S. Designs and general drawings of truss and girder bridges. Nine hours lab. a week. Pr.: C. E. 424.
- 478. Reinforced Concrete Design.** (2) I, II, S. A study of the theories of reinforced concrete and of its characteristics as a building material. Design of reinforced concrete structures. Two hours rec. a week. Pr.: C. E. 421.
- 480. Reinforced Concrete Design Laboratory.** (2) I, II, S. Design and design drawings of reinforced concrete structures. Six hours lab. a week. Pr. or conc.: C. E. 478.
- 606. Soil Mechanics II.** (3) I. Subsurface investigations; permeability, seepage, and capillarity; consolidation and settlement; stress distribution in soils and shearing strength. Two hours rec. and three hours lab. a week. Pr.: C. E. 450.
- 608. Soil Mechanics III.** (3) II. Stability of slopes; lateral pressure and stability of retaining walls; compaction; earth dams; bearing power of soils; behavior of soils under various types of foundations. Two hours rec. and three hours lab. a week. Pr.: C. E. 450.
- 611. 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. 225; Pr. or conc.: C. E. 231.
- 613. Land Surveying.** (3) I. 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.
- 615. Advanced Photogrammetry.** (3) II. 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. 611.
- 617. Adjustment of Surveys.** (3) II. Methods of adjusting surveys, with special attention to method of least squares. Three hours rec. a week. Pr.: C. E. 231, Math. 240 or equiv.
- 620. Regional Planning Engineering.** (3) I. Engineering problems involved in regional planning. Highway and traffic, water supply, sanitation, public utilities, and easements. Three hours rec. a week. Open to graduate students in Regional Planning. Not open to students with civil engineering background.
- 630. Advanced Reinforced Concrete Theory.** (3) I. Ultimate design prestressed concrete; analysis of reinforced concrete building frames, introduction to shells; other current topics. Three hours rec. a week. Pr.: C. E. 428, 480.
- 635. Indeterminate Structures.** (3) II. Analysis of statically indeterminate structures, influence lines; application of matrix theory. Three hours rec. a week. Pr.: C. E. 428.
- 640. Advanced Structural Theory.** (3) I. Theories of failure, fatigue, buckling, plastic design of steel; other current topics. Three hours rec. a week. Pr.: C. E. 428, 470.
- 645. Advanced Structural Design.** (3) II. The design of steel and/or reinforced concrete structures. Three hours rec. a week. Pr.: C. E. 428, 470, 480.
- 650. Sanitary Engineering Design.** (2) II. Cont. of C. E. 440, with emphasis on cost estimates and methods of financing. Six hours lab. a week. Pr.: C. E. 440.
- 660. Traffic Engineering.** (3) II. Basic characteristics of traffic; traffic engineering investigations; traffic laws and ordinances; signs, markings, and signals; traffic administration. Three hours rec. a week. Pr.: C. E. 453 or approval of instructor.
- 665. Highway Planning and Economics.** (3) I. Highway planning surveys, methods and results; highway classification, highway needs; economics of location; highway finance and administration. Three hours rec. a week. Pr.: C. E. 453, Econ. 110 or approval of instructor.
- 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. 453.
- 675. Airport Design.** (3) I. Problems encountered in planning design, construction, and maintenance of large airports. Two hours rec. and three hours lab. a week. Pr.: C. E. 451.
- 680. Pavement Design.** (3) II. Tire pressure, wheel loads, axle arrangements, landing gear; compaction of subgrade; base and subbase material, design of flexible and rigid pavements for highways and airports. Three hours rec. a week. Pr. or conc.: Ap. M. 603, 604.
- 720. Economics of Design and Construction.** (3) I. Study of methods, construction equipment and economic factors affecting engineering projects. Three hours rec. a week. Pr.: Senior classification.
- 732. Geodesy.** (2) I. Precise methods of surveying and leveling, with application of practical astronomy to such problems. Two hours rec. a week. Pr.: C. E. 231, Math. 240 or equiv.
- 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.

ELECTRICAL ENGINEERING

RUSSELL M. KERCHNER,* *Head of Department*

Professors Halijak, Hunt,* Kerchner,* Sitz* and Ward;* Associate Professors Hayre,* Murrish* and Wirtz;* Assistant Professor Cotton;* Instructors Bertnolli, Carlson, Dollar, Fowler, Hegler, Ho, Merrill, Neuenswander, Porter, Wakabayashi and Weathers; Emeritus: Professors Jorgenson and Kloeffer*

For Curriculum, See Page 201

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, S. 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, S. Experiments covering characteristics and applications of direct-current and alternating-current machinery. Three hours lab. a week. Pr. or conc.: E. E. 400.

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. 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. 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 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.: E. E. 426, Math. 240 or equiv.
- 460. Electronics I.** (2) I, II. The fundamental principles of electron tubes. Two hours rec. a week. Pr.: E. E. 400 or 419; Pr. or conc.: E. E. 426.
- 464. Electronics II.** (4) I, II, S. A study of basic electronic circuits, amplifiers, and oscillators. Four hours rec. a week. Pr.: E. E. 426, 460.
- 468. Electronics II Laboratory.** (2) I, II, S. Basic electronic circuits and characteristics. Six hours lab. a week. Pr. or conc.: E. E. 464.
- 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. Network theorems, infinite line, wave filters, equalizers, and impedance matching. Three hours rec. a week. Pr.: E. E. 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.
- 600. Transient Electrical Phenomena.** (3) II. Two phases of electrical phenomena: (a) Transients in time, and (b) transients in space. Three hours rec. a week. Pr.: E. E. 426.

- 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. 464, 468.
- 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.
- 615. Transmission and Distribution of Electrical Energy.** (3) II. Transmission line design, economic and technical features; properties of cables and insulators. Three hours rec. a week. Pr.: E. E. 430.
- 620. Analog Computation.** (3) II. Use of analog computers; solution of linear and non-linear algebraic and differential equations—scaling problems into machine units. Two hours rec. and three hours lab. a week. Pr.: Math. 240 or equiv., Phys. 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. 464.
- 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. 464.
- 670. Servomechanisms.** (3) I. 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. 464, 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. 464.

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 non-linearities, and approximation of linear and non-linear 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. 464.
- 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.
- 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. 464.

GENERAL ENGINEERING

JOHN W. SHUPE, *Acting Dean*

- 110. Engineering Lectures.** (0) I. Designed to acquaint freshman engineers and architects with fundamental principles of their profession and to give a general survey of engineering and architectural opportunities. 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.
- 117. Architectural Assembly.** (0) I, II. Presentation of professional problems and practices by students, faculty, architects, and architectural engineers. One hour lecture a month.
- 200. Kansas State Engineer Journalism.** (1) I, II. Editorial and business staff work on the Kansas State Engineer. Pr.: Junior classification and consent of dean.

INDUSTRIAL ENGINEERING

GEORGE F. SCHRADER,* *Head of Department*

Professors Darby, Hostetter,* Schrader* and Smaltz;* Associate Professors Clifton* and Elias;* Assistant Professors Byers, Dietrich, Hansen, Pauli, Smethers and Woodard; Instructor Nelson; Emeritus: Professor Carlson*

For Curriculum, See Page 202

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 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 quantitative techniques, tools and processing, work study, work flow design, and metallurgy.

Prerequisite to graduate work in these fields is the completion of a four-year curriculum equivalent to the undergraduate work in industrial engineering as offered at this institution, and also sufficient basic work in a given field to prepare the student for the advanced problem chosen.

Several very strong minor fields are available in the University. Those most emphasized by industrial engineering are the Human Engineering group in the Department of Psychology, the Business Management group in the Department of Business Administration, the Labor Economics group in the Department of Economics and Sociology, and the Statistics group in the Department of Statistics.

The facilities for advanced work in the Department of Industrial Engineering include a good library, excellent laboratory facilities, and complete shops for construction of apparatus and for methods studies. Majors in the department will have access to the University's digital computers. Industrial cooperation is excellent, and makes a valuable contribution to the research effort in the field.

FOR UNDERGRADUATE CREDIT

- 318. Industrial Production I.** (2) I, II. Introduction to industrial processing, emphasizing capability and suitability in modern industry. Six hours lab. a week.
- 339. Metals and Alloys.** (2) I, II. Structures and properties of engineering alloys. Physical changes occurring during heat treatment and fabrication of metals. Two hours rec. a week. Pr.: Chem. 230.
- 398. 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.
- 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

- 406. Industrial Operations I.** (2) I. Aspects of industrial management important as bases for industrial engineering activities. Two hours rec. a week. Pr.: Junior standing in engineering.
- 418. Industrial Production II.** (2) I, II. Technical aspects of production materials and processes and their influence on production design. One hour rec. and three hours lab. a week. Pr.: I. E. 318.
- 426. 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.
- 436. Industrial Management.** (3) I. Basic functions in an industrial organization and their interrelationship; management considerations involving product, process, plant, and personnel. Three hours rec. a week. Pr.: Junior standing in engineering.
- 438. Industrial Engineering Techniques I.** (3) I, II. Motion and time study; process analysis; charting, curves and nomographs; schematic and physical models; photographic techniques. Two hours rec. and three hours lab. a week. Pr.: I. E. 318.
- 448. Industrial Engineering Techniques II.** (3) II. Mathematics in production problems; production alternatives; conceptual models; linear programming techniques; certainty and uncertainty models. Three hours rec. a week. Pr.: I. E. 318; Pr. or conc.: Math. 222 or 232.
- 458. Industrial Decisions.** (3) II. Application of mathematical models and quantitative techniques to industrial decision problems. Three hours rec. a week. Pr.: Junior standing in engineering. Not open for credit to industrial engineering majors.
- 506. Industrial Operations II.** (2) I. Engineering in the principal functional areas of modern industry. Two hours rec. a week. Pr.: I. E. 406.
- 518. Industrial Production III.** (3) II. Engineering design of jigs, fixtures, and dies; other tooling problems. Two hours rec. and three hours lab. a week. Pr.: I. E. 418; Pr. or conc.: Ap. M. 339.
- 537. Industrial Engineering Controls I.** (2) II. Principles, techniques and applications of production control and inventory control. Two hours rec. a week. Pr.: I. E. 438, 448.
- 538. Industrial Engineering Techniques III.** (2) I. The use of automatic mechanical-electrical machines in the solution of industrial engineering and industrial management problems. One hour rec. and three hours lab. a week. Pr.: Junior standing in engineering.
- 547. Industrial Engineering Analysis I.** (3) II. Objectives and methods of industrial engineering analysis and experimentation; evaluating alternatives in industrial decision making. Three hours rec. a week. Pr.: I. E. 538.
- 556. Industrial Operations III.** (2) I, II. Relationships of industrial engineering with intra-industry groups; unconventional industrial engineering activity. Two hours rec. a week. Pr.: I. E. 506.
- 655. Industrial Engineering Design I.** (3) I, II. Synthesis and design of the workplace; work methods, flow and facilities; systems and designs. One hour rec. and six hours lab. a week. Pr. or conc.: I. E. 637, 647.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 637. Industrial Engineering Controls II.** (3) I. Quantitative and qualitative controls required by manufacturing industries, with special emphasis on controlling the process and its cost factors. Three hours rec. a week. Pr.: I. E. 537, 538.
- 646. Standard Data Systems.** (3) I. Microscopic and macroscopic standard data systems; commercial versions; company-developed plans; uses, advantages and disadvantages; mathematical analysis of standard data systems. Three hours rec. a week. Pr.: I. E. 438, Stat. 610; Pr. or conc.: I. E. 655.
- 647. Industrial Engineering Analysis II.** (3) I. The systems concept for the industrial engineer; fundamentals of systems analysis and design; reliability. Three hours rec. a week. Pr.: I. E. 538, 547.
- 649. 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.: I. E. 339.

- 686. 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. 655.
- 695. Industrial Engineering Design II.** (3) I, II. Comprehensive design problems for an industrial enterprise; application of undergraduate industrial engineering sequence. One hour rec. and six hours lab. a week. Pr.: I. E. 655.
- 716. Problems in Industrial Engineering.** Credit arranged. I, II, S. Pr.: Senior standing in industrial engineering, approval of instructor and department head.
- 718. 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. 637, 647.
- 749. Advanced Metallurgy.** Credit arranged. II. Studies in specialized phases and current concepts of metallurgy. Pr.: I. E. 339.

FOR GRADUATE CREDIT

- 816. 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.
- 886. Quantitative Techniques in Industrial Engineering.** (3) I, II. 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. 448, 547, Stat. 610.
- 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 Department of Education, School 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 Department of Education.

MECHANICAL ENGINEERING

RALPH G. NEVINS,* *Head of Department*

Professors Brainard, Duncan,* Durland,* Flinner,* Nevins,* Tripp* and Wood; Associate Professors Appl,* Crank* and Lindholm;* Assistant Professors Gowdy, Messenheimer, Michaels, Miller and Sieh; Instructors Ball, Byers, Haky, Harri, Kent, Neely and Sauer*

For Curriculum, See Page 203

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 school'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.
- 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.
- 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 AND GRADUATE CREDIT

- 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; static 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.
- 525. Air Conditioning.** (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.
- 555. Machine Vibrations I.** (3) I, II. A general consideration of free and forced vibration in machines for various degrees of freedom; critical speed; vibration isolation. Three hours rec. a week. Pr.: M. E. 451, Math. 240 or equiv.
- 560. 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).
- 620. Internal Combustion Engines.** (3) II. Analysis of cycles, design and performance characteristics. Three hours rec. a week. Pr.: M. E. 511.
- 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.
- 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.

- 655. 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 co-ordinates, and non-linear forms. Three hours rec. a week. Pr.: M. E. 555.
- 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. Principles of the design and application of control devices; response and dynamics of control systems. Two hours rec. and three hours lab. a week. Pr.: E. E. 423, Math. 240 or equiv.
- 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.
- 818. Advanced Thermodynamics II.** (3) II. Cont. of Advanced Thermodynamics I. Three hours rec. a week. Pr.: M. E. 711.
- 820. Advanced Air Conditioning.** (2) I. Advanced psychrometric analysis; physiological factors; bio-technology and heat transfer. Two hours rec. a week. Pr.: M. E. 525.
- 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.

NUCLEAR ENGINEERING

WILLIAM R. KIMEL,* *Head of Department*

Professors Kimel and Mikhail;* Associate Professor Mingle;* Assistant Professors Bailie,* Clack and Fagan*

For Curriculum, See Page 204

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 Solid 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 other topics including 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 work leading to the degree Master of Science in Nuclear Engineering.

Applicants for this degree 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, a "PACE" electronic analog computer, a neutron howitzer, counting rooms, and radiochemistry laboratories. A new nuclear laboratory building to house a hundred thousand watt TRIGA MARK II reactor, with a pulsing capability to two hundred and fifty million watts, together with other expanding facilities, will be completed during the year 1962.

FOR UNDERGRADUATE CREDIT

205. Nuclear Reactor Materials I. (2) I. Essential principles of the properties of materials used in construction of nuclear reactors. Two hours rec. a week. Pr. or conc.: Chem. 230, 250.

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. 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 determinations of uses of tracers in industrial applications. Three hours rec. a week. Pr.: Phys. 311, Math. 240 or equiv.

450. Elements of Nuclear Engineering. (3) I. Introduction and scope of nuclear reactor engineering; a study of nuclear reactions and radiations; the utilization of nuclear reactors for power generation; introduction to reactor instrumentation, control, and shielding; the application of these concepts to various reactor types. Three hours rec. a week. Pr. or conc.: Phys. 560, Math. 240 or equiv.

605. Nuclear Reactor Materials II. (3) II. An extension of N. E. 205; deals with the nuclear properties and metallurgy of the fundamental parts of reactors. Three hours rec. a week. Pr.: N. E. 205 or consent of department.

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. 605.

611. Radioisotope Applications Engineering. (3) II. 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, 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.
- 690. Nuclear Reactor Technology II.** (4) II. Basic theory and problems associated with design, construction, and operation of reactors. Two hours rec. and six hours lab. a week, lab. involving subcritical reactor experiments. Pr.: N. E. 670.
- 700. Nuclear Reactor Shielding.** (3) II. A design course to provide an analytical approach to reactor shielding problems. Three hours rec. a week. Pr. or conc.: N. E. 705.
- 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. 690.
- 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. 690, Ch. E. 428.

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 master's 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. 690.
- 820. Control of Nuclear Reactor.** (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. 690, 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.
- 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.
- 890. Nuclear Engineering Colloquium.** (1) I, II. Presentation and discussion of progress reports on research, special problems, and outstanding publications in nuclear engineering and related fields. Pr.: Graduate standing in nuclear engineering.
- 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. 700, 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.

The Engineering Experiment Station

JOHN W. SHUPE, *Acting Dean*

LELAND S. HOBSON, *Director*

The Engineering Experiment Station 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 people of the state. Industrial assistance and related work previously performed in the Engineering Experiment Station are now the responsibility of the Division of Engineering and Industrial Services and are discussed under that heading in the following section of this catalog.

The research work carried on in 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. Research is extremely important to the economy and the security of our nation, and the Kansas Engineering Experiment Station is making every effort to contribute its share. The second objective is that it gives our graduate students, and in some cases undergraduate students, an opportunity to work in important fields of research. These students learn the techniques of research and at the same time expand their knowledge in their own fields of study. This opportunity to do original research is extremely important in the development of engineers. The third objective of research is to enhance the intellectual level of the school and its staff. The importance of research in professional engineering requires that all search is to enhance the intellectual level of the school and its staff. The importance of research in professional engineering requires that all first-rate engineering schools maintain substantial and comprehensive programs in research.

The staff of the Engineering Experiment Station is composed of members of the departments of the School of Engineering and Architecture and other departments of the University. Agricultural engineering research is administered through the Agricultural Experiment Station. Many of the projects are applied research directed toward specific problems and for the purpose of aiding the industrial development of the state. Projects undertaken for specific industrial concerns are financed by those concerns. Basic research projects, which are for the purpose of disclosing new technical knowledge of value to science and industry, may be financed in part by commercial organizations, by the federal government, or by the state. A substantial portion of the funds used by the Engineering Experiment Station is supplied to the University by legislative appropriation from the State of Kansas. A second major portion of the funds comes from special research projects undertaken for the federal government.

Interesting research projects now being carried on in the different departments of the Engineering Experiment Station are as follows:

- Radiant Heating and Cooling
- Downward Projection of Heated Air
- Heat Transfer from Condensing Freon in Horizontal and Inclined Tubes
- Effect of Sonic Vibrations on Mass Transfer
- Solvent Extraction Studies
- Determination of the Orbits of Artificial Satellites
- Investigation of the Fundamental Principles of Electronic Signal Recognition
- Field and Lab Investigations on Hot Mix Asphalt Concrete
- Solvents in Extractive Distillation
- Heat Transfer Through Air-conditioning Ducts
- Investigation of the Mechanism of Heat Transfer Inside Tubes
- Slowing-down Density and Diffusion of Neutrons in Moderators
- Study of Effect of Floor Temperature on Comfort

Heat Transfer Between a Flat Plate and a Pulsating, Impinging Jet
Oxidation of Molybdenum by X-ray Irradiation
Reactor Kinetics
Use of Radioisotopes to Measure the Dynamic Characteristics of
Fluidized Beds
A Parameter Study on Dose Rate, Gamma-ray Sources, as Applied
to Nuclear Reactor Shielding
Vibrational Characteristics of Sandwich Material
Wear Rate Determinations Using Radioactive Isotopes
Radiation Shape Factors
Fine-particle Studies Relating to Air Pollution
Research in Satellite Tracking
Experimental Stress Analysis by Photogrammetric Methods
Chemical Reactor Design
Fluidized Solid Particle Suspensions Under Restricted Expansion
Effect of Land Development Traffic on the Functioning Highway
Interchanges
Atomic Fall-out Shelters
Fundamental Vibration Frequency of a Tapered Plate
Even-order Approximations in Neutron Transport Theory
Straight-line Paths by Four-bar Linkages
Line Balancing
Conveyor Theory
Intervalometer
Use of Symbolic Logic in Plant Location

A complete list of the Engineering Experiment Station research projects and a brief description of each are published in a bulletin entitled, "Research Activities, 1961, Kansas Engineering Experiment Station." A copy of this bulletin will be sent free of charge to any citizen of Kansas or any prospective student of the University upon request by letter or postcard.

Division of Engineering and Industrial Services

JOHN W. SHUPE, *Acting Dean*

LELAND S. HOBSON, *Director*

The Division of Engineering and Industrial Services was established by the Board of Regents in order to coordinate and develop engineering and industrial services rendered by professional staff members of the School of Engineering and Architecture of Kansas State University to communities, engineering groups, industrial management groups, and industrial workers. The Division works in close cooperation with the Kansas Industrial Development Commission, 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. During the past year, many technical meetings and conferences were held on the campus by various departments in the School of Engineering and a continuing program of assistance to industry is carried on by members of the staff. Special attention is given to the technical and managerial problems of Kansas industry. Many persons interested in starting new industries call upon the Division of Engineering and Industrial Services' staff for assistance. Industries which are unable to maintain personnel experienced in the many areas of modern technology seek the counsel and advice of this Division. This assistance to the home industries of Kansas is materially aiding the industrial development of the state.

COMMUNITY PLANNING AND DEVELOPMENT

PROFESSOR DONALD D. WHITE

As more and more Kansas communities become aware of the need for concerted action to solve problems of community development, there is increasing public interest in city and regional planning. Many communities embarking on industrial development programs have found that the foundation for potential industrial growth lies in adequate planning for the future. Many industries will locate only in towns with active planning and zoning programs. Comprehensive planning for the physical development of cities and regions is recognized as an integral part of modern society. Kansas is making rapid strides to enable any community to participate in an active planning program.

In 1961, the various planning activities of the Division of Engineering and Industrial Services were brought together in the Center for Community Planning Services. This program is designed to foster public understanding of the planning process, to conduct basic research on planning problems, and to encourage the use of new planning techniques by professionals practicing in the field of community planning.

To lay the groundwork for basic public understanding of why planning is needed, how the community can go about planning, and what a community can expect from planning, a short course on community development has been created. At the request of a local governing body and usually in cooperation with civic groups, six sessions are devoted to discussing the Dynamics of Growth, Community Analysis, Comprehensive Planning, Urban Renewal, Financing Community Development, and Organizing for Planning. Public officials as well as citizens attending the sessions have a better understanding of how their community can receive the benefits of an effective planning program. In addition to organized courses, the University has published bulletins outlining basic procedures in planning and zoning. Professionally trained planners are

available to make talks before civic groups and local officials to explain the ways in which planning can help solve the pressing problems of a forward looking community. Presentations are based upon generally accepted planning principles but are especially adapted to apply to Kansas communities. Loose-leaf data sheets are available, giving basic information on population, housing, traffic, subdivision design and outlining various programs of financial assistance to communities for planning and urban renewal offered by the state and federal government.

Facilities of the Center can be utilized for basic research in planning techniques and developmental problems. Modern planning research uses the computer, for example. Advanced social concepts such as the visual effect of environment are related to planning. In the Center, the whole facilities of the University are available to solve planning problems.

To aid professionals practicing in planning and allied fields, conferences are held at which new concepts are explored. Experts have been brought to the campus to discuss, for example, the use of gravity models to simulate traffic flow in a community. Potential new programs that can be created through federal urban planning assistance programs have been discussed. As the flow of new information and techniques continues, additional conferences and short courses will be conducted.

Through the various activities of the Center for Community Planning Services, the public is made aware of the need for planning, the professional planner is better equipped to serve the community in solving planning problems, and the basic research that will lead to more effective planning programs is carried forward.

Complementing and closely related to the research and field service activities is the interdepartmental graduate program leading to the Master of Regional Planning Degree. Dr. Murlin Hodgell of the Department of Architecture and Allied Arts directs the program of training which is professionally recognized. In training professional planners to work with Kansas communities, practical experience is offered through internships where graduate students, under supervision, work with local communities on actual planning problems.

In all planning activities, the Center works closely with the planning division of the Kansas Industrial Development Commission, which is the official state planning agency for Kansas.

COMMUNITY INDUSTRIAL SURVEYS

PROFESSOR D. A. NESMITH

The Industrial Survey program of the Division of Engineering and Industrial Services has, since its inauguration in the fall of 1947, made a significant contribution to industrial development efforts in the state, with the completion of approximately 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. The cost to the community is modest, involving those out-of-pocket expenses incurred by the Division in preparing the reports.

In the larger communities, abstracts of the 100-page community surveys are prepared for distribution to industrial prospects. These abstracts, containing about 35 pages of highlights from the original report, have found use in a number of high schools in the cities which have been surveyed, where they are used as special reference material in classes in civics and history. The abstracts have also provided a practical

method for up-dating the surveys every few years. In addition, each year a 10- to 12-page compilation of new data, entitled "Survey Facts," is provided to each of the communities for which a survey has been prepared. These up-to-date statistics are helpful to the local group in keeping their data current.

Closely related to the survey program is the Industrial Clinic program, sponsored jointly by the Kansas State Chamber of Commerce, the Kansas Industrial Development Commission, and the Division of Engineering and Industrial Services. 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.

The School of Home Economics

DORETTA SCHLAPHOFF HOFFMAN,* *Dean*

RUTH HOEFLIN,* *Associate Dean*

MARGARET E. RAFFINGTON, *Assistant to the Dean*

The objective of the School 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 School 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 School 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 Demonstrating

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 School 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 Department 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. Home economics students with aptitudes and interests in radio and television may take their electives in this field. The electives may be selected so as to fulfill requirements in teaching in Kansas elementary schools.

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
Gn. St.	111	Man's Phys. World I	4	Chem.	191	El. Org. Chem. Lab.	2 or
Engl.	100	Engl. Comp. I	3	Gn. St.	112	Man's Phys. World II	4
Art	100	El. Des. 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 or	F. & N.	110	Foods I	5
F. Ec.	200	Family Finance	2	Ph. Ed.		Physical Education	0
Gn. H. E.	110	Intro. to H. E.	1				
Ph. Ed.		Physical Education	0				
Total				14 or 15	Total		
					15 or 16		

SOPHOMORE

Gn. St.	121	Biology I†*	4	Gn. St.	122	Biology II†*	4
Spch.	105	Oral Comm. I	2	Art	220	Cost. Des. I	2
F. Ec.	200	Family Finance	2 or	C. & T.	260	Textiles	3 or
C. & T.	131	Socio-economics of Clothing	2	C. & T.	210	Pattern Study	3
F. & N.	131	Intro. to Nutrition	2			Elective or option	7
		Elective or option	6				
Total				16	Total		
					16		

JUNIOR

Gn. St.	131	Introd. Soc. Sci. I*	4	Gn. St.	132	Introd. Soc. Sci. II*	4
Art	240	Interior Decoration I	2	F. C. Dev.	450	Family Health	3 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
		Elective or option	3			Elective or option	6 or 7
Gn. H. E.	030	H. E. Lect.	0				
Engl.	090	English Proficiency	0				
Total				15	Total		
					16		

SENIOR

Gn. St.	141	Intro. to Human. I*	4	Gn. St.	142	Intro. to Human. II*	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. After completing this curriculum and receiving the 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	Tailoring	3 or
Educ.	400	Educ. Psychology II	3	C. & T.	610	Flat Pattern Designing ..	3
Educ.	201	Prin. of Sec. Educ.	3	F. C. Dev.	320	The Preschool Child	3
Educ.	550	Methods of Tchg. H. E. ..	3	F. C. Dev.	350	Family Relationships	2
Educ.	477	Tchg. Part. in Sec. Sch. ..	5	F. Ec.	665	Home Management	2
Educ.	750	Curriculum in H. E.	3	F. Ec.	565	Home Management Lab. .	2
C. & T.	210	Pattern Study and		F. & N.	240	Foods II	3
		Garment Construction .	3	Phys.	115	Household Physics	4
Option Requirements							42
Electives							6
Curriculum Requirements							6
(Take Chem. 110 and 190, 191; F. C. Dev. 450; C. & T. 260; take F. & N. 400 in place of F. & N. 131.)							76
(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 second subject matter teaching fields.

Course				Sem. Hrs.	Course				Sem. Hrs.
Educ.	202	Educ. Psychology I	3	Educ.	750	Curriculum in H. E.	3 or		
Educ.	400	Educ. Psychology II	3			other suitable course			
Educ.	201	Prin. of Sec. Educ.	3			in education	3		
Educ.	550	Methods of Tchg. H. E. ..	3	F. C. Dev.	320	The Preschool Child	3		
Educ.	477	Tchg. Part. in Sec. Sch. .	5	F. C. Dev.	660	The Family	3		
				F. Ec.	665	Home Management	2		
						Elective in H. E.	9		
Option Requirements								37—37	
Electives, 6 hours of which must be in humanities or social science								27—25	
Curriculum Requirements								60—62	
(Omit if desired: Art 240; C. & T. 260; F. C. Dev. 250, 350, 450; F. Ec. 200, 320.)									
Total								124 124	

Option in Home Economics Extension Work

This option is designed for the student who wishes to become a county home economics agent. After completing requirements for the degree, including courses in this option, the student is prepared to join the Extension service for work in a county in Kansas or another state.

The State Home Economics Leader advises with the student who selects this option.

<i>Course</i>			<i>Sem. Hrs.</i>	<i>Course</i>			<i>Sem. Hrs.</i>
Educ.	550	Methods of Tchg. H. E. ..	3	F. C. Dev.	350	Family Relationships	2
Educ.	605	Exten. Organ. & Policies	3	F. Ec.	340	Household Equipment	2
Educ.	752	Exten. Teaching Meth. ..	3	F. Ec.	665	Home Management	2
Art	345	Home Furnishings	2	F. Ec.	565	Hone Management Lab. .	2
C. & T.	210	Pat. Study & Garment		F. Ec.	600	Families in Amer. Econ. .	3
		Construction	3	F. & N.	240	Foods II	3
F. C. Dev.	320	The Preschool Child	3				
Option Requirements							31
Electives, 6 hours of which must be in humanities or social science							21
Curriculum Requirements							72
(Take F. C. Dev. 450; C. & T. 260.)							
Total							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 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—18
Curriculum Requirements							71—74
Total							124 124

Option in Crafts (Art)

The option in crafts is for students who wish 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 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 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—20
Curriculum Requirements							71—74
Total							124 124

Option in Teaching Art in High School (Art)

This option includes courses in crafts, design, drawing, and appreciation of art. It 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	787	Problems in Tchg. Art	2
Art	200	Elementary Design II	2	Educ.	202	Educ. Psychology I	3
Art	260	Design in Crafts I	2	Educ.	400	Educ. Psychology II	3
Art	265	Ceramics I	2	Educ.	201	Prin. of Sec. Educ.	3
Art	290	Lettering	2	Educ.	550	Meth. of Tchg. H. E. .. 3 or	
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.	552	Tchg. Partic. in H. E. .. 5 or	
Art	560	Metal Crafts & Jewelry ..	2	Educ.	447	Tchg. Partic. in the	
Art	600	Advanced Design	2			Sec. School	5
Art	690	Survey of Art I	3			One other course in educ.	3
Art	695	Survey of Art II	3				
Option Requirements							48—48
Electives							5—2
Curriculum Requirements							71—74
(Omit: Electives in humanities and/or social science, 6 hours.)							
Total							124 124

Option in Costume Design (Art, C. & T.)

This option is planned to provide 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	320	Costume Design II	3			Garment Construction ..	3
Art	325	Fashion Life Sketching ..	2	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							27—27
Electives, 6 hours of which must be in humanities or social science							26—23
Curriculum Requirements (Take C. & T. 260.)							71—74
Total							124 124

Option in Clothing Retailing (C. & T.)

Courses provided to prepare the student for a career in retailing are combined with those providing a comprehensive background in home economics. Elective hours may include courses in radio and television in addition to those satisfying other interests of the student. Opportunities for those completing this option are found in department stores and specialty shops.

<i>Course</i>			<i>Sem. Hrs.</i>	<i>Course</i>			<i>Sem. Hrs.</i>
B. A.	170	Principles of Acctg.	3	Psych.	515	Personnel Psychology	3
B. A.	400	Administration	3	Psych.	505	Consumer Psychology	3
B. A.	440	Marketing	3	C. & T.	210	Pattern Study and	
B. A.	540	Retailing	3			Garment Construction .	3
Engl.	205	Business Letter Writing 3 or		Art	395	Window Display	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
				C. & T.	730	History of Costume	3
Option Requirements							36—36
Electives, 6 hours of which must be in humanities or social science							17—14
Curriculum Requirements							71—74
(Take Ec. So. 110, 220, and other substitutions in place of Gn. St. 131 and 132; 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 for those completing this option 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							20—19
Curriculum Requirements							73—74
(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.	635	Creative Expression		F. C. Dev.	615	Nursery School Procedure	3
		Preschool Child	3	F. C. Dev.	630	Devel. & Guid. of Youth	3
F. C. Dev.	320	The Preschool Child	3	F. C. Dev.	660	The Family	3
F. C. Dev.	350	Family Relationships	2	F. Ec.	665	Home Management	2
F. C. Dev.	605	Child Development	3			Approved courses in	
						Soc., Psych., Comm. ..	6
Option Requirements							28—28
Electives, 6 hours of which must be in humanities or social science							24—22
Curriculum Requirements							72—74
(Take F. C. Dev. 450.)							
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.

Option in Homemaking (F. Ec.)

Option in Family Economics and Finance (F. Ec.)**Option in Household Equipment, Housing, and Home Management (F. Ec.)**

The required courses are basic for all three areas. However, sufficient electives are allowed for further specialization: in **equipment** for those training to become demonstrators of household equipment; in **housing** for those interested in house planning, kitchen designing, or research in housing as it relates to family living; 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 man-

Option Requirements	32—32
Electives, 6 hours of which must be in humanities or social science	19—18
Curriculum Requirements	73—74
(Take Chem. 110, 190, and 191; Zool. 210 and Bact. 220 in place of Gn. St. 121 and 122.)	
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>
Gn. St.	141	Intro. to Human. I	4	Gn. St.	142	Intro. to Human. II	4
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-economics of	
		Elective*	7			Clothing	2
Ph. Ed.		Physical Education	0			Elective*	6
				Ph. Ed.		Physical Education	0
Total			15	Total			15

SOPHOMORE

Gn. St.	131	Intro. Soc. Sci. I	4	Gn. St.	132	Intro. Soc. Sci. II	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

Gn. St.	111	Man's Phys. World I	4	Gn. St.	112	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

Gn. St.	121	Biology I	4	Gn. St.		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. & Mkt. (3), Home Mgt. (2), Hshld. Equip. (2), other courses** (9).

E. General: Foods I (5), Home Mgt. (2), Home Mgt. 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

This curriculum is designed to meet the needs of students who wish to become dietitians or directors of food services in hospitals, college residence halls, school lunch rooms, cafeterias, and tea rooms. After graduation, students 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			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
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-economics of	
Ph. Ed.		Physical Education	0			Clothing	2
				F. & N.	131	Intro. to Nutrition	2
				Ph. Ed.		Physical Education	0
Total			16	Total			17

SOPHOMORE

Gn. St.	141	Intro. to Human. I	4	Gn. St.	142	Intro. to Human. II	4
Spch.	105	Oral Comm. I	2	A. H.	280	Meat Sel. & Util. H. E. ..	2
Zool.	200	Gen. Zoology	4	Ec. So.	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				
Total			15	Total			15

JUNIOR

Ec. So.	220	Intro. to Sociology	3	B. A.	430	Personnel Admin.	3 or
Phys.	115	Household Physics	4	B. A.	400	Administration	3 or
Ins. M.	600	Food Prod. Mgmt.	3	Psych.	515	Personnel Psychology	3
Ins. M.	620	Inst. Food Purch.	3	Biochem.	420	Gen. Biochemistry	5
		Elective	2	F. & N.	250	Dietetics	3
Gn. H. E.	030	H. E. Lect.	0	Ins. M.	630	Inst. Equipment	3
Engl.	090	English Proficiency	0			Elective	2
Total			15	Total			16

SENIOR

Bact.	220	Gen. Microbiology	4	F. C. Dev.	320	The Preschool Child	3
Educ.	551	Meth. of Tchg. for		F. & N.	711	Diet Therapy	2
		Diet. Students	3	Ins. M.	640	Org. and Mgmt. of	
F. & N.	706	Advanced Nutrition I	3			Food Services	3
F. & N.	605	Exp. Cookery	3	Ins. M.	645	Org. and Mgmt. of	
Gn. H. E.	030	H. 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

This curriculum is designed to help meet demands for qualified men and women for 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			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
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
Ec. So.	220	Intro. to Sociology	3	Spch.	105	Oral Comm. I	2
Ins. M.	110	Intro. to Rest. Mgmt.	1	F. & N.	110	Foods I	5
Ph. Ed.		Physical Education	0	Ph. Ed.		Physical Education	0
		Air or Military Science ..	1			Air or Military Science ..	1
Total			16	Total			16

SOPHOMORE

Ec. So.	220	Economics I	3	Gn. St.	122	Biology II	4
Gn. St.	121	Biology I	4	Gn. St.	142	Intro. to Human. II	4
Gn. St.	141	Intro. to Human. I	4	Art	100	Elementary Design I	2
F. & N.	240	Foods II	3	F. & N.	131	Intro. to Nutrition	2
		Air or Military Science ..	1	Ins. M.	200	Quan. Food Prep.	2
						Air or Military Science ..	1
Total			15	Total			15

JUNIOR

B. A.	272	Principles of Acctg.	5	B. A.	305	Managerial Acctg.	3
C. & T.	260	Textiles	3 or	B. A.	430	Personnel Admin.	3
F. C. Dev.	260	Family Relations	2 or	Bact.	200	Public Health Bact.	3
Art	240	Interior Decoration	2	Ins. M.	640	Org. and Mgmt. of	
A. H.	280	Meat Sel. & Util. H. E. ..	2			Food Services	3
Ins. M.	600	Food Prod. Mgmt.	3	Ins. M.	645	Org. and Mgmt. of	
Ins. M.	620	Inst. Food Purch.	3			Food Services Lab.	2
Engl.	090	English Proficiency	0			Elective	2
Total			15 or 16	Total			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 Mgmt.	3	Psych.	505	Consumer Psych.	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

This curriculum includes courses in the Department of Technical Journalism sufficient to make a major sequence. The student acquires insight into the whole field of home economics, and in the sophomore year chooses electives in some one area. This means that she comes to understand journalism as related to home economics, and in addition is prepared to handle material in her chosen area, as foods, child guidance, interior decoration, housing, or clothing and textiles.

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
Gn. St.	111	Man's Phys. World I	4	Chem.	191	El. Org. Chem.	2 or
Engl.	100	Engl. Comp. I	3	Gn. St.	112	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
Ph. Ed.		Physical Education	0	C. & T.	131	Socio-economics 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

Gn. St.	121	Biology I*	4	Gn. St.	122	Biology II	4
Gn. St.	131	Introd. Soc. Sci. I*	4	Gn. St.	132	Introd. Soc. Sci. II	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
Total			15 or 16	Journ.	050	Tech. Journ. Lect.	0
				Total			15 or 16

JUNIOR

Gn. St.	141	Intro. to Human. I	4	Gn. St.	142	Intro. to Human. II	4
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.	450	Family Health	3
F. Ec.	320	The House	3 or	Art	240	Interior Decoration I	2
F. Ec.	605	Consumers & the Mkt.	3	Journ.	330	Editing	2
Spch.	140	Radio Talk	2 or			Elective	5 or 6
Journ.	630	Publ. Infm. Methods	2	Journ.	050	Tech. Journ. Lect.	0
		Elective	4 or 5				
Gn. H. E.	030	H. E. Lect.	0				
Engl.	090	English Proficiency	0				
Total			16	Total			16

SENIOR

Journ.	355	Adver. Salesmanship	2 or	Journ.	615	Magazine Article Writ. ..	2
Journ.	320	Prin. of Advertising	3	Journ.	620	Inter. of Cont. Affairs	3
Journ.	610	The Home Page	3			Elective	10
Journ.	660	Journ. in a Free Society ..	3	Journ.	050	Tech. Journ. Lect.	0
		Elective	6 or 7				
Gn. H. E.	030	H. E. Lect.	0				
Total			15	Total			15

Number of hours required for graduation, 124.

* One course in General Studies may be deferred to junior year.

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 twenty-four 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.	5
Engl.	100	Engl. Comp. I	3			Chem.	5
F. C. Dev.	250	Human Relations	2	Engl.	120	Engl. Comp. II	3
F. & N.	110	Foods I	5	Psych.	110	Gen. Psychology	3
Gn. H. E.	110	Intro. to H. E.	1	Art	100	Elementary Design I	2
Ph. Ed.		Physical Education	0	C. & T.	131	Socio-economics of	
						Clothing	2
				F. Ec.	200	Family Finance	2
				Ph. Ed.		Physical Education	0
Total			16	Total			17

SUMMER SESSION

Zool.	210	Gen. Zoology	4
Ec. So.	220	Intro. to Sociology	3
Total			7

SOPHOMORE

Gn. St.	141	Intro. to Human. I	4	Gn. St.	142	Intro. to Human. II	4
C. & T.	260	Textiles	3	Bact.	220	Gen. Microbiology	4
Spch.	105	Oral Comm. I	2	F. C. Dev.	320	The Preschool Child	3
F. C. Dev.	350	Family Relationships	2			Elective in H. E.	6
F. & N.	131	Intro. to Nutrition	2	Engl.	090	English Proficiency	0
		Elective in H. E.	4				
Total			17	Total			17

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.	400	Educ. Psychology II	3
Zool.	240	Hum. Anat. and Physiol.	5
Total			8

After the student completes the second summer session she transfers to the Department of Nursing, University of Kansas School of Medicine, for twenty-four months.* A student qualifies for a Bachelor of Science Degree in Home Economics from Kansas State University on completion of fifteen 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.

ART

JOHN HANNAH, *Acting Head of Department*

Professor Barfoot, Associate Professors Garzio,* Harris,* Morris,* Assistant Professors Geiger,* Hannah* and Hill; Instructors Craigie and O'Shea; Emeritus: Associate Professor Kedzie*

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.
- 320. Costume Design II.** (3) II. Creative designing for the fashion figure. Sources 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

- 425. Costume Illustration.** (2) I, S. The current fashion figure, use of swipe files, fashion layout, and rendering for reproduction in line, wash, acid-tone. Pr.: Art 320.
- 490. Drawing III.** (2) II, S. Creative work in a variety of media. Individual needs of student given special attention. Pr.: Art 390.
- 560. Metal Crafts 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 painting. 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, Warden;* Associate Professors Cormany,* Howe,* Lienkaemper,* Skiles;* 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. Enrollment in this course based on the results of placement test.

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 Gn. St. 112.

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.: Gn. St. 132 or equiv.
- 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.: Gn. St. 142, Hist. 115, or equiv.
- 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*

Professors Kell and Stith; Associate Professor Womble;* Assistant Professor McCord; Instructor Niday; 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, col-

lege 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.

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. Additional charge for lunch.
- 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.
- 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

- 450. Family Health.** (3) I, II, S. Factors conducive to maintaining a high level of health for family members from the prenatal period through old age. Pr.: Junior standing or consent of instructor.

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.
- 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.

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 Professors Annis, Gartner;* Emeritus: Associate Professor Correll*

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 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 economics. 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.

320. The House. (3) I, II, S. A consideration of dwellings, their environments, 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. Selection, use, and care of certain furniture and equipment used in the home. 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 parallel: Gn. St. 132 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 or Gn. St. 132.

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. Fundamental principles underlying the operation and construction of certain household equipment; demonstration of the practical use of equipment. 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.

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

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

DOROTHY L. HARRISON, *Head of Department*

Professors Harrison, Goertz;* Associate Professors Alsup,* Browning,* Hunsader,* Tinklin,* Turner;* Assistant Professor Mullen;* Instructor Lambert; Emeritus: Professor Ascham; 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 stu-

dents 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 demonstration 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 organization 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 Gn. St. 112, 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, Gn. St. 122 or Zool. 425, Chem. 190, 191 or 350, 351, or Gn. St. 112.
- 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

- 400. Principles of Nutrition.** (4) I, II, S. Functions of various nutrients and their interrelationship in the body. Not open to foods and nutrition majors. Three hours rec. and two hours lab. a week. Pr.: F. & N. 240, Chem. 190, 191, or 350, 351, and Gn. St. 122, or Zool. 425.
- 405. Advances in Foods.** (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 Ec. So. 110, or Gn. St. 132.
- 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 Gn. St. 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, Hoffman;* Assistant Professors Barnes,* Raffington; Emeritus: Professors Justin and Kramer*

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 sixteen hours of credit. All plans must be approved in advance by the Dean of the School 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 School of Home Economics and the Department of Education. A student's program of graduate study includes ten to twenty hours of courses in several departments or areas of home economics and ten to twenty 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 School of Home Economics and in the Department 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 Organization 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 131. 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 School 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, Zeigler;* Assistant Professor Hemphill;* 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

110. Introduction to Restaurant Management. (1) I. An introduction to the field of commercial food service, including the development of the industry and a survey of its opportunities.

- 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.

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) 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

- 880. Seminar in Food Service Administration.** Credit arranged. II, 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.
- 980. Research in Institutional Management.** Credit arranged. I, II, S. Pr.: Consent of instructor.

The School 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 School 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 School 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 May 30.

Applicants must offer: (1) satisfactory evidence of completing the high school units required for admission to the pre-veterinary curriculum in the School 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 School 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 School of Veterinary Medicine, the veterinary school 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	\$ 80.00	\$235.00
2. Student Health	10.00	10.00
3. Student Union (building fund)	7.50	7.50
4. Student Activities (incl. Union operations)	16.50	16.50
Total for Veterinary Medical students	\$114.00	\$269.00

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 96.

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		
	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>
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.	655 Pharmacodynamics	3
Zool.	625 Ani. Parasitology	3	Path.	700 Ap. Vet. Parasit.	3
Surg.	655 Materia Medica	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		Surg.	770 Inf. Dis. of Lrg. Ani.	5
	Techniques	1	Path.	757 Poultry Hyg. and Dis.	3
B. A.	101 Fundamentals of Busi-		Path.	753 Food Hygiene and	
	ness for Profes-			Pub. Health II	4
	sional People	2	Surg.	730 Clinics IV	4
Path.	751 Food Hygiene and Pub.		Surg.	680 Dis. of Sm. Ani.	2
	Health I	3	Path.	795 Necropsy and Clinical	
Path.	740 Pathology IV	3		Path. Lab. II	0
Surg.	625 Lrg. Ani. Surg. II	4	Gn. V. M.	130 Jr.-Sr. Conf.	0
Surg.	720 Clinics III	4			
Path.	785 Necropsy and				
	Clinical Path.				
	Lab. I	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	Research in Anatomy	1 to 4 semester hours
Path.	645	Veterinary Mycology	3 semester hours
Path.	690	Veterinary Hematology	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.	665	Physiologic Constituents of Body Fluids	2 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

Professor Trotter; Assistant Professor Cummings; Instructor Adrian; 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

Professors Twiehaus, Kitzelman,* West,* Associate Professors Burroughs, Coles,* Folse,* Kelley,* Piper,* Assistant Professors Anthony* and Nelson; Instructors Milleret, Mussman* and Wren; Emeritus: Professor Roderick**

The Department of Pathology presents courses in histology, pathology, food hygiene and public health, histopathological technic, and research. Instruction is by lecture, recitation, laboratory work, and demonstrations with visual-aid equipment. Practical necropsy experience is gained each afternoon of the week in the laboratory. Instruction in clinical pathology is required of fourth-year students each afternoon of the week. Students obtain various specimens from clinical patients for blood, blood chemistry, urine, parasites, and pathological examinations as well as tissue sectioning.

Major work leading to the degree Master of Science is offered in Pathology and the Doctor of Philosophy degree is offered in Veterinary Medicine (Pathology).

Prerequisite to major work in this field is the completion of a four-year curriculum in veterinary medicine, including courses in anatomy, histology, physiology, bacteriology, and physiological chemistry.

The facilities of the department for advanced work include well-equipped lecture rooms and laboratories. Museum material (fresh and preserved specimens) for gross and microscopical studies is available as well as the opportunity for experimental work with animals on problems of infectious disease.

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. Staff.
- 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) II, 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, II, 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) I, 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.

PHYSIOLOGY

*Professor Underbjerg; * Assistant Professor Bowen; Instructors 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, and pharmacodynamics 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 School 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, with special emphasis 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 Physi. 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.

655. Pharmacodynamics. (3) II. The study of the dynamic action of substances (drugs) other than nutrients in the living structures. Substances to be studied will include chemicals used in the practice of

veterinary medicine. One hour rec. and six hours lab. 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 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

Professors Frick, Mosier* and Oberst;* Assistant Professors Catlin, Christensen, Larson, Noordsy and Oehme; Instructors Carnahan, Rhoades and Sharp; Emeritus: Professor Frank*

The Dykstra Veterinary Hospital is equipped with every modern appliance for surgical operations and treatment of animal diseases. The hospital has a capacity of more than 50 horses or cattle, and in addition it can accommodate 100 small animals, such as sheep, swine, cats, dogs, etc. Members of the clinical staff, accompanied by students, operate five ambulatory cars, and make trips at all times of the day and night into the surrounding country to diagnose and treat animal patients for all diseases affecting livestock and poultry.

In this way the student comes into contact daily with the diseases of animals and their treatment. More than 25,000 clinical cases a year are treated. Third- and fourth-year students are assigned regularly to in-patients and out-patients each afternoon of the week and are responsible for arriving at diagnosis, treatment, and keeping of accurate clinical data, all under the supervision of a staff member. During clinical hours knowledge is also gained in the restraint of animals, in the pathology observed in necropsies and in the clinical (pathological) laboratory tests and examinations required.

Fourth-year students are required to serve a two-weeks' internship in the veterinary hospital during which time they are responsible for the treatment of all in-patients and out-patients, and the proper conduct of managing a modern hospital. All third- and fourth-year students are regularly assigned in rotation during the year to various specialists of the clinical staff.

Major work leading to the degree Master of Science is offered in the Department of Surgery and Medicine. Prerequisite to graduate work in this department is the completion of a four-year curriculum substantially

equivalent to that required of students majoring in veterinary medicine at this University.

Opportunities for advanced work in this 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 and medicine.

COURSES IN SURGERY

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

- 655. Materia Medica.** (4) I. A detailed study of important drugs: their origin; properties and classification; their physiological actions, clinical administration, and dosage; metrology; prescription writing; pharmaceutical processes and pharmaceutical preparations. Four hours rec. a week. Pr.: Second-year standing in veterinary medicine.
- 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.: Surg. 655.

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. 655, 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. 655, 665, 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, 655, 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. 655, Surg. 655.

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*

A. L. HJORT, *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*

Professor Thomas; Associate Professors Burke, Dexter, Shankland and Warner; Assistant Professors Graham, Jones, Tennant and Unruh; Instructors Dierking, Norris, Peck and Titus

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 in-

formation 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.

RADIO AND TELEVISION EXTENSION

KENNETH E. THOMAS, *Head of Department*

*Professor Thomas; * Assistant Professors Burke, Jones; Instructors Norris, 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 schools 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 SPECIALISTS

WILLIAM G. AMSTEIN, *Head of Department*

Professors Amstein, Bieberly, Cleavinger, Coolidge and Lind; Associate Professors Baird, C. King, Moyer and Osburn; Assistant Professors Bonewitz, Gallaher, Gates, Halazon, Harper, R. King, McAdams, McReynolds, Overley, Parks, Raisch, Roberts, Schlender, Thomas, Treat and Wright; Instructors Bartlett, Begeman, Biswell, Edelblute, Frederick, Greene, Gronewaller, Guy, Hageman, Jacobs, McClelland, Means, Mullen, Parker, Slusher, Smerchek, Strickler, Trayer, Weiner, Westmeyer, Wilkins and Wills; Emeritus: Professor Elling

This department includes 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 EXTENSION

JOHN M. FERGUSON, *Head of Department*

Professors Ferguson, Stover; Associate Professors Herpich, Wendling; Assistant Professors Brosz, Schindler and Selby; Instructor Fitzgerald

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 government 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, *Head of Department*

Professor Coppersmith; Associate Professors Whitehair and Wilkowske; Assistant Professors Jackson, Trieb and Walker; Instructors Baker, Baugher and McDonald

The Department of Marketing and Utilization of Agricultural Products was separated in 1961 from the Department of Agricultural Specialists. The department is 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*

*Professor Baird; * Associate Professors Ellithorpe, Johnson, Koenig, Self, Wiggins; Assistant Professors Apel, Atkinson, Briggs, Brill, Dickinson, Hawes, Kubler, Lang, Lester, Pass, Starkey; Emeritus: Professors Allen, Myers, 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. It evolves through community and committee meetings and includes 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*

Professor Regnier; Associate Professors Bussset, Hanna; Assistant Professors Anderson, Bates, Eyestone, Honstead, 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*

*Professor Ringler; * Assistant Professor Bevins; * Instructors Barkley, Cram, 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, * Teagarden; Associate Professors Glover, Hagans, Trent; Assistant Professors Blankenhagen, Cox, Dodrill, Hendershot, Hoss, McGaugh, Sughrue, Wells; Instructor Hofmeyer; Emeritus: Professors Baird, Blecha, Jaccard; Associate Professor 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 to plan and conduct an extension program in agriculture, home economics and 4-H Club work among the people of each county.

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*

Professors Beard and Verhaalen;* Assistant Professors Averill,* Borton, Ferguson, Kitchens, Miller and Mordy; Instructors Gorton, McCullick and Sherman; 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 SERVICES

The Office of Community 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, and
4. cultural improvement through programs such as the Kansas Rural-Urban Art Program and Music Education.

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 college 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. Overall 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 School 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.

Fee and refund policy. (a) Fees for college credit courses, resident or non-resident, are \$10.00 per semester hour for undergraduate credit and \$12.00 per semester hour for graduate credit; fees for non-credit adult education courses are variable. (b) The refund policy for Evening College and Extension Classes is as follows:

College credit classes:

1. 100 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.

Non-credit classes:

1. 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 demonstration.

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, Acctg. 300, or equiv.)

CAR 3. Drawing Fundamentals I. (2) The fundamentals of drawing for non-professional students. Three hours of studio and three hours by arrangement with the instructor a week. Not to be taken for credit by students enrolled in 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 twenty 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 a student would be likely to need 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 two years 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 two years, he may not submit more than eight assignments in one week. This means, then, that the student cannot complete a three-hour college credit course or a high school credit course in less than three weeks, a two-hour college credit course in less than two weeks, or a one-hour college credit course in less than one week.

College Credit. Credits earned from college courses taken through this department can be applied toward an undergraduate degree at Kansas 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.

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 school 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 \$8.00 per credit hour
2. High school courses \$12.00 per $\frac{1}{2}$ unit course

B. For non-residents:

1. College courses \$9.00 per credit hour
2. High school courses \$15.00 per $\frac{1}{2}$ 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. 25 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 after six months but before the end of one year from the date of enrollment, and before one-third of the assignments have been submitted.
4. No refund or transfer will be made if application for withdrawal is received after one year has 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 all students a list of textbooks used in home study courses, their prices, and the firms from which they can be obtained.

Examinations. All credit courses require final examinations. The examination may be taken any Saturday morning, or by special arrangement on other days, 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.

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.

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 the 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 14, Minnesota, 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.

School 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. 200 (General Botany) or Gn. St. 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

- 205. Elements of Horticulture.** (2) An introductory course in the general principles of plant growing, with emphasis on plants of horticultural interest. Pr.: Bot. 200 (General Botany) or Gn. St. 121 (Biology I).
- CH 2. Vegetable Gardening.** (2) A study of vegetable growing from the standpoint of home production, especially Kansas gardening.
- 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.

School of Arts and Sciences

BUSINESS ADMINISTRATION

- 270. Accounting I.** (3) An introduction to accounting principles, financial statements, special journals, controlling accounts, and basic accounting for partnerships and corporations.
- 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.
- 325. Business Law I.** (3) Contracts.
- 326. Business Law II.** (3) Agencies, partnerships, corporations.
- 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) and junior standing.
- 500. 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).

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.
- CS 4. Community Leadership.** (2) Principles and techniques of leadership; personal qualities of leaders; practical application of these elements to community organizations.

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 sophomore standing.
- 474. Methods of Teaching in Elementary Schools.** (3) Fundamentals of teaching all subjects commonly taught in the elementary grades; lesson planning and teaching procedures. Pr.: Psych. 100 (General Psychology).
- 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. 201 (Principles of Secondary Education) 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.: Educ. 201 (Principles of Secondary Education) or Educ. 200 (Principles of Elementary Education).
- 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.
- 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, POLITICAL SCIENCE, AND PHILOSOPHY

- 115. Civilization I.** (3) Civilization of the world to 1650, with emphasis on Western civilization.
- 130. Civilization II.** (3) Civilization of the world since 1650, with emphasis on Western civilization.
- 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.
- 170. United States Since 1865.** (3) The significant forces, movements, and personalities in the development of American life since 1865.
- 220. American Government I.** (3) National and state government, with emphasis upon Constitutional principles and basic structure.
- 690. Latin American Nations.** (3) Economic, political, social, and cultural development in Latin American republics. Pr.: Three hours of American history or junior standing.
- CHC 1. Community Civics.** (2) Study and problems of local, county, and state governments.

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.
- 442. 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

- 075. 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.

PHYSICAL EDUCATION

- CPE 1. Personal Hygiene.** (2) Course to meet the state requirement for certification of grade school teachers. No exact equivalent in residence; but in combination with Physical Education CPE 2 is equiv. to Ph. Ed. 355 (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. 355 (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.

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.

School of Engineering and Architecture

AGRICULTURAL ENGINEERING

- CE 3. Tractor Operation and Maintenance.** (2) Principles of the internal combustion engine, carburetion, valve timing, ignition, cooling, lubrication, and fuels; servicing and repair of farm engines and selection of power for agriculture.

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), Math. 232 (Calculus II), or conc.: Math. 222 (Analytical Geometry and Calculus III).

ELECTRICAL ENGINEERING

- 395. Basic Electrical Engineering.** (4) Fundamentals of electric, magnetic, and electrostatic currents. Pr. or conc.: Phys. 311 (Engineering Physics II), Math. 222 (Analytical Geometry and Calculus III), or Math. 231 (Calculus II).

INDUSTRIAL ENGINEERING AND INDUSTRIAL ARTS

- 339. Metals and Alloys.** (2) The manufacture and use of iron, steel, copper, aluminum, and their alloys. Pr. or conc.: 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), Math. 075 (Solid Geometry), or equiv.
- 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), Math. 110 (Solid Geometry), or equiv.
- 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).

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	1/2
PCA	2. Elementary Agriculture II	1/2

COMMERCE

PCM	7. Bookkeeping I	1/2
PCM	8. Bookkeeping II	1/2

DRAWING

PCD	3. Shop Mechanical Drawing I	1/2
PCD	4. Shop Mechanical Drawing II	1/2

ENGLISH

PCE	1C. Grammar and Composition (first semester, first year)	1/2
PCE	2L. Literature (second semester, first year)	1/2
PCE	3C. Composition (first semester, second year)	1/2
PCE	4L. Literature (second semester, second year)	1/2
PCE	5C. Composition (first semester, third year)	1/2
PCE	6L. Literature (second semester, third year)	1/2
PCE	7C. Composition (first semester, fourth year)	1/2
PCE	8L. Literature (second semester, fourth year)	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 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	1/2
PCM	2. Algebra II	1/2
PCM	3. Algebra III	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. The home study courses of this department are available to students on a **non-credit** basis regardless of their previous academic experience.

The department also offers four courses which are available for non-credit only.

NC 1. Cooperative Bookkeeping I. 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 establishment and operation of day care centers, co-operative nursery groups, play groups, or nursery schools. 24 assignments. \$25.00, exclusive of textbooks.

OFFICE OF TECHNICAL SPECIAL SERVICES

The Department of Continuing Education also carries on specialized services, financed cooperatively with other state or private agencies; one such program is the Rural Electric Job Training and Safety Program.

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

- *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.
- BLACK, ELLYN MARIE, Instructor, University Library (1957, 1958). B. S., 1938, Kansas State Teachers College of Emporia.
- BURKES, JOANNE, Residence Hall Director; Instructor (1961). B. A., 1958, University of Oklahoma.
- CAMP, MILDRED, Assistant Professor, Emeritus, University Library (1927, 1955). A. B., 1912, Eureka College; B. L. S., 1924, University of Illinois.
- *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.
- DODGE, THEODORE O., Assistant Professor, Budget Officer (1946, 1957). B. S., 1940, Kansas State University; C. P. A., Kansas.
- EDWARDS, AUBREY THORNTON, Director of Housing; Associate Professor of Psychology (1945, 1949). B. S., 1941, M. S., 1946, Kansas State University.
- FADENRECHT, GEORGE H., Associate Professor, Associate Director of Libraries (1953, 1956, 1962). A. B., 1947, Tabor College; M. A., 1949, University of Kansas, M. A. L. S., 1953, University of Michigan.
- FORD, KENNEY LEE, Associate Alumni Secretary (1928). B. S., 1924, M. S., 1932, Kansas State University.
- FRIESEN, WALTER S., Counselor, Counseling Center; Instructor in Psychology (1961). A. B., 1953, Tabor College; M. S., 1957, Kansas State Teachers 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 FORNEY, Professor; Administrative Assistant in charge of the 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.
- HENDRIX, JR., CLAUDE A., Physician, Student Health Center (1961). A. B., Franklin College; M. D., University of Louisville School of Medicine.
- 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; Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1925, 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.
- HYSLIP, CAROL E., Instructor, University Library (1962). B. A., 1961, Colorado State College; M. A., 1961, University of Denver.
- JUBELT, HILBERT P., Director, Student Health Center; Physician (1961). B. S., 1941, University of Illinois; M. D., 1943, University of Illinois College of Medicine.
- KADHIM, ESTELLE BEVERLY, Instructor, University Library (1960). A. B., 1955, M. S. in L. S., 1959, University of Illinois.
- KENNEDY, CARROLL EARL, Counselor, Counseling Center; Assistant Professor of Psychology (1954). A. B., 1949, Wheaton College; M. S., 1953, Kansas State University.
- KENNEDY, HAROLD W., Director, Aids and Awards Office (1961). B. S., 1949, Colorado State University; M. S., 1962, Kansas State University.
- 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.
- KING, JACK A., Assistant Director, Student Health Center; Physician (1961). M. D., 1939, University of Arkansas.
- KOTTNER, LOREN V., Director, Kansas State Union (1955). B. A., 1942, Nebraska Wesleyan University; M. A., 1958, New York University.
- *KRAUS, JOE W., Professor, Director of Libraries (1961). A. B., 1938, Culver-Stockton College; B. S. in L. S., 1939, M. A., 1941, Ph. D., 1960, University of Illinois.
- 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.
- LAUGHLIN, J. BRUCE, Assistant Director of Placement (1962). B. S., 1950, University of Kansas, M. S., 1961, Kansas State University.

- LAYMON, JACK D., Program Director, Kansas State Union (1961). B. A., 1937, Manhattan Bible College; M. A., 1961, Kansas State University.
- MACHIR, JESSIE McDOWELL, Registrar, Emeritus (1913, 1914).
- 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.
- 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.
- PATON, BERNICE HARRIETT, Assistant Professor, University Library (1947). B. A., 1925, University of Oklahoma; B. S. in L. S., 1932, Columbia University; M. A., 1944, University of Michigan.
- PEINE, CAROLINE F., Assistant Dean of Women; Instructor (1961). A. B., 1947, Carleton College; M. S., 1951, Kansas State University.
- PERRY, RALPH H., Comptroller (1946, 1953). B. S., 1946, Kansas State University.
- PETERS, CHESTER E., Director, Placement Center; Associate Professor (1953). B. S., 1947, M. S., 1950, Kansas State University; Ph. D., 1953, University of Wisconsin.
- PROUTY, JR., H. STEPHEN, Director of Records, Office of Admissions and Records (1961, 1962). B. S., 1957, M. S., 1960, Kansas State University.
- *PUGSLEY, ALBERT LEROY, Dean of Academic Administration; Professor of Structural Engineering (1943, 1951). 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.
- RAMSAY, JAMES ROBERT, Health Physicist, Student Health Center; Associate Professor (1960). B. S., 1952, Pennsylvania State University; M. D., 1956, University of Pennsylvania School of Medicine.
- 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.
- ROBERTS, MARY EILLEN, Assistant Professor, University Library (1938, 1943). B. S., 1930, Kansas State University; B. S. in L. S., 1938, University of Illinois; A. M., 1949, University of Michigan.
- ROCHAT, CARL ROBERT, Director of News Bureau; Associate Professor of Journalism (1953, 1954). B. S., 1940, Kansas State University; M. S., 1948, University of Illinois.
- SCHMIDT, ALICE ANN, Instructor, University Library (1959). B. A., 1955, College of Emporia; M. S. in L. S., 1959, Western Reserve University.
- SIGG, ROBERT J., Instructor; Assistant to the Dean, Office of Admissions and Records (1959). B. S., 1953, M. S., 1958, Kansas State University.
- 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, WALTER D., Assistant Director, Kansas State Union (1957). B. A., 1950, Kansas Wesleyan University.
- STEHLEY, DONALD R., Field Alumni Secretary (1961). B. S., 1950, Kansas State University.
- STONE, LEROY A., Assistant Director, Counseling Center; Assistant Professor of Psychology (1962). A. B., 1953, M. A., 1954, San Jose State College; Ph. D., 1962, University of North Dakota.
- SWAIM, ROLAND Q., Assistant Professor; Director, Placement Center (1957, 1962). B. S., 1935, Kansas State Teachers College of Emporia; M. S., 1950, Kansas State University; Ed. D., 1962, University of Wisconsin.
- THOMAS, JR., CLARENCE W., Residence Hall Director; Instructor (1955). B. S., 1951, M. S., 1952, Kansas State University.
- THOMPSON, WILMA M., Residence Hall Director; Instructor (1960). B. S., 1960, Colorado State College.
- *TREMME, WILLIAM C., Director, Student Religious Activities; Associate Professor of Philosophy (1956, 1959). A. B., 1940, Denver University; Th. M., 1945, Th. D., 1950, Iliff 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.
- *WEBER, ARTHUR D., Vice President (1924, 1952, 1962). 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.
- WILDY, CHARLES H., Assistant Dean of Students; Assistant Professor (1960). B. S., 1953, M. S., 1956, Southern Illinois University; Ed. D., 1960, Indiana University.
- WILKINSON, D. E., Physician, Student Health Center (1961). B. S., University of Nebraska; M. D., University of Nebraska.
- WILLIAMS, JANE P., Instructor, University Library (1960). A. B., 1949, Westminster College; M. A., 1954, George Peabody College.

School 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.
- 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.
- *BASSETTE, RICHARD, Assistant Professor of Dairy Science; Assistant Dairy Scientist, Agr. Exp. Sta. (1958). 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.
- *BELL, FLOYD W., Professor of Animal Husbandry, Emeritus (1918, 1958). B. S., 1911, Cornell University.
- BEVINS, ROBERT J., Assistant Professor of Agricultural Economics; Assistant Economist, Agr. Exp. Sta. (1961). B. S., 1949, M. S., 1955, University of Tennessee; Ph. D., 1960, Michigan State 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.
- *BORTFELD, CHARLES F., Associate Professor of Agricultural Economics; Associate Economist, Agr. Exp. Sta. (1948). B. S., 1937, M. A., 1939, University of Nebraska; Ph. D., 1958, University of Minnesota.
- 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.
- *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., Instructor; Assistant Animal Husbandman, Fort Hays Branch Agr. Exp. Sta. (1957). B. S., 1955, Kansas State University; M. S., 1956, Oklahoma State University.
- *BURKHARD, RAYMOND KENNETH, Associate Professor of Biochemistry; Associate Biochemist, Agr. Exp. Sta. (1950, 1957). A. B., 1947, Arizona State College; Ph. D., 1950, Northwestern University.
- 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 J., Instructor in Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1949, 1955). B. S., 1948, M. S., 1949, Ph. D., 1962, Kansas State University.
- *CHEPIL, WILLIAM STEVEN, Professor of Agronomy; Agronomist, U. S. D. A. (1948). B. S., 1930, M. S., 1932, University of Saskatchewan (Canada); Ph. D., 1940, University of Minnesota.
- 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.
- 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.
- DAVIDSON, FLOYD E., Professor and Superintendent in charge, Mound Valley Branch Agr. Exp. Sta. (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.
- DAVIS, CHESTER P., Associate Agricultural Engineer, U. S. D. A., Heat Pump Experiments (1954). B. S., 1942, Oklahoma State University; M. S., 1949, Purdue University.
- *DeDEURWAERDER, CHARLES A., Assistant Professor of Landscape Architecture; Landscape Architect, Agr. Exp. Sta. (1961). B. S., 1953, M. L. A., 1957, University of Massachusetts.
- 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.
- DEYOE, CHARLES W., Assistant Professor of Flour and Feed Milling Industries; Agr. Exp. Sta. (1962). B. S., 1955, Kansas State University; M. S., 1957, Ph. D., 1959, Texas A. and M. College.
- DODGE, GILBERT R., Assistant Professor and Administrative Assistant, Agr. Exp. Sta. (1958). B. S., 1950, Kansas State University; C. P. A., 1957, Kansas.
- *DOWNE, AYLWARD E. R., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1961). B. S., 1952, University of Alberta; M. A., 1954, Ph. D., 1961, Queen's University.
- DRAKE, CALVIN L., Instructor in Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1962). B. S., 1955, Kansas State University; M. S., 1959, University of Arkansas.
- DUITSMAN, W. WILLIAM, Associate Professor and Superintendent in charge, Fort Hays Branch Agr. Exp. Sta. (1941, 1952). B. S., 1940, Kansas State University.
- *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.
- *ELLIS, JR., ROSCOE, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1948, 1960). B. S., 1948, M. S., 1950, Kansas State University; Ph. D., 1952, University of Wisconsin.
- *ELZINGA, RICHARD J., Assistant Professor of Entomology, Assistant Entomologist, Agr. Exp. Sta. (1961). B. S., 1955, M. S., 1956, Ph. D., 1960, University of Utah.
- ERHART, ANDREW B., Professor and Superintendent in charge, Garden City Branch Agr. Exp. Sta. (1931, 1952). B. S., 1933, Kansas State University.
- ESHBAUGH, ELBERT L., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1945, 1952). B. S., 1936, M. S., 1951, Kansas State University.
- FARMER, EARL L., Assistant Professor of Dairy Science; Assistant in Dairy Improvement, Agr. Exp. Sta. (1949). B. S., 1948, University of Missouri; M. S., 1957, Kansas State University.
- *FARRELL, EUGENE PATRICK, Associate Professor of Flour and Feed Milling Industries; Milling Technologist, Agr. Exp. Sta. (1949, 1954). B. S., 1935, M. S., 1952, Kansas State University.
- *FARRELL, FRANCIS DAVID, President, Emeritus (1918, 1943). B. S., 1907, Utah State Agricultural College; Agr. D., 1925, University of Nebraska; LL. D., 1943, Washburn Municipal University.
- *FILINGER, GEORGE A., Professor of Horticulture; Pomologist, Agr. Exp. Sta. (1931, 1946). B. S., 1924, M. S., 1925, Kansas State University; Ph. D., 1931, Ohio State University.
- FORD, ROBERT N., Assistant Professor, Assistant Agronomist, Mound Valley Agr. Exp. Sta. (1960, 1961). B. S., 1948, M. S., 1952, Texas A & M College.
- FOWLER, WAYNE L., Assistant Professor of Agronomy; Secretary, Kansas Crop Improvement Association (1954). B. S., 1951, M. S., 1953, Kansas State University.

- *FRY, JACK L., Assistant Professor of Poultry Science, Assistant Poultry Scientist, Agr. Exp. Sta. (1959, 1960). B. S., 1952, M. S., 1956, Oklahoma State University; Ph. D., 1959, Purdue University.
- *GAWIENOWSKI, ANTHONY M., Assistant Professor of Biochemistry; Assistant Biochemist, Agr. Exp. Sta. (1957). B. S., 1948, Villanova University; M. S., 1953, Ph. D., 1956, University of Missouri.
- GEHRT, AL J., Administrative Assistant, U. S. D. A., Agricultural Research Service (1958).
- *GIESEMAN, RAYMOND W., Assistant Professor of Agricultural Economics; Assistant Agricultural Economist, Agr. Exp. Sta. (1960). B. S., 1955, Kansas State University; M. S., 1956, Michigan State University; Ph. D., 1960, North Carolina State College.
- *GOOD, DON L., Professor of Animal Husbandry; Animal Husbandman, Agr. Exp. Sta. (1947, 1961). B. S., 1947, Ohio State University; M. S., 1950, Kansas State University; Ph. D., 1956, University of Minnesota.
- GRAVES, ALBERT H., Agricultural Engineer, U. S. D. A., Handling and Storage of Grain, Agr. Exp. Sta. (1956). B. S., 1950, Kansas State University.
- *GREIG, JR., JAMES K., Associate Professor of Horticulture; Associate Olericulturist, Agr. Exp. Sta. (1952, 1961). B. S., 1949, M. S., 1950, University of Arkansas; Ph. D., 1960, Kansas State University.
- GWIN, JR., ROY E., Instructor; Assistant Agronomist, Tribune Branch Agr. Exp. Sta. (1957, 1958). B. S., 1943, Kansas State University.
- HACKEROTT, HAROLD LEROY, Assistant Professor; Assistant Agronomist, Fort Hays Branch Agr. Exp. Sta. (1954). B. S., 1945, M. S., 1946, Kansas State University.
- HADLE, FRED BENTON, Assistant Professor of Horticulture; Assistant Pomologist, Agr. Exp. Sta. (1951). B. S., 1951, M. S., 1958, Kansas State University.
- HADLEY, RALPH G., Agricultural Aide, U. S. D. A., Agricultural Research Service (1959).
- *HALL, CHARLES V., Associate Professor of Horticulture; Associate Olericulturist, Agr. Exp. Sta. (1953, 1961). B. S., 1950, M. S., 1953, University of Arkansas; Ph. D., 1960, Kansas State University.
- *HALL, JOSEPH LOWE, Associate Professor of Biochemistry; Associate Biochemist, Agr. Exp. Sta. (1922, 1949). B. S., 1919, M. S., 1921, Ph. D., 1922, University of Illinois.
- HARRIS, WALLACE W., Assistant Professor; Assistant Agronomist, Colby Branch Agr. Exp. Sta. (1954, 1955). B. S., 1951, M. S., 1954, Kansas State University.
- HARVEY, T. L., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1954, 1957). B. S., 1950, M. S., 1951, Kansas State University.
- HERRON, GEORGE M., Instructor; Assistant in Soils, Garden City Branch Agr. Exp. Sta. (1956). B. S., 1949, M. S., 1950, Oklahoma State University.
- *HEYNE, ELMER GEORGE, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1936, 1947). B. S., 1935, University of Nebraska; M. S., 1938, Kansas State University; Ph. D., 1952, University of Minnesota.
- HILLMAN, RICHARD M., Instructor in Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1962). B. S. 1959, Texas Technological College.
- *HOBBS, JAMES A., Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1950, 1958). B. S., 1935, M. S., 1940, University of Manitoba (Winnipeg); Ph. D., 1948, Purdue University.
- *HODGES, JULIAN ADAIR, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1923, 1941). B. S., 1917, M. S., 1923, University of Kentucky; A. M., 1938, Ph. D., 1938, Harvard University.
- *HOOVER, LEO MICHAEL, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1947, 1959). B. S., 1940, Kansas State University; M. S., 1941, Iowa State University; Ph. D., 1954, Harvard University.
- *HOPKINS, THEODORE L., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1960). B. S., 1951; M. S., 1952, Oregon State College.
- HOSENEY, RUSSELL C., Analytical Chemist, U. S. D. A., Agricultural Research Service (1956). B. S., 1957, Kansas State University.
- *HUSTON, KEITH, Associate Professor of Dairy Science; Associate Dairy Scientist, Agr. Exp. Sta. (1954). B. S., 1949, M. S., 1950, Ph. D., 1951, University of Wisconsin.
- *JACOBS, HYDE S., Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1957, 1961). B. S. A., 1952, M. S., 1953, University of Idaho; Ph. D., 1957, Michigan State University.
- *JOHNSON, JOHN A., Professor of Flour and Feed Milling Industries; Associate in Milling and Baking Research, Agr. Exp. Sta. (1940, 1955). B. S., 1940, North Dakota Agricultural College; M. S., 1942, Kansas State University; Ph. D., 1954, University of Minnesota.
- JONES, ELMER T., Associate Entomologist, U. S. D. A., (1934). B. S., 1924, M. S., 1925, University of Missouri.
- KAHRS, AMOS J., Instructor in Poultry Science; Assistant Poultry Scientist, Agr. Exp. Sta. (1956, 1958). B. S., 1953, Kansas State University.
- KAUFFELD, NORBERT M., Instructor in Entomology; Assistant Entomologist, Agr. Exp. Sta. (1962). B. S., 1949, M. S., 1949, Kansas State University.
- *KEEN, RAY A., Professor of Horticulture; Associate Ornamental Horticulturist, Agr. Exp. Sta. (1947, 1956). B. S., 1942, Kansas State University; M. S., 1947, Ph. D., 1956, Ohio State University.
- *KELLEY, PAUL LEO, Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1943, 1957). B. S., 1943, M. S., 1946, Kansas State University; Ph. D., 1956, Iowa State University.
- KLINE, GERALD L., Agricultural Engineer, U. S. D. A., Off Farm Conditioning, Handling and Storage of Grain, Agr. Exp. Sta. (1954). B. S., 1943, M. S., 1946, Iowa State University.

- *KNIGHT, DALE A., Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1948, 1957). B. S., 1945, Kansas State University; M. S., 1946, Cornell University; A. M., 1948, Ph. D., 1952, University of Chicago.
- *KNUTSON, HERBERT, Professor; Head, Department of Entomology; Entomologist in charge, Agr. Exp. Sta. (1953). A. B., 1936, Iowa Wesleyan College; M. S., 1937, Southern Methodist University; Ph. D., 1941, University of Minnesota.
- *KOCH, BERL A., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1956, 1961). B. S., 1949, Iowa State University; M. S., 1951, Cornell University; Ph. D., 1955, University of California.
- *KOUDELE, JOSEPH WENDELL, Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1947, 1958). B. S., 1943, University of Nebraska; M. S., 1947, University of Minnesota; Ph. D., 1956, Michigan State University.
- KROFF, DONALD HARRIS, Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1962). B. S., 1952, University of Wisconsin; M. S., 1953, University of Florida; Ph. D., 1956, University of Wisconsin.
- *LAUDE, HILMER HENRY, Professor of Agronomy, Emeritus (1911, 1958). B. S., 1911, Kansas State University; M. S., 1918, Texas A & M College; Ph. D., 1930, University of Chicago.
- LAUNCHBAUGH, JR., JOHN L., Associate Professor; Associate Agronomist, Fort Hays Branch Agr. Exp. Sta. (1955). A. B., 1947, M. S., 1948, Fort Hays Kansas State College; Ph. D., 1952, Texas A & M College.
- LAWLESS, JOHN R., Instructor; Assistant Agronomist, Colby Branch Agr. Exp. Sta. (1960). B. S., 1958, University of Nebraska; M. S., 1960, Washington State University.
- *LINKO, PEKKA, Assistant Professor; Assistant in Flour and Feed Milling Industries, Agr. Exp. Sta. (1957, 1958). M. S., 1953, Ph. D., 1960, University of Helsinki.
- LIVERS, RONALD W., Associate Professor; Associate Agronomist, Fort Hays Branch Agr. Exp. Sta. (1962). B. S., 1948, M. S., 1949, Kansas State University; Ph. D., 1957, University of Minnesota.
- LUNDQUIST, MARVIN CARL, Instructor in Agronomy; Assistant Agronomist, Sandyland Experiment Fields (1951, 1956). B. S., 1950, M. S., 1952, Kansas State University.
- *MACKINTOSH, DAVID LESLIE, Professor of Animal Husbandry; Animal Husbandman, Agr. Exp. Sta. (1921, 1947). B. S., 1920, University of Minnesota; M. S., 1925, Kansas State University.
- *MacMASTERS, MAJEL M., Professor of Flour and Feed Milling Industries; Cereal Chemist, Agr. Exp. Sta. (1960). B. S., 1926, M. S., 1928, Ph. D., 1934, University of Massachusetts.
- *MADER, ERNEST LEE, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1948). B. S., 1936, M. S., 1944, Oklahoma State University; Ph. D., 1948, University of Nebraska.
- *MANUEL, MILTON LLOYD, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1945, 1959). B. S., 1941, M. S., 1948, Kansas State University; Ph. D., 1952, University of Minnesota.
- *MARION, GERMAIN BERNARD, Associate Professor of Dairy Science; Associate Dairy Scientist, Agr. Exp. Sta. (1953). B. S., 1948, Cornell University; M. S., 1951, Ph. D., 1951, University of Wisconsin.
- *MARTIN, WILLARD HUNGATE, Professor of Dairy Science; Dairy Husbandman, Agr. Exp. Sta. (1925, 1928). B. S., 1918, Purdue University; M. S., 1922, Pennsylvania State University.
- *McCAMPBELL, CHARLES WILBUR, Professor, Emeritus; Head, Department of Animal Husbandry, Emeritus (1910, 1952). B. S., 1902, D. V. M., 1910, B. S. A., 1918, Kansas State University.
- McCORMICK, DEWEY Z., Assistant Professor of Animal Husbandry; Foreign Agricultural Programs (1960). B. S., 1921, Kansas State University.
- *McCOY, JOHN HENRY, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1940, 1960). B. S., 1940, M. S., 1942, Kansas State University; Ph. D., 1955, University of Wisconsin.
- McKEE, R. MILES, Instructor in Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1959). B. S., 1951, Kansas State University.
- *McKINNEY, RAYMOND D., Assistant Professor of Agricultural Economics; Assistant Agricultural Economist, Agr. Exp. Sta. (1954, 1956). B. S., 1950, University of Nebraska; M. P. A., 1954, Harvard University.
- MENZIES, CARL STEPHEN, Assistant Professor of Animal Husbandry, Assistant Animal Husbandman, Agr. Exp. Sta. (1954, 1958). B. S., 1954, Texas Technological College; M. S., 1956, Kansas State University.
- MICHEEL, CHARLES C., Agricultural Economist, U. S. D. A., Agricultural Research Service, Production Economics Research Branch (1954). B. S., 1946, M. S., 1949, South Dakota State College.
- MICKELSEN, ROSS, Instructor in Dairy Science; Assistant Dairy Scientist, Agr. Exp. Sta. (1957). B. S., 1953, M. S., 1957, Utah State University.
- MILLER, DONALD, Instructor in Flour and Feed Milling Industries (1953, 1958).
- *MILLER, GERALD DALE, Assistant Professor of Flour and Feed Milling Industries; Assistant Cereal Chemist, Agr. Exp. Sta. (1946, 1947). B. S., 1924, University of Nebraska; M. S., 1953, Kansas State University.
- *MITCHELL, HOWARD LEE, Professor; Head, Department of Biochemistry; Biochemist in charge, Agr. Exp. Sta. (1946, 1961). B. S., 1938, Oklahoma State University; Ph. D., 1946, Purdue University.

- *MONTGOMERY, GEORGE, Professor of Agricultural Economics (on leave) (1925, 1947). B. S., 1925, M. S., 1927, Kansas State University; Ph. D., 1954, University of Minnesota.
- MOORE, WALTER ASHTON, Assistant Professor of Agronomy; Assistant Agronomist, South Central Kansas Experiment Fields (1943, 1951). B. S., 1944, Kansas State University.
- MORIN, ROBERT, Instructor in Agronomy; Assistant Agronomist, North Central Kansas Experiment Fields (1961). B. S., 1959, M. S., 1961, Kansas State University.
- MOWRY, GEORGE R., Agricultural Engineer, U. S. D. A., Heat Pump Experiment (1959). B. S., 1941, Pennsylvania State University.
- MULLEN, CLYDE WILLIAM, Assistant Dean Emeritus (1937, 1961). B. S., 1915, Oklahoma State University; M. S., 1917, Kansas State University.
- NAUHEIM, CHARLES W., Agricultural Economist, U. S. D. A., Agricultural Research Service, Production Economics Research Branch (1954). B. S., 1932, M. S., 1934, Kansas State University.
- NELSON, JOHN M., Assistant Professor, Garden City Branch Agr. Exp. Sta. (1962). B. S., 1960, M. S., 1961, University of Arizona.
- *NORDIN, JOHN A., Professor; Head, Department of Agricultural Economics; Agricultural Economist in charge, Agr. Exp. Sta. (1961). B. A., 1935, M. A., 1937, Ph. D., 1941, University of Minnesota.
- *NORDIN, PHILIP, Assistant Professor of Biochemistry; Assistant Biochemist, Agr. Exp. Sta. (1954). B. S., 1949, M. S., 1950, University of Saskatchewan (Canada); Ph. D., 1953, Iowa State University.
- *NORTON, CHARLES L., Professor; Head, Department of Dairy Science, Dairy Scientist in charge, Agr. Exp. Sta. (1958). B. S., 1940, University of Illinois; Ph. D., 1944, Cornell University.
- NOSSAMAN, NORMAN L., Instructor, Assistant Agronomist, Garden City Branch Agr. Exp. Sta. (1961). B. S., 1953, M. S., 1957, Oklahoma State University.
- *OLSON, RAYMOND V., Professor; Head, Department of Agronomy; Agronomist in charge, Agr. Exp. Sta. (1947, 1952). A. S., 1939, North Dakota School of Forestry; B. S., 1941, North Dakota State College; M. S., 1942, Ph. D., 1947, University of Wisconsin.
- *ORAZEM, FRANK, Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1956, 1960). Cand. Rer. Pol., Dr. Rer. Pol., 1947, Karl Franzen University (Graz, Austria); M. S., 1953, Kansas State University; Ph. D., 1956, Iowa State University.
- *OTTO, MERTON L., Associate Professor of Agricultural Economics; Foreign Agricultural Programs, Agr. Exp. Sta. (1939, 1947). B. S., 1921, M. S., 1942, Kansas State University.
- OVERLEY, CARL BENJAMIN, Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1946, 1947). B. S., 1946, Kansas State University.
- *PAINTER, REGINALD HENRY, Professor of Entomology; Entomologist, Agr. Exp. Sta. (1926, 1941). B. A., 1922, M. A., 1924, University of Texas; Ph. D., 1926, Ohio State University.
- *PARKER, RALPH LANGLEY, Professor of Entomology, Emeritus (1925, 1958). B. S., 1915, University of Rhode Island; Sc. M., 1917, Brown University; M. S., 1922, Iowa State University; Ph. D., 1925, Cornell University.
- *PARRISH, DONALD BAKER, Professor of Chemistry; Associate Biochemist and Nutritionist, Agr. Exp. Sta. (1943, 1952). B. S., 1935, M. S., 1938, Ph. D., 1949, Kansas State University.
- *PAULI, ARLAND WALTER, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1951, 1961). B. S., 1951, University of Missouri; M. S., 1952, Ph. D., 1957, Kansas State University.
- *PAYNE, LOYAL FREDERICK, Professor of Poultry Science, Emeritus (1921, 1961). B. S., 1912, Oklahoma State University; M. S., 1925, Kansas State University.
- *PERKINS, ALFRED THOMAS, Professor of Biochemistry; Biochemist in charge of Chemistry Service Lab., Agr. Exp. Sta. (1925, 1938). B. S., 1920, Pennsylvania State University; M. S., 1922; Ph. D., 1923, Rutgers University.
- PETERS, LEROY, Survey Entomologist (Kansas Entomological Commission) (1958). B. S., 1955, M. S., 1956, Kansas State University.
- PETERSON, VERLIN HOWARD, Assistant Professor of Agronomy; Assistant Agronomist, Southeast Kansas Experiment Fields (1948, 1954). B. S., 1948, M. S., 1949, Kansas State University.
- *PFOST, HARRY B., Professor of Flour and Feed Milling Industries; Feed Technologist, Agr. Exp. Sta. (1959). B. S., 1940, University of Missouri; M. S., 1948, Alabama Polytechnic Institute; Ph. D., 1959, Michigan State University.
- PHILLIPS, WILLIAM M., Assistant Professor; Associate Agronomist, Weed Investigations, Field Crops Research Branch, ARS, U. S. D. A., Fort Hays Branch Agr. Exp. Sta. (1952). B. S., 1947, M. S., 1949, Kansas State University.
- *PICKETT, WILLIAM F., Professor of Horticulture; Campus Co-ordinator, Foreign Agricultural Programs, Agr. Exp. Sta. (1918, 1960). B. S., 1917, M. S., 1923, Kansas State University; Ph. D., 1935, Michigan State University.
- *PINE, WILFRED HAROLD, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1934, 1949). B. S., 1934, M. S., 1938, Kansas State University; Ph. D., 1948, University of Minnesota.
- *PITTENGER, THAD H., Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1959). B. S., 1947, Ph. D., 1951, University of Nebraska.
- PITTS, CHARLES W., Instructor in Entomology (1962). B. S., 1960, Mississippi State; M. S., 1962, Kansas State University.

- POMERANZ, YESHAJAHU, Associate Professor of Flour and Feed Milling Industries; Research Technologist, U. S. D. A., Agr. Exp. Sta. (1962). B. S., 1944, Israeli Institute of Technology; Ph. D., 1962, Kansas State University.
- *QUINLAN, LEON REED, Professor of Landscape Architecture; Ornamental Horticulturist and Landscape Architect, Agr. Exp. Sta. (1927, 1931). B. S., 1921, Colorado State University; M. L. A., 1925, Harvard University.
- RANEY, ROBERT J., Instructor in Agronomy; Assistant Agronomist, Irrigation Experiment Field (1953, 1955). B. S., 1952, M. S., 1954, Kansas State University.
- REED, CHARLES E., Instructor in Agricultural Economics (1962). B. S., 1947, Kansas State University; M. S., 1954, University of Kansas.
- *RETTENMEYER, CARL WILLIAM, Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1960). A. B., 1953, Swarthmore College; Ph. D., 1960, University of Kansas.
- *RICHARDSON, DRAYTFORD, Professor of Animal Husbandry; Animal Nutritionist, Agr. Exp. Sta. (1951). B. S., 1938, Clemson Agricultural College; M. S., 1950, Ph. D., 1951, Iowa State University.
- *ROAN, CLIFFORD C., Professor of Entomology; Entomologist, Agr. Exp. Sta. (1954, 1958). B. S., 1941, M. S., 1947, Ph. D., 1950, University of Illinois.
- ROTH, PAUL L., Instructor in Horticulture; Assistant Forester, Agr. Exp. Sta. (1955). B. S., 1951, M. S., 1955, Purdue University.
- *RULIFFSON, WILLARD S., Associate Professor of Biochemistry; Assistant Biochemist, Agr. Exp. Sta. (1953). B. S., 1940, Buena Vista College; M. S., 1948, Ph. D., 1953, State University of Iowa.
- RUSS, OLIVER GEORGE, Assistant Professor of Agronomy; Assistant Agronomist, Bindweed Experiment Field (1949, 1956). B. S., 1950, M. S., 1953, Kansas State University.
- *SANFORD, PAUL EVERETT, Professor of Poultry Science; Poultry Nutritionist, Agr. Exp. Sta. (1949, 1960). B. S., 1941, Kansas State University; M. S., 1942, Ph. D., 1949, Iowa State University.
- *SCHRUBEN, LEONARD WILLIAM, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1949, 1951). B. S., 1939, Kansas State University; M. S., 1940, University of Illinois; M. P. A., 1948, M. A., 1949, Ph. D., 1949, Harvard University.
- *SHELLENBERGER, JOHN A., Professor; Head, Department of Flour and Feed Milling Industries; Cereal Chemist in charge, Agr. Exp. Sta. (1944, 1945). B. S., 1928, University of Washington; M. S., 1930, Kansas State University; Ph. D., 1934, University of Minnesota.
- SIDDOWAY, FRANCIS H., Soil Scientist, U. S. D. A., Wind Erosion (1958). B. S., 1947, M. S., 1951, University of Idaho.
- *SJO, JOHN B., Associate Professor of Agricultural Economics; Associate Economist, Agr. Exp. Sta. (1948, 1961). B. S., 1949, M. S., 1952, Kansas State University; Ph. D., 1960, Michigan State University.
- SLOAN, ROBERT F., Assistant Professor of Agronomy; Assistant Agronomist, North Central Kansas Agricultural Experiment Fields (1936, 1951). B. S., 1938, M. S., 1941, Kansas State University.
- *SMITH, EDGAR FITZHUGH, Professor of Animal Husbandry; Animal Husbandman, Agr. Exp. Sta. (1946, 1961). B. S., 1941, Texas A & M College; M. S., 1947, Kansas State University; Ph. D., 1956, Texas A & M College.
- *SMITH, FLOYD W., Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1946, 1950). B. S., 1942, Kansas State University; M. S., 1946, Ph. D., 1949, Michigan State University.
- SMITH, LEWIS T., Assistant Professor of Poultry Science; Assistant Poultry Scientist, Agr. Exp. Sta. (1961). B. S., 1950, University of Rhode Island; M. S., 1953, North Carolina State College.
- SMITH, RICHARD M., Assistant Professor of Agronomy; Research Soil Scientist, U. S. D. A. (1962). A. B., 1934, A. M., 1935, University of Missouri; Ph. D., 1940, Ohio State University.
- *SMITH, ROGER CLETUS, Professor of Horticulture, Emeritus (1920, 1958). A. B., 1911, Miami University; A. M., 1915, Ohio State University; Ph. D., 1917, Cornell University.
- *SMITH, WALTER H., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1948, 1950). B. S., 1943, M. S., 1949, Kansas State University.
- SNELLING, KENNETH W., Assistant Professor; Assistant Agronomist, Garden City Branch Agr. Exp. Sta. (1962). B. A., 1955, Wayland Baptist College; M. S., 1957, Oklahoma State University.
- SOMSEN, HAROLD W., Entomologist, U. S. D. A. (1948). B. S., 1948, M. S., 1950, North Dakota Agricultural College.
- *SORENSEN, EDGAR LAVELL, Assistant Professor; Research Agronomist, U. S. D. A., (1955). B. S., 1941, M. S., 1952, Utah Agricultural College; Ph. D., 1955, University of Wisconsin.
- SORENSEN, LEONARD ORLO, Assistant Professor of Agricultural Economics; Assistant Agricultural Economist, Agr. Exp. Sta. (1955). B. A., 1951, M. S., 1953, University of Minnesota.
- *SPIES, HAROLD G., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1959). B. S., 1956, Oklahoma State University; M. S., 1957, Ph. D., 1959, University of Wisconsin.
- STEGMEIER, WILLIAM D., Instructor; Assistant in Soils, Garden City Branch Agr. Exp. Sta. (1958). B. S., 1956, M. S., 1959, Colorado State University.
- *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.

- SWALLOW, CLARENCE W., Instructor in Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1954). B. S., 1951, M. S., 1955, Kansas State University.
- *THOMPSON, HUGH E., Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1956). 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.
- *TSIEN, WEI S., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1958, 1961). B. S., 1944, National Central University (China); M. S., 1954, Iowa State University; Ph. D., 1956, University of Minnesota.
- 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; Biochemist, Agr. Exp. Sta. (1929, 1957). B. A., 1913, University of Nebraska; M. S., 1917, University of Chicago; Ph. D., 1925, University of Nebraska.
- WHITNEY, KEITH, Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1958). B. S., 1956, M. S., 1958, Ph. D., 1962, Kansas State University.
- *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., Assistant Professor; Assistant Dairy Husbandman, Mound Valley Agr. Exp. Sta. (1959). 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.
- WITHEE, LAURESTON VAN, Instructor in Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1953, 1956). B. S., 1947, Kansas State University; M. S., 1952, University of Nebraska.
- 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.

School 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., Instructor in English (1962). B. A., 1952, M. A., 1957, Ph. D., 1962, University of Wisconsin.
- *ADAMS, MARJORIE, Assistant Dean; Associate Professor of English (1954, 1960). B. A., 1941, Louisiana Polytechnic; M. A., 1948, Ph. D., 1951, University of Texas.
- *AGAN, RAYMOND JOHN, Associate Professor of Education (1958). B. S., 1940, M. S., 1950, Iowa State University; Ed. D., 1955, University of Missouri.
- *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.
- *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.
- *ANSDALL, 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.
- ARENDT, BILLY D., Instructor in Mathematics (1962). B. S., 1960, M. S., 1962, Iowa State University.

- *ASKEW, MELVIN WAYNE, Assistant Professor of English (1957, 1959). B. A., 1949, M. A., 1950, Ph. D., 1957, University of Oklahoma.
- 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.
- 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.
- *BAKER, HARRY LEIGH, Professor of Education (1946, 1951). 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.
- *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.
- BARKER, NEAL HAYNES, Instructor in Military Science (1959). B. S., 1927, Harvard 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.
- BARRETT, ERNIE D., Administrative Assistant (1958). B. S., 1951, M. S., 1956, Kansas State University.
- BARTEL, MONROE H., Instructor in Zoology (1962). B. A., 1958, Tabor College; M. S., 1960, 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.
- *BAXTER, LAURA FALKENRICH, Associate Professor of Education, Emerita (1927, 1941). B. S., 1915, M. S., 1930, Kansas State 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.
- *BERLAND, ALWYN, Associate Professor of English (1953, 1959). M. A., 1948, University of Chicago; M. Litt. (Cantab), 1953, University of Cambridge (England).
- *BEVAN, WILLIAM, Professor; Head, Department of Psychology (1959). A. B., 1942, Franklin & Marshall College; M. A., 1943, Ph. D., 1947, Duke University.
- *BILLINGS, ARTHUR GOODYN, Temporary Associate Professor of Economics (1960). A. B., 1933, University of Kansas; M. A., 1941, Ph. D., 1952, Harvard 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.
- BOYLE, TED, Instructor in English (1962). B. S., 1955, M. A., 1959, Ph. D., 1962, University of Nebraska.
- *BRACKEN, CHARLES, Assistant Professor of Education (1960). A. B., 1948, M. A., 1949, East Carolina College; Ed. D., 1960, Duke University.
- BRACKETT, WILLIAM RAYMOND, Associate Professor of Physics, Emeritus (1919, 1955). B. A., 1905, University of Colorado.
- *BRADLEY, HOWARD RALEY, Assistant Professor of Education (1951). B. S., 1930, M. S., 1937, Kansas State University.
- BRAINARD, EDWARD A., Assistant Professor of Education (1962). B. S., 1953, St. Cloud Teachers College; A. M., 1957, Ed. D., 1961, Colorado State College.
- *BRANDT, WARREN W., Associate Dean, Professor; Head, Department of Chemistry (1961). B. S., 1944, Michigan State University; Ph. D., 1949, University of Illinois.
- *BRAZELTON, WILLIAM ROBERT, Assistant Professor of Economics (1961). B. A., 1956, Dartmouth College; M. A., 1960, Ph. D., 1961, University of Oklahoma.
- BROWDER, LEWIS E., Instructor in Botany; 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.
- *BUNTON, NORMA D., Professor; Head, Department of Speech (1954, 1960). B. S., 1939, Southwest Texas State Teachers College; M. Ed., 1947, University of Texas; Ph. D., 1954, State University of Iowa.
- CALDWELL, WALLACE FORD, Instructor in Political Science (1961). A. B., 1956, Washington State University; M. A., 1961, University of Washington.
- CAMPOS, FRANK, Instructor in Military Science (1961).
- *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.
- *CHADDHA, ROSHAN L., Assistant Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1960). B. S., 1953, M. S., 1955, Agra University; Ph. D., 1960, Virginia Polytechnic Institute.
- *CHAPIN, ERNEST KNIGHT, Associate Professor of Physics (1923, 1932). A. B., 1918, M. S., 1923, University of Michigan.
- *CHELIKOWSKY, JOSEPH RUDOLPH, Professor; Head, Department of Geology and Geography (1937, 1955). B. A., 1931, M. A., 1932, Ph. D., 1935, Cornell University.
- CHILLMAN, DAWES, Instructor in English (1962). B. A., 1955, Tufts University; M. A., 1960, Ph. D., 1962, University of Texas.
- 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, ROBERT H., Assistant Professor of Political Science (1962). A. B., 1958, DePauw University; M. A., 1960, Ph. D., 1962, Princeton University.
- CLARK, WILLIAM KLINE, Instructor in Geology (1949, 1956). B. S., 1947, University of Notre Dame; M. S., 1950, Kansas State University.
- CLEARY, ELIZABETH, Instructor in Speech (1961). B. S., 1934, Boston University; M. A., 1961, Kansas State University.
- COHEN, PETER Z., Instructor in English (1961). B. S., 1953, M. A., 1961, University of Wyoming.
- *CONOVER, ROBERT WARREN, Professor of English, Emeritus (1915, 1954). B. A., 1911, M. A., 1914, Wesleyan University.
- *CONROW, KENNETH, Assistant Professor of Chemistry (1961). B. A., 1954, Swarthmore College; Ph. D., 1957, University of Illinois.
- COOK, PHIL ALEXANDER, Assistant Professor of Education (1960). B. A., 1948, Southwestern State College; M. A., 1951, Colorado State College of Education; Ed. D., 1962, 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.
- COY, MALCOLM LEE, Assistant Professor of Military Science (1959). B. A., 1948, State University of Iowa; M. A., 1949, University of Iowa; The Armored Officers Advanced Course.
- 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.
- *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, Assistant Professor of Social Sciences (1946, 1949). B. S., 1928, M. S., 1940, Kansas State University.
- CRAWFORD, NAOMI Z., Instructor in Chemistry (1922, 1953). B. S., 1919, M.S., 1922, University of Nebraska.
- *CURNUTTE, JR., BASIL, Associate Professor of Physics; Associate Physicist, Agr. Exp. Sta. (1954, 1955). B. S., 1945, U. S. Naval Academy; Ph. D., 1953, Ohio State University.
- *DAKIN, RALPH EUGENE, Associate Professor of Sociology; Sociologist, Agr. Exp. Sta. (1948, 1959). 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, Michigan State University.
- DAVES, WALTER F., Assistant Professor of Psychology (1962). A. B., 1957, M. A., 1959, Emory University.
- *DAVIDSON, ALLEN PARK, Professor of Education, Emeritus (1919, 1958). B. S., 1914, M. S., 1925, Kansas State University.
- *DAVIS, EARLE ROSCO, Professor; Head, Department of English (1949, 1950). A. B., 1927, B. M., 1929, Monmouth College; M. A., 1928, University of Illinois; Ph. D., 1935, Princeton University.
- *DeCOU, DONALD FRANK, Associate Professor of Economics (1947). B. S., 1929, Kansas State Teachers College (Pittsburg); M. B. A., 1934, Northwestern 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.
- DENNING, DENNIS F., Instructor in Speech (1959). B. S., 1951, M. S., 1956, Kansas State Teachers College (Emporia).
- DeWEESE, PAUL F., Assistant Professor of Technical Journalism (1948, 1953). B. S., 1947, Kansas State University.
- *DICKERSON, OTTIE J., Assistant Professor of Botany; Nematologist, Agr. Exp. Sta. (1961). A. S., 1953, Arkansas Polytechnic College; B. S. A., 1955, M. S., 1956, University of Arkansas; Ph. D., 1961, University of Wisconsin.

- DISSINGER, EDWARD R., Assistant Football Coach (1959). B. S., 1936, Baker University; M. A., 1961, Kansas State University.
- *DOHERTY, JR., WILLIAM THOMAS, Professor of History (1961). A. B., 1943, B. S., 1943, Southeast Missouri State College; M. A., 1947, American University; Ph. D., 1951, University of Missouri.
- DONER, JR., JAMES IAN, Instructor in Military Science (1960). B. S., 1959, University of Maryland.
- DOTY, ROBERT W., Instructor in Physics (1961). B. S., 1954, Eureka College; M. A., 1960, University of Missouri.
- 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.
- *DRAGSDORF, RUSSELL DEAN, Professor of Physics; Physicist, Agr. Exp. Sta. (1948, 1956). S. B., 1944, Ph. D., 1948, Massachusetts Institute of Technology.
- *DRUMRIGHT, RUSSEL GRANT, Assistant Professor of Education (1956). B. S., 1943, Oklahoma State University; M. Ed., 1949, University of Colorado; Ph. D., 1956, University of Oklahoma.
- 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.
- *EDMUNDS, LEON K., Assistant Professor of Botany; Plant Pathologist, U. S. D. A., Agr. Exp. Sta. (1960). B. S., 1953, Ph. D., 1958, University of Wisconsin.
- *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.
- *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.
- *ELMER, OTTO HERMAN, Professor of Botany, Emeritus (1927, 1961). B. S., 1911, M. S., 1917, Oregon State College; Ph. D., 1924, Iowa State University.
- EMERSON, M. JARVIN, Assistant Professor of Economics (1962). B. A., 1957, Luther College; M. A., 1960, 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, Instructor in Modern Languages (1960). B. A., 1952, M. A., 1953, University of Nebraska.
- 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.
- *FARRELL, FRANCIS DAVID, President; 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., Associate Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1953, 1957). B. S., 1946, University of Minnesota; M. S., 1948, University of Iowa; Ph. D., 1952, Iowa State University.
- *FINA, LOUIS R., Assistant Professor of Bacteriology; Microbiologist, Agr. Exp. Sta. (1954). 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, Assistant Professor of Mathematics (1961). 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.
- 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.
- *GAITO, JOHN, Associate Professor of Psychology (1961). A. B., 1951, University of Pennsylvania; A. M., 1952, Temple University; Ph. D., 1959, University of Pennsylvania.
- *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.
- *GLENN, ESTHER BEACHEL, Assistant Professor of English (1948, 1954). A. B., 1930, Kansas Wesleyan University; M. S., 1952, Kansas State University.
- GOEDECKE, WALTER R., Assistant Professor of Philosophy (1962). A. B., 1946, M. A., 1952, University of Chicago; M. A., 1954, Harvard University; Ph. D., 1958, University of Chicago.
- *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.
- GOPLEN, ARMAN DUANE, Instructor in Mathematics (1961). B. S., 1956, M. S., 1959, University of North Dakota.
- *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, FINIS McCRADY, Professor; Head, Department of Education (1948, 1952). B. S., 1922, Kansas State Teachers College (Pittsburg); M. S., 1929, University of Kansas; Ed. D., 1949, University of Colorado.
- GREEN, RALPH EMERSON, Instructor in Physics (1961). B. S., 1939, Tri-State College; M. S., 1954, University of Alabama.
- GREENE, EARL FRANKLIN, Associate Professor of Military Science (1960). B. S., 1959, University of Maryland; The Artillery Officers' Advanced Course.
- GROSECLOSE, B. CLARK, Assistant Professor of Physics (1962). B. S., 1955, Emory and Henry College; M. A., 1957, Ph. D., 1959, University of Virginia.
- *GRUENDER, C. DAVID, Assistant Professor of Philosophy (1957, 1961). A. B., 1950, Antioch College; M. A., 1952, University of Chicago; Ph. D., 1957, University of Wisconsin.
- *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.
- *HAGEN, BEATRICE L., Temporary Associate Professor of Mathematics (1960). A. B., 1920, University of Kansas; M. A., 1926, Ph. D., 1930, University of Chicago.
- HAILEY, ROBERT L., Assistant Football Coach (1960). B. S., 1951, M. A., 1959, University of Missouri.
- *HAJDA, JOSEPH, Associate Professor of Political Science (1957, 1960). B. Pol. Sci., 1948, Technical School of Political and Social Sciences (Czechoslovakia); A. B., 1951, M. A., 1952, Miami University; Ph. D., 1954, Indiana University.
- *HALL, GEORGE L., Associate Professor of Physics (1960). B. S., 1949, William and Mary College; M. S., 1951, Syracuse University; Ph. D., 1956, University of Virginia.
- *HALL, LAWRENCE FENOR, Associate Professor of Education (1926, 1941). B. S., 1923, M. S., 1927, Kansas State University.
- *HAMMAKER, ROBERT M., Assistant Professor of Chemistry (1961). B. S., 1956, Trinity College; Ph. D., 1960, Northwestern University.
- HANNAH, ELAINE, Temporary 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, Associate Professor of Zoology; Associate Parasitologist, Agr. Exp. Sta. (1950, 1951). B. A., 1939, M. A., 1941, University of Minnesota; Ph. D., 1948, University of Nebraska.

- *HANSING, EARL DAHL, Professor of Botany; Plant Pathologist, Agr. Exp. Sta. (1935, 1947). B. S., 1933, University of Minnesota; M. S., 1937, Kansas State University; Ph. D., 1941, Cornell University.
- *HARDBECK, GEORGE WILLIAM, Associate Professor of Economics (1961). B. S., 1954, M. S., 1956, Ph. D., 1958, University of Illinois.
- HARDER, DUANE, Instructor in Mathematics (1962). B. A., 1960, Bethany Nazarene College; M. S., 1962, Kansas State University.
- HARLAND, GLEN E., Instructor of Physics (1962). B. S., 1958, M. S., 1960, Kansas State University.
- *HARRIS, JOHN ORVILLE, Professor of Bacteriology; Bacterial Physiologist, Agr. Exp. Sta. (1941, 1952). B. S., 1939, Kansas State University; M. S., 1941, University of Hawaii; Ph. D., 1943, Kansas State University.
- HARRIS, ROBERT, Assistant Professor of Speech (1962). B. A., 1954, M. A., 1955, Brooklyn College.
- *HAUSMAN, CARL R., Assistant Professor of Philosophy (1953, 1960). 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 (1928, 1952). A. B., 1926, Doane College.
- *HAYMAKER, HERBERT HENLEY, Professor of Botany (1917, 1927). B. S., 1915, Kansas State University; M. S., 1917, Ph. D., 1927, University of Wisconsin.
- *HAYS, ROBERT WILSON, Assistant Professor of Music (1946). B. A., 1920, Carroll College; M. S., 1940, Union Theological Seminary.
- *HELSON, HARRY, John C. Peterson Regent's Professor of Psychology (1961). A. B., 1921, Bowdoin College; M. A., 1922, Ph. D., 1924, Harvard University.
- *HERRICK, EARL HOWARD, Professor of Zoology; Mammalogist, Agr. Exp. Sta. (1935, 1941). B. S., 1926, M. S., 1927, Kansas State University; Ph. D., 1929, Harvard University.
- HETLAND, JOEL STANLEY, Assistant Professor of Air Science (1961). B. S., 1946, U. S. Military Academy.
- HICK, SANDRA RAE, Instructor in Physical Education (1961). B. S., 1960, Mankato State University.
- *HIGGINSON, FRED HALL, Associate Professor of English (1950, 1956). A. B., 1942, M. A., 1947, University of Wichita; Ph. D., 1950, University of Minnesota.
- *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.
- HODGE, JUDITH KAREN, Instructor in Physical Education (1957). B. A., 1942, Mills College.
- *HOLTZ, ADRIAN AUGUSTUS, Professor of Economics, Emeritus (1929, 1954). A. B., 1909, Colgate University; Ph. M., 1910, B. D., 1911, Ph. D., 1914, University of Chicago.
- *HOSTETTER, HELEN PANSY, Professor of Technical Journalism (1926, 1946). A. B., 1917, University of Nebraska; B. S., 1940, Kansas State University; M. S., 1926, Northwestern University.
- *HOWE, FLORENCE VIRGINIA, Professor of Speech (1947, 1960). A. B., 1935, Elmira College; M. S., 1949, Ed. D., 1958, Boston University.
- *HULBERT, LLOYD C., Assistant Professor of Botany; Ecologist, Agr. Exp. Sta. (1955). 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.
- *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.
- *HYDE, EMMA, Associate Professor of Mathematics, Emerita (1920, 1951). B. A., 1899, University of Kansas; M. A., 1916, University of Chicago.
- *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.
- JASHINSKI, VICTOR HARRY, Assistant Professor of Air Science (1959). B. A., 1952, Sacramento State College; M. A., 1956, George Washington University.
- 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.
- *JOHNSTON, CHARLES O., Professor of Botany; Plant Pathologist, U. S. D. A., Agr. Exp. Sta. (1919, 1960). B. S., 1918, M. S., 1924, Kansas State University.
- *JONES, DALE VINCENT, Associate Professor of English (1946, 1951). B. S., 1931, M. S., 1941, Kansas State University.
- *JONES, GEORGE HILTON, Associate Professor of History (1961). A. B., 1943, Louisiana State University; D. Phil., 1950, Oxford University.
- JONES, JACK, Associate Professor of Military Science (1960). The Command and General Staff College.
- *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.
- *KAINSKI, JOHN M., Assistant Professor of Botany; Assistant Plant Pathologist, Agr. Exp. Sta. (1961). M. S., 1955, Kansas State University; Ph. D., 1959, Cornell University.
- *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.
- *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.
- *KINNEY, EVELYN KENDRICK, Assistant Professor of Mathematics (1957). B. A., 1948, M. A., 1949, Ph. D., 1958, 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.
- KITTERMAN, JOHN H., Instructor in Physics (1962). B. S., 1959, M. S., 1961, Kansas State University.
- KNORR, FRITZ GUSTAVE, Head Wrestling Coach; Assistant Professor of Athletics (1942, 1952). B. S., 1932, M. S., 1945, Kansas State University.
- *KOCH, WILLIAM ERNEST, Assistant Professor of English (1946, 1947). B. A., 1938, North Dakota State Teachers College; M. S., 1949, Kansas State University.
- *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.
- KREHBIEL, EUGENE B., Instructor in Zoology (1962). B. S., 1958, Bethel College; M. S., 1961, Kansas State University.
- KUEHNEL, ROBERT D., Instructor in Military Science (1961).
- *LAMAM, RUSSELL, Assistant Professor of English (1935, 1946). B. S., 1932, Kansas State University; M. A., 1933, State University of Iowa.
- *LAMBERT, JACK L., Associate Professor of Chemistry (1950, 1958). A. B., 1947, M. S., 1947, Kansas State Teachers College (Pittsburg); Ph. D., 1950, Oklahoma State University.
- LANCASTER, EARNEST HADEN, Instructor in Military Science (1956).
- *LANGFORD, ROY CLINTON, Professor of Psychology (1925, 1941). B. S., 1925, M. S., 1926, Kansas State University; Ph. D., 1934, Leland Stanford Junior University.
- *LANGVARDT, ARTHUR LeROY, Associate Professor of English (1947, 1961). A. B., 1940, Kansas State Teachers College (Emporia); M. A., 1949, Ph. D., 1956, University of Colorado.
- *LANNING, FRANCIS C., Associate Professor of Chemistry (1942, 1961). B. S., 1930, M. S., 1931, University of Denver; Ph. D., 1936, University of Minnesota.
- LARSON, INGEMAR WALLACE, Instructor in Zoology (1955, 1957). B. A., 1951, Concordia College; M. S., 1957, Kansas State University.
- LARSON, SARA CHARLOTTE, Instructor in Geography (1946). A. B., 1917, Knox College; B. E., 1927, Illinois State Normal University; M. S., 1942, University of Chicago.
- LaRUE, KENNETH D., Assistant Football Coach (1960). B. S., 1952, M. A., 1957, Ball State Teachers College.
- *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.
- *LEAF, BORIS, Professor of Physics (1946, 1954). B. S., 1939, University of Washington; Ph. D., 1942, University of Illinois.
- *LEAVENGOD, LUTHER OMAR, Professor; Head, Department of Music (1945). B. M., 1929, University of Kansas; M. M., 1936, University of Michigan.
- LEE, HORACE B., Professor of Athletics; Director of Athletics (1956). A. B., 1939, Stanford University.
- *LEEDHAM, GEORGE EDWIN, Associate Professor of Music (1949). B. M., 1938, Artist Diploma, 1938, 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.
- *LITTELL, 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.
- *LOCKHART, CHARLES HOWARD, Assistant Professor of Zoology (1940, 1947). B. S., 1934, M. S., 1938, Kansas State University.
- *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.
- *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, 1928). 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.
- *MANDEVILLE, CHARLES EARLE, Professor of Physics (1961). B. A., 1940, M. A., 1941, Ph. D., 1943, Rice University.
- MANUEL, LEO W., Instructor in Mathematics (1960). B. S., 1958, Kansas State College of Pittsburg; M. S., 1960, University of Illinois.
- *MARCUS, LESLIE F., Temporary Assistant Professor of Statistics; Statistical Consultant, Agr. Exp. Sta. (1960). B. A., 1951, M. A., 1960, 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.
- MASON, WILLA F., Instructor in Physical Education (1961). B. S., 1959, Northeastern State College; M. S., 1960, Oklahoma State University.
- *MATTHEWS, CHARLES WALTON, Professor of English (1921, 1925). B. S., 1918, Kansas State Teachers College (Pittsburg); M. A., 1923, University of Chicago.
- MAXWELL, GEORGE WILLARD, Assistant Professor of Physics, Emeritus (1927, 1960). A. B., 1912, M. S., 1920, University of Michigan.
- 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.
- *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.
- *McDONALD, RICHARD N., Assistant Professor of Chemistry (1960). B. S., 1954, M. S., 1955, Wayne State University; Ph. D., 1957, University of Washington.
- *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.
- McKUSKER, KENT MARCUS, Assistant Professor of Air Science (1958). B. S., 1954, University of Maryland; M. A., 1962, Kansas State University.
- *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.
- *MELCHERS, LEO EDWARD, Professor of Botany, Emeritus (1913, 1956). B. S., 1912, M. S., 1913, Ohio State University.
- *MELOAN, CLIFTON E., Assistant Professor of Chemistry (1959). B. S., 1953, Iowa State University; Ph. D., 1959, Purdue University.
- *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, Assistant Professor of English (1950, 1959). 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.
- *MOGGIE, MAURICE CHARLES, Professor of Education (1930, 1945). B. S., 1929, M. S., 1931, Kansas State University; Ph. D., 1941, Ohio State University.
- *MOORE, FRITZ, Professor of Modern Languages (1934). A. B., 1927, University of Akron; M. A., 1930, Ph. D., 1932, University of Illinois.
- MOORE, HELEN, Professor of Mathematics; Dean of Women, Emerita (1940, 1957). A. B., 1917, University of Kansas; M. A., 1928, Columbia University.
- 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 ADELIN, 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, FRANK LEWIS, Assistant Professor of Physical Education, Emeritus (1925, 1947). B. S., 1925, Kansas State University.
- 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.
- *NEWMAN, PAUL B., Assistant Professor of English (1959). B. S., 1940, University of Chicago; M. F. A., 1951, University of Iowa; Ph. D., 1958, University of Chicago.
- *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 and Sociology (1961). B. A., 1935, M. A., 1937, Ph. D., 1941, University of Minnesota.
- NORTHROP, CHARLES GORDON, Instructor in Modern Languages (1961). B. A., 1953, Southern Methodist University; M. A., 1961, University of Oklahoma.
- *NUGENT, WALTER KING, Assistant Professor of History (1961). A. B., 1954, St. Benedict's College; M. A., 1955, Georgetown University; Ph. D., 1961, University of Chicago.
- *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.
- *OVERALL, JOHN E., Associate Professor of Psychology (1961). B. S., 1954, Trinity University; M. A., 1956, Ph. D., 1958, University of Texas.
- *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 (1947, 1951). B. A., 1931, M. A., 1933, University of British Columbia (Canada); Ph. D., 1947, University of Cincinnati.
- *PARRISH, FRED LOUIS, Professor of History (1927, 1942). A. B., 1917, M. A., 1922, Northwestern University; B. D., 1920, Garnett Biblical Institute; Ph. D., 1927, Yale 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.
- 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.
- PEREGO, AUSTIN O., Assistant Professor of Speech (1961). B. F. A., 1950, Drake University; M. A., 1956, University of Iowa.
- *PERRY, MURVIN H., Assistant Professor of Technical Journalism (1959). B. S., 1950, South Dakota State College; M. A., 1954, Ph. D., 1959, State University of Iowa.
- *PETERSON, BERNADINE HELEN, Associate Professor of Education (1961). B. S., 1945, Wisconsin State College; M. S., 1957, Ph. D., 1961, University of Wisconsin.
- *PETERSON, JOHN CHRISTIAN, Professor of Psychology, Emeritus (1917, 1954). A. B., 1913, University of Utah; Ph. D., 1917, University of Chicago.
- PETRENKO, GLENN, Assistant Professor of Military Science (1961). B. A., 1952, University of Colorado.
- *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.
- PFLUG, HANS D., Visiting Assistant Professor of Geology (1962). Dr. Rer. Nat., 1951, University of Bonn (Germany); Dr. Ing., 1956, Mining College of Freiberg (Germany); Docent, 1956, Justus Liebig University (Germany).
- *PHARES, E. JERRY, Associate Professor of Psychology (1955, 1961). B. A., 1951, University of Cincinnati; M. A., 1953, Ph. D., 1955, Ohio State University.
- PINNELL, MINERVA, Assistant Professor of English (1962). B. F. A., 1943, University of Illinois; M. A., 1946, Ph. D., 1956, Radcliffe College.
- PLOTKIN, NATHAN, Assistant Professor of Military Science (1960). B. A., 1952, University of Illinois.
- PRAWL, SHERLUND DALE, Assistant Professor of Military Science (1961). B. S., 1954, Kansas State University.
- PURCZINSKY, JR., JULIUS OSWALD, Assistant Professor of Modern Languages (1961). B. A., 1949, Baylor University; M. A., 1953, Ph. D., 1957, University of Texas.
- *PYLE, ROBERT EMMETT, Associate Professor of Modern Languages (1938, 1959). B. A., 1938, M. A., 1941, University of Kansas; Ph. D., 1957, Columbia University.

- RAST, JACOB P., Instructor in Speech (1962). B. A., 1956, University of South Carolina; M. A., 1961, University of Kansas.
- *RAU, JR., HERBERT L., Assistant Professor of Geography (1958). B. S., 1951, Valparaiso University; M. S., 1955, Ph. D., 1958, Northwestern University.
- REILING, ILSE, Instructor in Modern Languages (1959). B. S., 1958, Kansas State University.
- *RICE, PHILIP MORRISON, Professor of History; Head, Department of History, Political Science, and Philosophy (1959). A. B., 1938, Pomona College; M. A., 1947, Ph. D., 1948, University of North Carolina.
- RICHERT, A. ALLAN, Instructor in Mathematics (1961). B. A., 1958, M. A., 1960, University of Kansas.
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- *RIGGS, HAZEL M., Associate Professor of History (1945, 1952). A. B., 1920, M. A., 1923, University of Kansas.
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- *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).
- *ROGERSON, BREWSTER, Associate Professor of English (1953). A. B., 1941, University of North Carolina; Ph. D., 1945, Princeton University.
- *ROHRER, WAYNE C., Associate Professor of Sociology; Rural Sociologist, Agr. Exp. Sta. (1959). B. S., 1946, M. S., 1948, Texas A. & M. College; Ph. D., 1952, Michigan State University.
- *RUST, LUCILE OSBORN, Professor of Education, Emerita (1924, 1960). B. S., 1921, Kansas State Teachers College (Pittsburg); M. S., 1922, Kansas State 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.
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- SCHNEIDER, HAROLD WILLIAM, Instructor in English (1961). B. A., 1950, University of Minnesota.
- *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, Associate Professor of Geography (1947, 1953). B. S., 1941, Central Oklahoma State College; M. S., 1947, Oklahoma State University.
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- *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., Instructor in Music (1962). B. S., 1956, Fort Hays Kansas State College; M. S., 1960, Kansas State University.
- 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.
- *SILL, JR., WEBSTER HARRISON, Associate Professor of Botany; Associate Plant Pathologist, Agr. Exp. Sta. (1952, 1956). B. S., 1939, West Virginia Wesleyan College; M. A., 1947, Boston University; Ph. D., 1951, University of Wisconsin.
- 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, University of Rochester.
- SMITH, FREDERICK S., Instructor in Modern Languages (1962). A. B., 1959, Bowdoin College.
- SMITH, GEORGE ROBERT, Assistant Professor; Head, Department of Air Science (1959). B. A., 1941, Fresno State College; Air Command and Staff College.

- *SMITS, BENJAMIN LEVI, Assistant Professor of Chemistry, Emeritus (1926, 1952). B. S., 1924, M. S., 1925, Ph. D., 1926, Michigan State University.
- *SNYDER, ROBERT L., Assistant Professor of Speech (1954, 1959). A. B., 1953, Wartburg College; M. A., 1954, State University of Iowa.
- *SNYDER, VERYLE E., Assistant Professor of Physical Education (1954). B. S., 1942, M. S., 1950, Kansas State University.
- *SOCOLOFSKY, HOMER E., Associate Professor of History (1946, 1959). 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, 1948, 1959). B. A., 1936, M. A., 1937, University of Colorado; Ph. D., 1955, Clark University.
- *STAMEY, WILLIAM L., Professor of Mathematics (1953, 1957). A. B., 1943, Colorado State University; M. A., 1948, Ph. D., 1951, University of Missouri.
- *STEPHENSON, JIM BOB, Associate Professor of Speech (1960). B. A., 1946, M. A., 1947, Ph. D., 1957, University of Michigan.
- *STEUNENBERG, THOMAS BERNARD, Professor of Music (1947). B. M. E., 1933, Northwestern University; M. M., 1938, University of Michigan; Ph. D., 1947, University of Rochester.
- STOUT, MARTHA, Instructor in Speech (1961). B. A., 1960, Washburn University; M. A., 1961, Smith College.
- *STRATTON, CHARLES WILLIAM, Professor of Music (1927, 1947). 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.
- *STRICKLAND, VIVAN LEWIS, Professor of Education, Emeritus (1917, 1950). A. B., 1906, M. S., 1915, Ph. D., 1925, University of Nebraska.
- *STURMER, ANNA MARIE, Professor of English, Emerita (1920, 1950). A. B., 1917, A. M., 1920, University of Nebraska.
- *SWEEDLUN, VERNE SEBASTIAN, Professor of Social Sciences (1941, 1947). A. B., 1923, Bethany College; M. A., 1929, University of Kansas; Ph. D., 1940, University of Nebraska.
- TAYLOR, ANITA GRIMM, Instructor in Speech (1957, 1959). B. S., 1957, M. S., 1958, Kansas State University.
- TAYLOR, CECIL R., Assistant Football Coach (1959). B. S., 1959, Kansas State University.
- *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., M. Ph. Ed., Springfield College.
- *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.
- THROCKMORTON, JEAN LAVON, Assistant Professor of English (1956). A. B., 1941, Friends University; M. A., 1942, Ph. D., 1953, University of Kansas.
- *TIEMEIER, OTTO WILLIAM, Associate Professor of Zoology; Associate Wildlife Conservationist, Agr. Exp. Sta. (1947, 1957). A. B., 1937, M. A., 1939, University of Kansas; Ph. D., 1947, University of Illinois.
- TREMMEL, WILLIAM C., Director of Student Religious Activities; Associate Professor of Philosophy (1956, 1959). A. B., 1940, Denver University; Th. M., 1945, Th. D., 1950, Iliff School of Theology.
- *TRENNEPOHL, HARLAN JEAN, Assistant Professor of Education (1956). 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.
- *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., Assistant Professor of Geology (1953, 1959). B. S., 1950, M. S., 1955, Kansas State University; Ph. D., 1959, University of Texas.
- VERA, THEODORE, Instructor in Bacteriology (1960, 1961). B. S., 1956, D. V. M., 1956, 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., 1958, 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.
- *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, GEORGE WEBSTER, Instructor in Military Science (1961).
- *WHITE, MARY FRANCES, Assistant Professor of English (1947, 1951). B. S., 1928, M. S., 1930, Kansas State University; Ph. D., 1955, Denver University.
- *WILCOXON, GEORGE DENT, Professor of History (1946, 1948). A. B., 1936, M. A., 1938, Ph. D., 1941, University of California.
- WILKINS, DONALD M., Assistant Professor of Psychology (1961). B. A., 1954, Southwestern at Memphis; M. S., 1959, North Carolina State College; Ph. D., 1962, Michigan State University.
- *WIMMER, EDWARD JOSEPH, Professor of Zoology (1928, 1941). B. A., 1925, M. A., 1927, Ph. D., 1928, University of Wisconsin.
- *WINGARD, PAUL SIDNEY, Assistant Professor of Geology (1957, 1961). A. B., 1952, M. S., 1955, Miami University; Ph. D., 1960, University of Illinois.
- WINTER, MORICE FREDERICK, Head Basketball Coach; Professor of Athletics (1947, 1953). B. S., 1947, University of Southern California.
- WOLDT, GRACE S., Instructor in Mathematics (1946). A. B., 1927, Ohio Wesleyan University.
- WOODARD, GEOFFREY DAVIDSON, Assistant Professor of Botany (1960, 1962). B. S., 1951, M. S., 1953, University of Adelaide (Australia); Ph. D., 1962, University of California.
- 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.
- YODER, DONALD ARTHUR, Assistant Professor of Military Science (1958). B. S., 1951, University of Wichita.
- *YUAN, SHAO CHI, Associate Professor of Political Science (1960, 1961). A. B., 1935, Fu Jen University (Peking); M. A., 1938, Ph. D., 1940, Harvard University.

School of Commerce

- *AMOS, JOHN MAX, Assistant Professor of Business Administration (1960). B. S., 1956, M. S., 1957, Kansas State University; Ph. D., 1960, Ohio State University.
- BARTON-DOBININ, JOSEPH, Instructor in Business Administration (1958). 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.
- *ERIKSEN, CONRAD JOHN KERULF, Associate Professor of Business Administration (1946, 1947). B. A., 1929, University of Kansas; M. B. A., 1931, Harvard University.
- GILKISON, PAUL DAVID, Assistant Professor of Business Administration (1962). B. S., 1959, M. B. A., 1960, University of Kansas.
- 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., Assistant Professor of Business Administration (1962). A. B., 1952, Harvard College; M. B. A., 1957, University of Kansas; D. B. A., 1962, Indiana University.
- HUNERYAGER, SHERWOOD G., Assistant Professor of Business Administration (1962). B. S., 1956, M. S., 1958, University of Illinois.
- *JONES, C. CLYDE, Professor; Dean, School of Commerce (1962). B. A., 1944, Marshall College; M. A., 1950, Ph. D., 1954, Northwestern University.
- LAUGHLIN, EUGENE J., Assistant Professor of Business Administration (1955, 1961). B. S., 1951, Rockhurst College; M. S., 1959, Kansas State University; C. P. A., 1960, Kansas.
- MENZIE, JOSEPH W., Assistant Professor of Business Administration (1956, 1959). B. S., 1932, Kansas State University; LL. B., 1935, University of Michigan.
- MONROE, ROBERT JAMES, Instructor in Business Administration (1962). B. S., 1961, Kansas State University.
- *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).

- REED, IRA MAX, Instructor in Business Administration (1961). B. S., 1959, M. B. A., 1960, University of Arkansas.
- RIDGWAY, VALENTINE F., Assistant Professor of Business Administration (1957). B. S., 1948, M. S., 1950, University of Missouri.
- TALLEN, DWAIN REED, Instructor in Business Administration (1962). B. A., 1957, College of Emporia.
- 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 Engineering and Architecture

- *APPL, FREDRIC CARL, Associate Professor of Mechanical Engineering (1960). B. S., 1954, M. S., 1955, Ph. D., 1958, Carnegie Institute of Technology.
- *BAILIE, RICHARD C., Assistant Professor of Nuclear Engineering (1958, 1959). 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.
- *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.
- BERTNOLLI, EDWARD CLARENCE, Instructor in Electrical Engineering (1957, 1958). B. S., 1958, M. S., 1961, Kansas State University.
- *BEST, CECIL HAMILTON, Associate Professor of Applied Mechanics (1961). A. A., 1950, City College of San Francisco; B. S., 1955, M. S., 1956, Ph. D., 1960, University of California.
- *BRINARD, BOYD BERTRAND, Professor of Mechanical Engineering (1923, 1938). B. S., 1922, University of Colorado; S. M., 1931, Massachusetts Institute of Technology. Professional Engineer, 1945.
- BURGESS, DANNY NEIL, Instructor in Applied Mechanics (1956, 1958). B. S., 1958, M. S., 1960, Kansas State University.
- 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, GORDON EUGENE, Instructor in Electrical Engineering (1959). B. S., 1959, M. S., 1960, Kansas State University.
- CARLSON, WALTER WILLIAM, Professor of Industrial Engineering and Industrial Arts, Emeritus (1910, 1950). B. S., 1908, M. E., 1916, Kansas State University. Professional Engineer, 1935.
- *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.
- 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, 1949). B. S., 1904, C. E., 1906, Cornell College; M. S., 1908, Lehigh University. Professional Engineer in Wyoming, 1909, in Kansas, 1931.
- COOL, VINCENT JUNIOR, Assistant Professor of Architecture (1957). B. S., 1951, Kansas State University. Registered Architect, 1952.
- *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.
- *COTTON, ROBERT ROSSITER, Assistant Professor of Architecture (1958). B. Arch., 1953, Massachusetts Institute of Technology; M. S., 1958, Pennsylvania State University. Registered Architect, 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, Professor of Civil Engineering, Emeritus (1923, 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., 1958, M. S., 1961, Kansas State University.
- *DARBY, EARL GILBERT, Professor of Industrial Arts (1941, 1952). B. S., 1923, M. S., 1943, Kansas State University.

- DEIBLER, GERALD WILLIAM, Instructor in Drawing and Painting (1956). B. S., 1951, University of Nebraska; M. F. A., 1955, University of Colorado.
- DEINES, VERNON PHILLIP, Instructor in Architecture (1957, 1959). B. S., 1952, M. R. P., 1961, Kansas State University. Professional Engineer, 1952.
- 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.
- *DURGAN, JACK CLYDE, Associate Professor of Architecture (1954, 1958). B. Arch., 1951, Oklahoma State University; M. S., 1958, Kansas State University. Registered Architect in Texas, 1951, in Kansas, 1954.
- *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). B. S., 1955, University of Cairo; M. S., 1958, Texas A & M; Ph. D., 1960, Oklahoma University.
- FAGAN, JOHN ROBERT, Assistant Professor of Nuclear Engineering (1959). B. S., 1957, University of Nebraska.
- *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, Associate Professor of Chemical Engineering (1957, 1961). B. S., 1951, National Taiwan University; M. S., 1954, Kansas State University; Ph. D., 1957, West Virginia University. Professional Engineer in China, 1951.
- 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.
- *FISCHER, EMIL CARL, Professor; Head, Department of Architecture and Allied Arts; Architect, Engg. Exp. Sta. (1955). A. B., 1929, Columbia College; B. S., 1932, M. S., 1933, Columbia University. Registered Architect, 1955.
- *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, 1954). C. E., 1910, Ohio State University. Professional Engineer, 1931.
- FUNK, JOHN WILLIAM, Assistant Professor of Agricultural Engineering; Assistant 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). 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.
- HAKY, RONALD JACK, Instructor in Mechanical Engineering (1961). B. S., 1960, B. A., 1960, University of Illinois.
- *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). B. S., 1936, Kansas State University; M. Sc., 1961, University of Nebraska. Professional Engineer, 1961.
- HARRI, JOHN G., Instructor in Mechanical Engineering (1962). B. S., 1961, M. S., 1962, Kansas State University.
- *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.
- HEGLER, BURNS EDWARD, Instructor in Electrical Engineering (1957). B. S., 1943, M. S., 1958, Kansas State University. Professional Engineer, 1959.
- *HEINTZELMAN, JOHN CRANSTON, Professor of Architecture (1947, 1954). B. Arch., 1938, Massachusetts Institute of Technology; M. Arch., 1941, Columbia University. Registered Architect, 1953.
- HELANDER, LINN, Professor of Mechanical Engineering, Emeritus (1935, 1961). B. S., 1915, University of Illinois. Professional Engineer, 1941.
- *HELM, JR., JOHN FREDERICK, Professor of Drawing and Painting (1924, 1938). B. D., 1924, Syracuse University; D. F. A., 1951, Bethany College.

- 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.
- *HODGELL, MURLIN RAY, Associate Professor of Architecture (1949, 1957). B. S., 1949, Kansas State University; M. S., 1953, University of Illinois; M. R. P., 1956, Ph. D., 1959, Cornell University. Registered Architect, 1949, Professional Engineer, 1960.
- *HODGES, TEDDY OMAR, Professor of Agricultural Engineering (1959). B. S., 1950, Texas A & 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. 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.
- HUNT, ORVILLE DON, Professor of Electrical Engineering (1923, 1947). B. S., 1923, Washington State University; M. S., 1930, Kansas State University. Professional Engineer, 1947.
- *JACOBS, CLINTON OTTO, Assistant Professor of Farm Mechanics (1949, 1955). B. S., 1949, M. S., 1953, Kansas State University.
- JORGENSEN, LOUIS MARK, Professor of Electrical Engineering, Emeritus (1925, 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; Head, Department 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.
- *KIRMSE, PHILIP GEORGE, Professor; Head, Department of Applied Mechanics (1942, 1958). B. S., 1939, M. S., 1944, Ph. D., 1958, University of Minnesota. Professional Engineer, 1961.
- KLOEFFLER, ROYCE GERALD, Professor of Electrical Engineering (1916, 1923). 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.
- *KRIDER, ALDEN, Professor of Architecture (1949, 1955). B. S., 1933, M. S., 1955, Kansas State University. Registered Architect in Missouri, 1945, in Kansas, 1949.
- *KUBITZA, WILHELM KARL, Associate Professor of Civil Engineering (1953, 1958). Dipl. Ing. 1950, Technical University of Darmstadt. Professional Engineer, 1959.
- *KYLE, BENJAMIN GAYLE, Associate Professor of Chemical Engineering (1958, 1961). B. S., 1950, Georgia Institute of Technology; M. S., 1955, Ph. D., 1958, University of Florida.
- *LARMER, OSCAR VANCE, Assistant Professor of Drawing and Painting (1950, 1956). B. F. A., 1949, University of Kansas; M. F. A., 1955, Wichita University.
- *LARSON, GEORGE HERBERT, Professor; Head, Department of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1946, 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. 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, Instructor in Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1956). 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., 1962, 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.
- *McGRAW, EUGENE THOMAS, Instructor in Architecture (1958). B. A. Arch., 1957, Oklahoma State University.
- MENSCH, ROBERT LEON, Instructor in Agricultural Engineering (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, Assistant Professor of Mechanical Engineering (1942, 1946). B. S., 1924, Kansas State University. Professional Engineer, 1948.
- MICHAELS, KENNETH BRUCE, Assistant Professor of Mechanical Engineering (1958). 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, EUGENE NEIL, Instructor in Chemical Engineering (1960). B. S., 1958, M. S., 1960, University of West Virginia.
- *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.
- MILLER, JR., PAUL LEROY, Assistant Professor of Mechanical Engineering (1958, 1961). B. S., 1957, Kansas State University. Professional Engineer, 1962.
- *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; Head, Department of Civil Engineering; Civil Engineer, Engg. Exp. Sta. (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.
- MORSE, RICHARD HUGH, Instructor; Assistant to the Dean (1961). B. S., 1951, Kansas State University. Registered Architect, 1954.
- MUNGER, HAROLD HAWLEY, Associate Professor of Applied Mechanics, Emeritus (1942, 1954). B. S., 1939, M. S., 1941, Kansas State University. Professional Engineer, 1941.
- *MURRISH, CHARLES HAROLD, Associate Professor of Electrical Engineering (1961). B. S. G. E., 1942, University of Denver; M. S., 1948, Stanford University; Ph. D., 1960, University of Wisconsin.
- NEELY, JR., HENRY MASON, Instructor in Mechanical Engineering (1958). B. S., 1956, 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, Instructor in Electrical Engineering (1958). 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.
- PORTER, MARION GENE, Instructor in Electrical Engineering (1960). B. S., 1960, Kansas State University.
- REECE, FLOYD NORMAN, Assistant Professor of Agricultural Engineering (1962). B. S., 1952, M. S., 1959, Kansas State University. Professional Engineer in Kansas, 1960.
- ROBERTSON, KEITH ELLIS, Instructor in Agricultural Engineering (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.
- *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.
- ROWLAND, THOMAS LEROY, Instructor in Architecture (1962). B. Arch., 1961, Kansas State University.
- SAUER, HARRY JOHN, Instructor in Mechanical Engineering (1960). A. S., 1954, St. Joseph Junior College; B. S., 1956, M. S., 1960, Missouri School of Mines. Professional Engineer, 1961.
- SCHOLER, CHARLES HENRY, Professor of Applied Mechanics, Emeritus; Materials Testing Engineer, Engg. Exp. Sta. (1919, 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, 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 Applied Mechanics (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, 1953). B. S., 1944, M. S., 1953, Kansas State University. Professional Engineer, 1953.
- SMUTZ, FLOYD ALONZO, Professor of Mechanical Engineering, Emeritus (1918, 1960). B. S., 1914, Kansas State University.
- SNELL, ROBERT ROSS, Assistant Professor in Civil Engineering (1957). B. S., 1954, Kansas State University. Professional Engineer, 1959.
- *STEVENSON, PAUL NELSON, Associate Professor of Farm Mechanics (1957). B. S., 1948, University of Missouri; M. S., 1957, Iowa State University.
- STROHMEYER, DONALD KARL, Instructor in Architecture (1957). B. S., 1954, University of Kansas.
- *TAYLOR, DELOS CLIFTON, Professor of Applied Mechanics (1931, 1956). B. S., 1925, M. S., 1937, Kansas State University. Professional Engineer, 1948.
- 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.
- *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.
- TURNQUIST, RALPH OTTO, Instructor in Mechanical Engineering (1959). B. S., 1952, M. S., 1961, Kansas State University.
- WAKABAYASHI, ISAAC, Instructor in Electrical Engineering (1955). B. S., 1953, University of California.
- *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.
- WEIGEL, PAUL, Professor of Architecture, Emeritus (1921, 1924). 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.
- *WIRTZ, LEO ANDREW, Associate Professor of Electrical Engineering (1947, 1957). 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 Arts (1949, 1954). B. S., 1948, M. S., 1949, Kansas State University; M. S., 1961, University of Missouri School of Mines.

School 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.
- BANGS, SYBIL J., Instructor in Institutional Management (1960). B. S., 1943, M. S., 1960, Kansas State University.
- *BARFOOT, DOROTHY, Professor of Art (1930, 1962). B. A., State University of Iowa; M. A., 1928, Columbia University.
- *BARNES, JANE WILSON, Assistant Professor (1939, 1954). B. S., 1912, M. S., 1932, Kansas State University.
- BROWNING, NINA MYRTLE, Associate Professor of Foods and Nutrition (1930, 1943). B. S., 1923, M. S., 1927, Kansas State University.
- *CORMANY, ESTHER MARGARET, Associate Professor of Clothing and Textiles; Associate Textile Economist, Agr. Exp. Sta. (1936, 1941). B. S., 1926, M. S., 1932, Kansas State University.
- CORRELL, MYRTLE GUNSELMAN, Associate Professor of Family Economics, Emerita; Associate Textile Economist, Agr. Exp. Sta. (1926, 1959). B. S., Kansas State University; A. M., 1926, University of Chicago.

- CRAIGIE, BARBARA, Instructor in Art (1954). B. A., 1932, University of Minnesota; M. A., 1942, University of Missouri.
- *EDELBLUTE, NINA, Associate Professor of Institutional Management; Associate Food Economist, Agr. Exp. Sta. (1940, 1952). B. S., 1931, M. S., 1940, Kansas State University; Ph. D., 1960, University of Illinois.
- *GARTNER, JOSEPH, Assistant Professor of Family Economics (1961). B. S., 1954, University of Connecticut; M. S., 1955, University of New Hampshire; Ph. D., 1961, Iowa State University.
- *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, Assistant Professor in Art (1957). B. F. A., 1952, University of Buffalo; M. F. A., 1955, University of Illinois.
- *HARRIS, VIDA AGNES, Associate Professor of Art (1924, 1941). B. S., 1914, Kansas State University; A. M., 1927, University of Chicago.
- *HARRISON, DOROTHY LUCILE, Professor; Head, Department of Foods and Nutrition; in charge Home Economics Research, Agr. Exp. Sta. (1947, 1955). 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; Head, Department of Family and Child Development; Agr. Exp. Sta. (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 (1954). B. S., 1941, University of Nebraska; M. S., 1943, Michigan State University; Ph. D., 1946, Cornell University.
- HOSE, RUTH SCHMIDT, Instructor in Institutional Management (1958). B. A., 1938, Elmhurst College.
- *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.
- 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, Assistant Professor of Family and Child Development (1957, 1960). B. S., 1933, M. S., 1951, Kansas State University.
- *MORRIS, MARIA, Associate Professor of Art (1925, 1941). 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 (1936, 1947). B. S., 1925, Kansas State University; M. S., 1928, Iowa State University.
- NIDAY, CAROL ANDERSON, Instructor in Family and Child Development (1961). B. S., 1960, Berea College; M. S., 1962, Kansas State University.
- 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.
- SKELTON, MARILYN McNELIS, Instructor in Foods and Nutrition, Agr. Exp. Sta. (1959). B. S., 1957, M. S., 1958, Kansas State University.
- *SKILES, BETTY LOU, Associate Professor of Clothing and Textiles (1961). B. S., 1958, M. A., 1959, Ph. D., 1961, Texas Woman's 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.
- *TURNER, CAROLINE NANCY, Visiting Associate Professor of Foods and Nutrition (1961). B. S., 1939, M. S., 1960, University of Melbourne.
- *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.
- *WOMBLE, DALE L., Associate Professor of Family and Child Development (1958). A. B., 1944, M. S., 1951, Kansas State College of Pittsburg; Ed. D., 1955, Florida 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.

School 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., Assistant Professor of Pathology; Assistant Professor, Agr. Exp. Sta. (1955, 1958). 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., Instructor in Surgery and Medicine (1961). B. S., 1959, D. V. M., 1959, Kansas State University.
- CATLIN, JACK EDWARD, Assistant Professor of Surgery and Medicine (1962). 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, Associate Professor of Pathology; Assistant Pathologist, Agr. Exp. Sta. (1954, 1959). D. V. M., 1945, Ph. D., 1958, Kansas State University; M. S., 1948, Iowa State University.
- CUMMINGS, BRIAN CHRISTOPHER, Assistant Professor of Anatomy; Assistant Professor, Agr. Exp. Sta. (1958, 1960). B. S., 1957, D. V. M., 1957, M. S., 1960, Kansas 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; Ph. D., 1962, University of Texas.
- *FRANK, EDWARD RAYMOND, Professor of Surgery and Medicine (1926, 1935). B. S., 1918, D. V. M., 1924, M. S., 1929, Kansas State University.
- *FRICK, EDWIN JACOB, Professor; Department of Surgery and Medicine (1919, 1935). D. V. M., 1918, Cornell University.
- HIBBS, CLAIR M., Instructor in Pathology (1962). B. S., 1949, D. V. M., 1953, University of Missouri; M. S., 1962, 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.
- *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.
- LARSEN, JAMES STANLEY, Assistant Professor of Surgery and Medicine (1959). B. S., 1955, D. V. M., 1955, University of Illinois.

- *LEASURE, ELDEN EMANUEL, Dean; Professor of Physiology; Veterinarian in charge. Agr. Exp. Sta. (1926, 1948). 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.
- MILLERET, ROY JOSEPH, Instructor in Pathology (1960). 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.
- NELSON, DALLAS LEROY, Assistant Professor of Pathology; Assistant Pathologist, Agr. Exp. Sta. (1956). B. S., 1953, D. V. M., 1953, M. S., 1959, Ph. D., 1962, 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.
- *PIPER, RICHARD C., Associate Professor of Pathology (1961). D. V. M., 1956, M. S., 1957, Ph. D., 1960, Ohio State University.
- RAILSBACK, LEE T., Assistant to the Dean (1961). B. S., 1936, D. V. M., 1937, Kansas State University.
- RHOADES, JOHN DAVID, Instructor in Surgery and Medicine (1961). B. S., 1959, D. V. M., 1961, University of Missouri.
- *RODERICK, LEE MILES, Professor of Pathology, Emeritus (1938, 1958). D. V. M., 1915, Ohio State University; B. S., 1922, M. S., 1922, North Dakota Agricultural College; Ph. D., 1926, University of Chicago.
- SHARP, DARRELL, Instructor in Surgery and Medicine (1961). B. S., 1951, D. V. M., 1958, Kansas State University.
- SWANSON, ROBERT NEIL, Instructor in Physiology (1960). B. S., 1953, Fort Hays Kansas State College; D. V. M., 1960, M. S., 1960, 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.
- *TWIEHAUS, MARVIN JOHN, Professor; Head, Department of Pathology; Pathologist, Agr. Exp. Sta. (1937, 1953). Fellow—American College of Veterinary Pathologists. D. V. M., 1936, M. S., 1951, 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.
- ADAMS, GROVER FOREST, Instructor; Continuing Education (1960). B. S., 1949, Kansas State University.
- ALLEN, GERTRUDE EDNA, Professor, Emeritus; Specialist in Foods and Nutrition (1929, 1947). B. S., 1923, University of Minnesota; M. S., 1936, Kansas State University.
- AMSTEIN, WILLIAM GERALD, Professor; State Leader of Agricultural Specialists (1929, 1953, 1957). B. S., 1927, University of Massachusetts; M. S., 1928, Kansas State University.
- ANDERSON, ROBERTA ARLENE, Assistant Professor; Extension Specialist in 4-H Club Work (1958). B. S., 1954, University of Minnesota; M. S., 1958, University of Wisconsin.
- APEL, MARY DEAN, Assistant Professor of Home Economics, Extension (1961). B. S., 1953, Kansas State University; M. S., 1960, Cornell 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.
- *AVERILL, THOMAS BRANKS, Assistant Professor, Coordinator, Office of Community Services; Continuing Education (1959). A. B., 1951, Kent State University; M. S. A., 1954, Wayne State University.
- 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.

- BARKLEY, PAUL WESTON, Instructor; Extension Specialist in Rural Areas Development (1960). B. S., 1957, M. S., 1959, Oregon State University.
- BARTLETT, CLARENCE EDWARD, Assistant Professor; 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.
- BAUGHER, EARL EUGENE, Instructor; Extension Economist in Marketing Information (1961). B. S., 1958, Kansas State University.
- *BEARD, EARL SAMUEL, Professor; Coordinator, Office of Home Study; Continuing Education (160). B. S., 1948, Baylor University; M. A., 1950, Ph. D., 1953, University of Iowa.
- *BEVINS, ROBERT JACKSON, Assistant 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.
- *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, Assistant 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.
- 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.
- BROSZ, DONALD JONATHAN, Assistant Professor; Extension Irrigation Engineer (1960, 1961). B. S., 1955, M. S., 1960, South Dakota State College.
- BURKE, JACK MERRIL, Associate Professor, Director of Radio Station KSAC (1958). B. S., 1953, M. E., 1958, North Dakota Agricultural College.
- RUSSET, GLENN MORTON, Associate Professor; Associate State Club Leader (1941, 1958). B. S., 1941, Kansas State University; M. S., 1957, Cornell 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; 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.
- CRAM, LEO LAWRENCE, Instructor; Extension Specialist in Rural Areas Development (1961). B. S., 1958, M. S., 1961, Kansas State University.
- DEXTER, MIRIAM LENORE, Associate Professor; Assistant Extension Editor (1944, 1959). B. S., 1926, M. S., 1933, Kansas State University.
- 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, Instructor; 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, Instructor; Area Extension Engineer (1959). B. S., 1951 and 1959, Kansas 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, Assistant Professor; Extension Specialist in Entomology (1948, 1950). B. S., 1948, M. S., 1952, Kansas State University.
- GLOVER, OTIS BENTON, Associate Professor; District Agent (1929, 1956). B. S., 1917, Kansas State University.
- GORTON, ROBERT, Instructor; Continuing Education (1960). B. S., 1953, Louisiana Polytechnic Institute; M. S., 1960, Louisiana State University.
- GRAHAM, RALF ORLIN, Assistant Professor; Assistant Extension Editor (1961). A. B., 1948, Peru State Teachers College; M. A., 1955, University of Minnesota.
- GRAY, GENE WILLIAM, Instructor; District Extension Forester (1962). B. S., University of Missouri, 1956.
- GREENE, LAURENZ STEPHEN, Instructor; Extension Economist in Farm Management (1952, 1960). B. S., 1950, Kansas State University.
- *GRIFFITH, PAUL WILSON, Professor; Associate Director (1935, 1950). B. S., 1934, M. S., 1948, Kansas State University; Ph. D., 1961, University of Wisconsin.
- GRONWOLLER, HENRY PAUL, Assistant Instructor; Economist in Farm Management (1961). B. S., 1952, New Mexico A & M.
- 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.
- 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.
- HENDERSHOT, HELEN MARIE, Assistant Professor; District Home Economics Agent (1944, 1958). B. S., 1945, Kansas State University; M. S., 1958, Cornell 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., Kansas State University, 1955; M. A., Pennsylvania State University, 1957.
- HJORT, ARTHUR LAWRENCE, Emeritus (1947, 1948).
- HOFMEYER, KENNETH JOHN, Instructor; Extension Specialist in Extension Studies (1961). B. S., 1959, Iowa 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.
- HURLBUT, DAVID DELOSS, Instructor; District Extension Forester (1962). B. S., University of Missouri, 1960.
- 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.
- 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.
- 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, Assistant Professor; Extension Specialist in Dairy Science (1938, 1953). B. S., 1938, M. S., 1957, Kansas State University.

- KITCHENS, JOHN EDWARD, Assistant Professor; Coordinator of Conferences and Institutes (1956). 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, Associate Professor; Associate Home Economics Leader (1929, 1959). B. S., 1928, Kansas State University; M. S., 1958, University of Wisconsin.
- KUBLER, RUTH MAURINE, Assistant Professor; Extension Specialist in Home Furnishings (1957, 1959). B. S., 1943, M. S., 1951, Pittsburg State College; M. S., 1952, Kansas State University.
- LANG, LAURENCE H., Assistant Professor; Extension Specialist in Family Life (1958). B. A., 1950, Antioch College; M. S., 1954, Columbia University.
- LESTER, ANITA HOPE, Assistant Professor; Extension Specialist in Home Management (1961). B. S., 1954, Southern Methodist; M. S., 1961, Cornell University.
- 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, Instructor; 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., Fieldman, Extension Specialist 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.
- 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, Associate 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.
- PASS, INEZ, Assistant Professor; Extension Specialist in Foods and Nutrition (1961). B. S., 1941, M. S., 1960, Oklahoma A & M.
- PATTISON, FLOYD HOLMPS, Professor, Emeritus; Continuing Education (1919, 1927). B. S., 1912, Kansas State University; M. S., 1929, Massachusetts Institute of Technology.
- PECK, ERNEST GEORGE, Assistant Professor; Visual Assistant (1955, 1961). B. S., 1950, 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, Assistant Professor; Extension Specialist in Horticulture (1954, 1961). B. S., 1949, M. S., 1950, Oklahoma 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.
- 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 ELSWORTH, 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.
- SHEETS, GEORGE CLYDE, Itinerant Instructor; Job Training and Safety Program, Continuing Education (1962).
- SHERMAN, LOUIS LEROY, Instructor; Continuing Education (1962). B. M., Bethany College, 1954; M. S., Kansas State University, 1962.
- 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.
- STARK, MAURICE EARL, Administrative Assistant (1962). B. S., Kansas State University, 1959.
- STARKEY, WINONA McNEIGHT, Assistant Professor; Extension Specialist in Home Furnishings (1944, 1956). B. S., 1947, M. S., 1954, 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.
- SUGHRUE, 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; Director of Division of University Information (1951, 1961). 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, Associate Professor; Coordinator of Extension Personnel Training (1961). B. S., 1948, Oklahoma State University; M. S., 1960, Ph. D., 1961, University of Wisconsin.
- TRIEB, SYKES EMIL, Assistant Professor; Extension Economist in Retail Marketing (1954, 1958). 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.
- *VERHALEN, ROMAN J., Professor; Head, Department of Continuing Education (1954, 1957). B. A., 1946, M. A., 1947, Ph. D., 1949, Wyoming University.
- 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, Associate Professor; Extension Editor (1935, 1947). B. S., 1934, Kansas State University.
- WEINER, PHILLIP DAVID, Instructor; Extension Specialist in Meats (1962). B. S., 1960, University of Wisconsin.
- 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, Associate Professor; 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.
- WILLIS, WILLIAM GRANT, Instructor; Extension Specialist in Plant Pathology (1951, 1962). B. S., 1951, Kansas State University.

COUNTY CLUB AGENTS

- BLAIR, KENNETH RAY, Brown County (1961, 1962). Hiawatha.
- BORST, WILLIAM HENRY, Wyandotte County (1953). Kansas City.
- BOZWORTH, ROBERT WAYNE, Labette County (1960, 1961). Altamont.
- CARLSON, VIRGIL PHILLIP, McPherson County (1957, 1959). McPherson.
- CHILDERS, JAMES R., Reno County (1944). Hutchinson.
- DRAKE, MARK KLINE, Saline County (1961). Salina.
- ELLIOTT, LELAND WESLEY, Washington County (1958, 1959). Washington.
- ESSLINGER, DONALD LOUIS, Rice County (1957, 1958). Lyons.
- GOTTSCH, ALBERT HAROLD, Butler County (1954, 1956). El Dorado.
- GREENWOOD, WILLIAM L., Greenwood County (1960). Eureka.
- GRIFFIN, HOWARD M., Cowley County (1961). Winfield.
- HAMILTON, DONALD FRANK, Harvey County (1960, 1961). Newton.
- HECHT, ROGER, Shawnee County (1952, 1960). Topeka.
- HENDERSHOT, ROYAL CLARK, Kingman County (1956, 1960). Kingman.
- HENSLEY, DALE, Montgomery County (1957). Independence.
- HINES, PAUL NELSON, Marshall County (1944, 1961). Marysville.
- HUNDLEY, JR., WILLIAM CLAY, Douglas County (1955). Lawrence.
- LAFFERTY, GARY LEE, Lyon County (1961, 1962). Emporia.
- LOYD, DONALD GLEN, Crawford County (1948, 1949). Girard.
- MCGINNESS, KENNETH EUGENE, Johnson County (1945). Olathe.
- MAYGINNES, PAUL HENRY, Marion County (1951). Marion.
- MEIREIS, CLIFFORD LEO, Pratt County (1955). Pratt.
- NELSON, ROSS MAURICE, Franklin County (1959, 1960). Ottawa.
- NYHART, SYLVESTER O., Russell County (1958, 1959). Russell.
- RECTOR, RALPH BERT, Leavenworth County (1948, 1956). Leavenworth.
- REINHARDT, LOY DEE, Cherokee County (1959). Columbus.
- RIAT, LAWRENCE DEAN, Dickinson County (1961). Abilene.
- SISK, ENSLEY J., Miami County (1960). Paola.
- SMITH, JIMMIE WAYNE, Riley County (1958). Manhattan.
- VANSKIKE, WILLIAM VINCENT, Barton County (1950, 1956). Great Bend.
- WREN, THURMAN S., Sedgwick County (1949, 1955). Wichita.

COUNTY HOME ECONOMICS AGENTS

- AIKEN, SHIRLEY FRANCES, Jefferson County (1959, 1961). Oskaloosa.
- ARGANBRIGHT, MAHALA MARY, Norton County (1949, 1960). Norton.
- BISHOP, BEVERLY JEAN, Jewell County (1961). Mankato.
- BLACKWELL, CORA ALICE, Ottawa County (1948, 1962). Minneapolis.
- BLACKWOOD, HELEN H., Haskell County (1960). Sublette.
- BOOTH, MYRTLE FAYE, Republic County (1960, 1961). Belleville.
- BRACKEN, CAROLYN SUE, Miami County (1958, 1960). Paola.
- BRANDEN, ELSIE PAINTER, Finney County (1955, 1961). Garden City.
- BROOKS, BLANCHE, Osage County (1941, 1942). Lyndon.
- CARLSON, JEAN KEMPTON, Lyon County (1950, 1952). Emporia.
- CLINE, LUCILE GILKISON, Sherman County (1955). Goodland.
- COLGLAZIER, ELIN K., Logan County (1958, 1960). Oakley.
- COMLEY, MARY LOU, Kiowa County (1961). Greensburg.
- CONARD, KAREN, Washington County (1960). Washington.
- CONLEY, JOSEPHINE M., Johnson County (1955). Olathe.
- CRESS, JEANICE BLAUER, Allen County (1955, 1956). Iola.
- CRIST, ROSEMARY ALTHEA, Franklin County (1950). Ottawa.

CURRIE, TRELLA, Cloud County (1955). Concordia.
DAVIS, OLIVE, Morton County (1960). Elkhart.
DISNEY, W. ELAINE, Ellis County (1961). Hays.
DOMSCH, L. ANN, Rawlins County (1959). Atwood.
DREESSEN, MONA RUTH, Butler County (1958). El Dorado.
DUNBAR, MARY JO, Wyandotte County (1957). Kansas City.
ECK, DELORES STOVER, Sedgwick County (1957, 1961). Wichita.
EDIGER, VENETA H., McPherson County (1961). McPherson.
ENNS, IMOJANE MARIE, Ness County (1961). Ness City.
FICKEN, WILLA LOIS, Grant County (1957). Ulysses.
FISHER, SHARON GAY, Meade County (1959). Meade.
FREDENBURG, NEOSHO LOUISE, Morris County (1953). Council Grove.
FREY, ALICE LETTIE, Clay County (1955). Clay Center.
GEORGE, SHIRLEY, Stanton County (1960). Johnson.
GRABER, VIVIAN EWY, Kingman County (1955). Kingman.
GUTHRIE, GERSILDA, Hodgeman County (1958). Jetmore.
HANSEN, MARTHA A., Barber County (1957). Medicine Lodge.
HEINLY, FRED A. KAYANN, Rice County (1957). Lyons.
HERNDON, MAY BETH, Rush County (1953). La Crosse.
HESTER, MARIAN V., Barton County (1953). Great Bend.
HINTZ, NORMA JEAN, Wichita County (1961). Leoti.
HOVE, GERTRUDE, Cherokee County (1949, 1961). Columbus.
HUFFMAN, DOROTHY LOUISE, Pratt County (1952, 1953). Pratt.
HUND, MARGARET ANN, Jackson County (1960). Holton.
JOHNSON, JUANITA BILLINGTON, Crawford County (1948). Girard.
JONES, MARIELLEN, Greenwood County (1955, 1958). Eureka.
JUSTICE, MARY LEE, Woodson County (1959, 1961). Yates Center.
KENT, NANCY JO, Comanche County (1959). Coldwater.
KINDLER, BEVERLY LOUISE, Norton County (1951, 1960). Norton.
KRETCHMAR, MARY K., Anderson County (1960). Garnett.
LEIKAM, ELEANORA, Gray County (1954). Cimarron.
LONG, ANNABELLE BRAKKE, Shawnee County (1955). Topeka.
LYMAN, MERLENE H., Edwards County (1961). Kinsley.
McBEE, BETTY GRACE, Cheyenne County (1952). St. Francis.
McCAULEY, EULA NEAL, Doniphan County (1930, 1959). Troy.
McELFRESH, S. ANN, Ellsworth County (1960, 1961). Ellsworth.
McMURTRAY, JANET A., Saline County (1960, 1961). Salina.
McREYNOLDS, ELDORA ZANNA, Clark County (1959). Ashland.
MANSFIELD, EVA PEARL, Leavenworth County (1953). Leavenworth.
MEEK, MARY E., Dickinson County (1953). Abilene.
MERIWETHER, NANCY ALICE, Nemaha County (1958, 1960). Seneca.
MIKSCH, BEVERLY B., Reno County (1961). Hutchinson.
MILLER, ALICE LOUISE, Ford County (1953, 1955). Dodge City.
MOLZ, DIXIE IRENE, Stafford County (1953). St. John.
MOORE, ALVERDA, Riley County (1955). Manhattan.
MORTON, MARY ANN, Dickinson County (1961). Abilene.
NEELLY, ERMA, Trego County (1950). Wakeeney.
NEUFELD, DOROTHY H., Pawnee County (1957). Larned.
NEUSCHWANDER, OCIE ALICE, Greeley County (1957). Tribune.
NEWBY, GRACE L., Chase County (1961). Cottonwood Falls.
OLEN, ALICE McKAUGHEN, Seward County (1956). Liberal.
OLSON, ELEANOR ANN, Mitchell County (1960). Beloit.
OUSDAHL, GLORIA JEAN, Marshall County (1959, 1960). Marysville.
PALMER, RACHEL FEATHERINGILL, Sedgwick County (1941). Wichita.
PEASE, MURIEL FRANCES, Bourbon County (1940, 1957). Fort Scott.
PHILLIPS, BETTY SELLERS, Graham County (1958). Hill City.
PRICE, BETTY J., Atchison County (1961). Effingham.
PRICE, MARJORIE ELEANOR, Coffey County (1957, 1960). Burlington.
PTACEK, ARRIA NEAL, Rooks County (1954). Stockton.
RANKIN, VELDA FRANCES, Sumner County (1952). Wellington.
REEVES, DONNA LEE, Montgomery County (1959). Independence.
ROSSER, KAREN ELAINE, Harvey County (1961). Newton.
ROSSILLON, MARY ALICE, Brown County (1958, 1960). Hiawatha.
SCHROEDER, DOROTHEA ANN, Wyandotte County (1942, 1943). Kansas City.

SCHROEDER, MARY, Thomas County (1960, 1961). Colby.
 SHEELEY, DOROTHY ANN, Saline County (1961). Salina.
 SHIPMAN, LORETTA KAY, Elk County (1961). Howard.
 SPEAR, DORIS LOUISE, Rice County (1961). Lyons.
 STOECKER, MARJORIE I., Linn County (1961). Linn.
 SWAFFORD, BETSY LEE, Lane County (1961). Dighton.
 TREDWAY, RUTH BROTHERS, Chautauqua County (1956, 1960). Sedan.
 TRUAX, RUBY CORR, Sedgwick County (1959). Wichita.
 VICE, FAYE EVELYN, Labette County (1946, 1947). Altamont.
 WEAVER, MAE K., Barton County (1952). Great Bend.
 WEINHOLD, KATHERYN FAIRES, Phillips County (1959). Phillipsburg.
 WELLS, SHELBY SUE, Neosho County (1961). Erie.
 WONER, ELIZABETH, Harper County (1949, 1950). Anthony.
 YATES, OLETHA L., Douglas County (1959). Lawrence.

COUNTY AGRICULTURAL AGENTS

ALBRIGHT, KENNETH BAIRD, Ellis County (1955, 1957). Hays.
 BAIRD, CHARLES JACK, Mitchell County (1953, 1958). Beloit.
 BAKER, EDWARD KIRK, Russell County (1955). Russell.
 BARBER, ARNOLD, Atchison County (1955). Effingham.
 BARKER, W. H., Nemaha County (1950). Seneca.
 BARNES, JOHN H., Harvey County (1953, 1959). Newton.
 BIERY, FREEMAN E., Jewell County (1953). Mankato.
 BLAIR, W. LAWRENCE, Lyon County (1960, 1961). Emporia.
 BLUME, WILLIS LEE, Haskell County (1948). Sublette.
 BROWN, DONALD ALBERT, Franklin County (1949, 1950). Ottawa.
 BULK, HERBERT WILLIAM, Shawnee County (1949). Topeka.
 BURCHETT, LOWELL ALAN, Jackson County (1961). Holton.
 BYARLAY, HAL DEAN, Lincoln County (1953). Lincoln.
 BYARLAY, LOWELL HARTLEY, Osborne County (1959, 1960). Osborne.
 CLARK, MONTE CHARLES, Ford County (1949, 1961). Dodge City.
 COX, WILLIAM EDWARD, Crawford County (1957, 1958). Girard.
 DAUBER, DONALD DEAN, Rice County (1960). Lyons.
 DAVIES, DAVID R., Kiowa County (1960, 1961). Greensburg.
 DICKEN, DARRELL DEAN, Scott County (1942). Scott City.
 DICKSON, WILLIAM M., Neosho County (1961). Erie.
 DIVINE, JOE BENDER, Osage County (1944). Lyndon.
 DUCKERS, JR., HARRY GARFIELD, Wyandotte County (1943). Kansas City.
 DUNAVAN, WILBUR J., Smith County (1960). Smith Center.
 ENGLE, KERMIT VERNON, Ellsworth County (1936). Ellsworth.
 ETHERIDGE, RAY WADE, Barber County (1954, 1959). Medicine Lodge.
 FAIDLEY, DONALD LEE, Phillips County (1956). Phillipsburg.
 FISH, GERALD KEITH, Trego County (1958, 1959). Wakeeney.
 FOOSHEE, DALE LEWIS, Elk County (1958). Howard.
 FROMM, KENNETH WILLIAM, Finney County (1953, 1960). Garden City.
 FRYE, RAYMOND GLENN, Sumner County (1943). Wellington.
 GEBHART, JEWELL OLIVER, Washington County (1945). Washington.
 GERMANN, RALPH F., Hodgeman County (1956, 1958). Jetmore.
 GOERTZ, HARVEY E., Brown County (1937). Hiawatha.
 GRIFFITH, LESTER EDWARD, Marion County (1949, 1960). Marion.
 GRIGGS, OTIS RAY, Reno County (1951, 1960). Hutchinson.
 HACKLER, RAYMOND F., Miami County (1960). Paola.
 HALL, CHARLES TOMAS, Johnson County (1934, 1939). Olathe.
 HAMILTON, ROBERT JOHN, Rush County (1956). La Crosse.
 HARDING, WARREN GAMALIEL, Rooks County (1955). Stockton.
 HARRINGTON, MAURICE CLAREN, Anderson County (1958, 1960). Garnett.
 HARRIS, ALFRED EUGENE, Meade County (1938, 1940). Meade.
 HARRIS, LOREN EMORY, Saline County (1958, 1961). Salina.
 HARTER, EUGENE H., Pottawatomie County (1960). Westmoreland.
 HEDSTROM, EDWIN, Marshall County (1935). Marysville.
 HENDERSHOT, ROGER LYMAN, Harper County (1941, 1951). Anthony.
 HENRY, LARRY GAY, Greeley County (1956, 1959). Tribune.
 HEROD, JON GREVE, Morton County (1957). Elkhart.
 HINKLE, JR., EDGAR NEWTON, Decatur County (1960). Oberlin.

HOLLINGSWORTH, CLARENCE ATHEL, Greenwood County (1937, 1953). Eureka.
HOPE, JERRY CLIFTON, Labette County (1955, 1960). Altamont.
INGLE, DONALD WALTER, Sedgwick County (1930, 1947). Wichita.
JEPSEN, RICHARD LOUIS, Sheridan County (1953). Hoxie.
JOHNSON, ARTHUR RUSSELL, Jefferson County (1958, 1960). Oskaloosa.
JORDAN, J. WILLIS, Seward County (1953, 1961). Liberal.
KIVETT, HARRY LEE, Edwards County (1957). Kinsley.
KUBIK, RICHARD S., Thomas County (1949). Colby.
LINE, MERLIN ELMER, Kearny County (1946, 1949). Lakin.
LOVE, DONALD EDWIN, Cheyenne County (1952). St. Francis.
McCALLUM, GEORGE DANIEL, Chautauqua County (1958, 1959). Sedan.
McCULLY, JR., WILLIAM B., Gray County (1959, 1960). Cimarron.
McKAY, BEN D., Ness County (1954, 1960). Ness City.
McMASTER, GERALD ORESTES, Norton County (1951). Norton.
McWILLIAMS, DONALD DALE, Rawlins County (1956). Atwood.
MADDUX, ALBERT GLENN, Chase County (1959, 1960). Cottonwood Falls.
MALEY, ALVIN EDWARD, Morris County (1953). Council Grove.
MANN, RAY DAMPTON, Wallace County (1956, 1957). Sharon Springs.
MANRY, E. CLIFFORD, Pawnee County (1940, 1947). Larned.
MARLOW, DAROLD DEAN, Wabaunsee County (1950). Alma.
MAXWELL, THOMAS ROBERT, Allen County (1954, 1956). Iola.
NEILL, JOSEPH P., Cloud County (1946, 1960). Concordia.
NEWSOME, BOB WELDON, Riley County (1955, 1960). Manhattan.
NUTTELMAN, ROBERT F., Montgomery County (1941, 1944). Independence.
ORR, BRYCE, Coffey County (1952, 1953). Burlington.
ORWIG, THOMAS W., Dickinson County (1955, 1960). Abilene.
OTT, GENE OWEN, Graham County (1953). Hill City.
PARKER, LEONARD CALVIN, Smith County (1956, 1958). Smith Center.
PETERSON, DONALD KEITH, Stafford County (1955, 1961). St. John.
PHERIGO, DAN L., Wilson County (1958, 1960). Fredonia.
PRETZER, DON DALE, Linn County (1958, 1959). Mound City.
ROBERTSON, JOHN F., Comanche County (1956, 1959). Coldwater.
ROBINSON, JOHN WESLEY, Lane County (1959, 1960). Dighton.
SALLEE, LESLIE H., Clay County (1957, 1960). Clay Center.
SCHLESENER, NORMAN EDWARD, Ottawa County (1956, 1958). Minneapolis.
SHILLING, DALE, Kingman County (1958, 1960). Kingman.
SIX, DEAL DEMI, Douglas County (1935). Lawrence.
SMITH, CHARLES WESLEY, Cowley County (1955). Winfield.
SMYTHE, PATRICK EDWARD, Republic County (1956, 1958). Belleville.
SPENCER, ALBERT ERNEST, Doniphan County (1960, 1962). Troy.
SPITZE, DONALD CHARLES, Stanton County (1957, 1958). Stanton.
STAGG, BEVERLY R., McPherson County (1940, 1960). McPherson.
STROADE, RICHARD DEE, Logan County (1959, 1960). Oakley.
STURDEVANT, JAMES WADELL, Butler County (1948, 1958). El Dorado.
TAYLOR, GAYLORD, Stevens County (1961, 1962). Hugoton.
THOMPSON, JERRY D., Cherokee County (1956, 1960). Columbus.
TYLER, WAYNE HOWARD, Bourbon County (1954, 1955). Fort Scott.
WALKER, JR., MARSHALL FRANCIS, Grant County (1951). Ulysses.
WARD, DON F., Sheridan County (1960, 1961). Hoxie.
WARY, JR., RAYMOND EDWARD, Woodson County (1958, 1960). Yates Center.
WHIPPS, LOREN EDGAR, Sherman County (1946). Goodland.
WHITE, WILBUR WALDO, Gove County (1942). Gove.
WILES, DON KOENIG, Clark County (1956, 1958). Ashland.
WILSON, JACK HARLAN, Wichita County (1951). Leoti.
WILSON, PAUL HENRY, Barton County (1946, 1947). Great Bend.

Statistical Summary for 1959-60

Students by States, Foreign Countries, and Kansas Counties

States

Alabama	5	Kentucky	3	North Dakota	10
Alaska	3	Louisiana	5	Ohio	18
Arizona	5	Maine	1	Oklahoma	37
Arkansas	13	Maryland	13	Oregon	8
California	49	Massachusetts	8	Pennsylvania	19
Colorado	33	Michigan	11	South Carolina	3
Connecticut	6	Minnesota	27	South Dakota	18
Delaware	3	Mississippi	8	Tennessee	2
Florida	2	Missouri	214	Texas	40
Georgia	7	Montana	5	Utah	4
Hawaii	15	Nebraska	149	Vermont	6
Idaho	6	New Hampshire	3	Virginia	6
Illinois	81	New Jersey	35	Washington	6
Indiana	31	New Mexico	16	West Virginia	4
Iowa	33	New York	46	Wisconsin	23
Kansas	6759	North Carolina	7	Wyoming	6
				Total	7812

Foreign Countries and Territories Outside the Continental United States

Africa	1	Germany	1	New Zealand	1
Arabia	1	Greece	5	Nicaragua	1
Argentina	1	Guam	1	Nigeria	4
Aruba	5	Guatemala	1	Pakistan	5
British West Indies	1	Haiti	1	Peru	2
Bolivia	1	Honduras	2	Philippines	4
British Guiana	1	India	65	Puerto Rico	15
Canada	7	Iran	4	Saudi Arabia	1
Canal Zone	1	Iraq	10	Sudan	3
China	44	Israel	1	Sweden	1
Colombia	1	Italy	1	Switzerland	1
Cyprus	1	Japan	2	Thailand	4
Egypt	6	Java	1	Turkey	2
El Salvador	1	Jordan	8	Venezuela	3
Ethiopia	2	Korea	12	West Germany	1
Finland	1	Lebanon	4	West Pakistan	5
Formosa	1	Mexico	5		
				Total	253

Kansas Counties

Allen	36	Greeley	8	Osborne	37
Anderson	19	Greenwood	44	Ottawa	44
Atchison	61	Hamilton	5	Pawnee	41
Barber	21	Harper	26	Phillips	46
Barton	104	Harvey	66	Pottawatomie	130
Bourbon	25	Haskell	12	Pratt	51
Brown	61	Hodgeman	6	Rawlins	31
Butler	107	Jackson	50	Reno	145
Chase	19	Jefferson	27	Republic	72
Chautauqua	19	Jewell	57	Rice	73
Cherokee	29	Johnson	249	Riley	1095
Cheyenne	17	Kearny	5	Rooks	44
Clark	15	Kingman	37	Rush	32
Clay	126	Kiowa	18	Russell	57
Cloud	102	Labette	48	Saline	202
Coffey	32	Lane	17	Scott	28
Comanche	18	Leavenworth	49	Sedgwick	362
Cowley	91	Lincoln	38	Seward	27
Crawford	37	Linn	23	Shawnee	251
Decatur	29	Logan	20	Sheridan	16
Dickinson	147	Lyon	39	Sherman	54
Doniphan	18	McPherson	123	Smith	44
Douglas	26	Marion	42	Stafford	51
Edwards	23	Marshall	126	Stanton	6
Elk	6	Meade	15	Stevens	6
Ellis	47	Miami	49	Sumner	79
Ellsworth	40	Mitchell	63	Thomas	55
Finney	49	Montgomery	80	Trego	19
Ford	39	Morris	33	Wabaunsee	52
Franklin	45	Morton	4	Wallace	13
Geary	199	Nemaha	63	Washington	73
Gove	11	Neosho	50	Wichita	13
Graham	17	Ness	19	Wilson	37
Grant	11	Norton	54	Woodson	15
Gray	15	Osage	63	Wyandotte	169
				Total	6759

Statistical Summary for 1960-61

Students by States, Foreign Countries, and Kansas Counties

States			
Alabama	3	Kentucky	2
Alaska	6	Louisiana	11
Arizona	7	Maine	2
Arkansas	14	Maryland	7
California	51	Massachusetts	10
Colorado	37	Michigan	12
Connecticut	9	Minnesota	28
Delaware	2	Mississippi	11
District of Columbia	3	Missouri	258
Florida	6	Montana	5
Georgia	8	Nebraska	145
Hawaii	15	Nevada	1
Idaho	5	New Hampshire	4
Illinois	92	New Jersey	43
Indiana	32	New Mexico	14
Iowa	44	New York	68
Kansas	7129	North Carolina	8
		North Dakota	12
		Ohio	24
		Oklahoma	38
		Oregon	7
		Pennsylvania	24
		South Carolina	2
		South Dakota	14
		Tennessee	7
		Texas	42
		Utah	6
		Vermont	8
		Virginia	13
		Washington	7
		West Virginia	6
		Wisconsin	26
		Wyoming	8
		Total	8336

Foreign Countries and Territories Outside the Continental United States

Afghanistan	1	Greece	1	Nigeria	3
Africa	1	Guam	1	Norway	1
Arabia	2	Guatemala	2	Pakistan	9
Argentina	3	Honduras	2	Peru	5
Aruba	2	India	143	Philippines	8
Bolivia	1	Indonesia	1	Puerto Rico	14
Cambodia	6	Iran	9	South Rhodesia	1
Canada	5	Iraq	11	Spain	2
Canal Zone	2	Israel	3	Sudan	1
Chile	1	Japan	4	Switzerland	2
China	66	Java	1	Syria	2
Colombia	2	Jordan	7	Thailand	5
Costa Rica	1	Korea	16	Turkey	5
Cyprus	1	Lebanon	4	Venezuela	3
Egypt	13	Mexico	4	Vietnam	8
England	2	Morocco	1	West Africa	1
Ethiopia	3	Netherlands	2	West Pakistan	3
Formosa	2	New Zealand	1		
Germany	2	Nicaragua	3	Total	404

Kansas Counties

Allen	44	Greeley	13	Ottawa	56
Anderson	16	Greenwood	34	Pawnee	38
Atchison	66	Hamilton	7	Phillips	33
Barber	27	Harper	27	Pottawatomie	132
Barton	118	Harvey	76	Pratt	60
Bourbon	18	Haskell	10	Rawlins	25
Brown	76	Hodgeman	5	Reno	163
Butler	99	Jackson	42	Republic	74
Chase	17	Jefferson	27	Rice	71
Chautauqua	16	Jewell	49	Riley	1130
Cherokee	29	Johnson	336	Rooks	30
Cheyenne	32	Kearny	3	Rush	17
Clark	15	Kingman	43	Russell	57
Clay	132	Kiowa	24	Saline	207
Cloud	107	Labette	50	Scott	42
Coffey	34	Lane	16	Sedgwick	450
Comanche	21	Leavenworth	51	Seward	29
Cowley	91	Lincoln	35	Shawnee	262
Crawford	26	Linn	18	Sheridan	29
Decatur	26	Logan	16	Sherman	43
Dickinson	172	Lyon	50	Smith	30
Doniphan	18	McPherson	122	Stafford	56
Douglas	32	Marion	47	Stanton	7
Edwards	27	Marshall	133	Stevens	6
Elk	6	Meade	20	Sumner	83
Ellis	46	Miami	43	Thomas	46
Ellsworth	44	Mitchell	67	Trego	14
Finney	49	Montgomery	81	Wabaunsee	58
Ford	35	Morris	44	Wallace	11
Franklin	34	Nemaha	57	Washington	96
Geary	232	Neosho	54	Wichita	17
Gove	12	Ness	20	Wilson	32
Graham	13	Norton	58	Woodson	15
Grant	11	Osage	55	Wyandotte	177
Gray	17	Osborne	42		
				Total	7129

Degrees Conferred in the Year 1960

SCHOOL	Men	Women	Total
SCHOOL OF AGRICULTURE (B. S.)	161	.....	161
Agriculture	129	.....	129
Agricultural Journalism	1	.....	1
Feed Technology	18	.....	18
Landscape Design	7	.....	7
Milling Industry	6	.....	6
SCHOOL OF ARTS AND SCIENCES (B. S.)	406	207	613
Bachelor of Arts	36	47	83
Bachelor of Science	215	45	260
Business Administration	118	9	127
Chemistry	3	.....	3
Elementary Education	4	89	93
Bachelor of Music .....	.....	1	1
Music Education	2	10	12
Physical Education	20	4	24
Technical Journalism	8	2	10
SCHOOL OF ENGINEERING AND ARCHITECTURE (B. S.)	340	1	341
Agricultural Engineering	14	.....	14
Architectural Engineering	11	.....	11
Architecture	30	.....	30
Chemical Engineering	15	.....	15
Civil Engineering	43	.....	43
Electrical Engineering	103	.....	103
Industrial Education	2	.....	2
Industrial Engineering	28	1	29
Industrial Technology	10	.....	10
Mechanical Engineering	78	.....	78
Nuclear Engineering	6	.....	6
SCHOOL OF HOME ECONOMICS (B. S.)	1	78	79
Home Economics .....	.....	73	73
Home Economics and Journalism .....	.....	2	2
Home Economics and Nursing .....	.....	3	3
Restaurant Management	1	.....	1
SCHOOL OF VETERINARY MEDICINE (D. V. M.)	67	2	69
Veterinary Medicine	67	2	69
GRADUATE SCHOOL (M. S.)	205	34	239
Art (Home Economics) .....	.....	2	2
Agricultural Economics	10	.....	10
Agricultural Education	2	.....	2
Agricultural Engineering	2	.....	2
Agronomy	10	.....	10
Anatomy	2	.....	2
Animal Husbandry	4	.....	4
Applied Mechanics	5	.....	5
Architecture	3	.....	3
Bacteriology	3	.....	3
Botany	2	.....	2
Business Administration	9	.....	9
Chemical Engineering	4	.....	4
Chemistry	2	.....	2
Civil Engineering	5	.....	5
Clothing and Textiles .....	.....	6	6
Dairy Husbandry	9	.....	9
Economics	6	.....	6
Education	20	4	24
Electrical Engineering	12	.....	12
English	3	2	5
Entomology	4	.....	4
Extension Education	2	.....	2
Family and Child Development .....	.....	3	3
Farm Mechanics	2	.....	2
Feed Technology	1	.....	1
Foods and Nutrition .....	.....	3	3
General Home Economics .....	.....	2	2
Geology	5	.....	5
Government	1	.....	1
History	2	2	4
Home Economics Education .....	.....	3	3
Horticulture	6	.....	6
Industrial Education	1	.....	1
Institutional Management .....	.....	3	3
Mathematics	7	.....	7

Degrees Conferred in the Year 1960—Concluded

SCHOOL	Men	Women	Total
Mechanical Engineering	10	.....	10
Milling Industry	2	.....	2
Music	4	1	5
Nuclear Engineering	2	.....	2
Pathology	3	.....	3
Philosophy	1	.....	1
Physical Education	9	.....	9
Physical Science Teaching	2	.....	2
Physics	10	.....	10
Physiology	1	.....	1
Poultry Husbandry	3	.....	3
Psychology	2	.....	2
Speech	2	2	4
Statistics	2	.....	2
Surgery and Medicine	4	.....	4
Zoology	4	1	5
GRADUATE SCHOOL (Ph. D.)	30	1	31
Agronomy	1	.....	1
Animal Breeding	2	.....	2
Animal Nutrition	3	.....	3
Bacteriology	1	.....	1
Chemistry	9	.....	9
Entomology	8	.....	8
Foods and Nutrition .....	.....	1	1
Genetics	3	.....	3
Parasitology	2	.....	2
Physics	1	.....	1
Grand Total	1210	323	1533

NEW AND DIFFERENT STUDENTS ENROLLED
AT KANSAS STATE UNIVERSITY

First Semester, Second Semester and
Summer Session 1959-60

Freshmen	1827
Sophomores	1681
Juniors	1447
Seniors and 5th Year	1494
Specials and Provisionals	274
Graduate	1342
TOTAL	8065

Degrees Conferred in the Year 1961

SCHOOL	Men	Women	Total
SCHOOL OF AGRICULTURE (B. S.)	144	.....	144
Agricnlture	114	.....	114
Feed Technology	16	.....	16
Landscape Design	5	.....	5
Milling Industry	9	.....	9
SCHOOL OF ARTS AND SCIENCES (B. S.)	428	228	656
Bachelor of Arts	67	61	128
Bachelor of Science	189	40	229
Business Administration	134	10	144
Elementary Education	4	103	107
Music Education	5	5	10
Physical Education	24	8	32
Technical Journalism	5	1	6
SCHOOL OF ENGINEERING AND ARCHITECTURE (B. S.)	359	.....	359
Agricultural Engineering	23	.....	23
Architectural Engineering	9	.....	9
Architecture	42	.....	42
Chemical Engineering	22	.....	22
Civil Engineering	43	.....	43
Electrical Engineering	100	.....	100

Degrees Conferred in the Year 1961—Continued

SCHOOL	Men	Women	Total
Industrial Education	1	.....	1
Industrial Engineering	19	.....	19
Industrial Technology	6	.....	6
Mechanical Engineering	77	.....	77
Nuclear Engineering	17	.....	17
SCHOOL OF HOME ECONOMICS (B. S.) .....	.....	117	117
Home Economics .....	.....	103	103
Home Economics and Journalism .....	.....	4	4
Home Economics and Nursing .....	.....	9	9
Restaurant Management .....	.....	1	1
SCHOOL OF VETERINARY MEDICINE (D. V. M.)	65	.....	65
Veterinary Medicine	65	.....	65
GRADUATE SCHOOL (M. S.)	216	31	247
Agricultural Economics	11	.....	11
Agricultural Education	3	.....	3
Agricultural Engineering	3	.....	3
Agronomy	9	.....	9
Anatomy	3	.....	3
Animal Husbandry	5	.....	5
Applied Mechanics	9	.....	9
Architectural Engineering	1	.....	1
Architecture	3	.....	3
Bacteriology	7	1	8
Biochemistry .....	.....	1	1
Botany	5	.....	5
Business Administration	2	.....	2
Chemical Engineering	4	.....	4
Chemistry	9	4	13
Civil Engineering	12	.....	12
Dairy Husbandry	7	.....	7
Economics	6	.....	6
Education	15	6	21
Electrical Engineering	5	.....	5
English	1	1	2
Entomology	5	.....	5
Extension Education	4	.....	4
Family and Child Development .....	.....	2	2
Family Economics .....	.....	2	2
Farm Mechanics	2	.....	2
Foods and Nutrition .....	.....	3	3
Geography	2	.....	2
Geology	2	.....	2
Government	1	.....	1
History	4	.....	4
Horticulture	6	1	7
Industrial Engineering	3	.....	3
Institutional Management .....	.....	4	4
Mathematics	8	.....	8
Mechanical Engineering	14	.....	14
Milling Industry	2	.....	2
Music	2	2	4
Nuclear Engineering	3	.....	3
Pathology	2	.....	2
Philosophy	3	.....	3
Physical Education	1	.....	1
Physics	3	.....	3
Physiology	3	.....	3
Poultry Husbandry	5	.....	5
Regional Planning	1	.....	1
Sociology	3	.....	3
Speech	4	2	6
Statistics	3	1	4
Surgery and Medicine	4	.....	4
Technical Journalism .....	.....	1	1
Zoology	6	.....	6
GRADUATE SCHOOL (Ph. D.)	31	1	32
Agricultural Economics	1	.....	1
Agronomy	1	.....	1
Animal Breeding	3	.....	3
Animal Nutrition	1	.....	1
Bacteriology	2	.....	2
Chemistry	9	.....	9
Entomology	6	.....	6
Foods and Nutrition .....	.....	1	1

Degrees Conferred in the Year 1961—Concluded

SCHOOL	Men	Women	Total
Genetics	1	.....	1
Milling Industry	1	.....	1
Pathology	1	.....	1
Plant Pathology	3	.....	3
Physics	1	.....	1
Zoology	1	.....	1
Grand Total	1243	377	1620

NEW AND DIFFERENT STUDENTS ENROLLED
AT KANSAS STATE UNIVERSITYFirst Semester, Second Semester and
Summer Session 1960-61

Freshmen	2197
Sophomores	1692
Juniors	1466
Seniors and 5th Year	1541
Specials and Provisionals	327
Graduate	1517
TOTAL	8740

Tabulation for First Semester 1959-60

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	102	1	64		59		47	1	5		277	2	279
Agricultural Administration							4				4		4
Agricultural Economics	16		21		23		31				91		91
Agric. Economics (Tech.)	1				2						3		3
Agricultural Education	20		25		15		40				100		100
Agricultural Journalism	4		5				1				10		10
Dairy Manufacturing	3		5		2		10				20		20
Feed Technology	18		23		24		27				92		92
Horticulture (Specialized)	2		2		3		5				12		12
Landscape Design	6		2		6		8		2		24		24
Milling Technology	7		3		12		9				31		31
Technical Agronomy	6		13		12		13				44		44
TOTAL	185	1	163		158		195	1	7		708	2	710

SCHOOL OF ARTS AND SCIENCES

Biological Science	89	28	86	15	16	9	21	7	6		218	59	277
Humanities	19	57	20	43	23	34	22	28	1	4	85	166	251
Physical Science	53	14	45	8	38	9	56	1	3	1	195	33	228
Social Science	34	29	45	27	35	23	42	20	3	6	159	105	264
Education	59	153	70	154	58	126	75	108	10	6	272	547	819
General	65	52	31	18	20	5	16	5	3		135	80	215
Business Administration	108	21	111	23	100	18	121	10	9	1	449	73	522
Applied Music		1	1	3	1						2	4	6
Voice, Music, Applied		1						1				2	2
Chemistry (Professional)					2		3	1			5	1	6
Geology (Professional)	2				4		25				31		31
Music Education, Instr.							3	1			3	1	4
Physics (Professional)	1		1		3		2	1			7	1	8
Technical Journalism			1		5	2	7	3			13	5	18
Special Students		1	2		1				21	21	24	22	46
TOTAL	430	357	413	291	306	226	396	183	56	39	1601	1096	2697

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	15		19		25		17		1		77		77
Architectural Engineering	25	1	16		13		16				70	1	71
Architecture	48	3	68	1	41		76		9		242	4	246
Chemical Engineering	49	2	37		18		18		2		124	2	126
Civil Engineering	65		70		44		52		5		236		236
Electrical Engineering	102		103		142		150		8		505		505
Industrial Education	1		2		6		8				17		17
Industrial Engineering	13		9		17		35		1		75		75
Industrial Technology	4		13		8		15				40		40
Mechanical Engineering	80		87		81		99	1	5		352	1	353
Nuclear Engineering	47	1	40		22		14				123	1	124
Special Students			1						2	1	3	1	4
TOTAL	449	7	465	1	417		500	1	33	1	1864	10	1874

SCHOOL OF HOME ECONOMICS

Home Economics		128	2	84		82		69		2	2	365	367
Dietetics and Inst. Mngt.		8		9		11		7				35	35
Home Econ. and Journ.		10		7		3		2		1		23	23
Home Econ. and Nursing		25		20		1						46	46
Restaurant Management	2					1	1				3	1	4
Special Students										4		4	4
TOTAL	2	171	2	120		98	1	78		7	5	474	479

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	68	1	56	2	65		67	2	1		257	5	262
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SUMMARY

Net Total Undergraduates	1134	537	1099	414	946	324	1159	265	97	47	4435	1587	6022
Graduate School											612	117	729
GRAND TOTAL											5047	1704	6751

Tabulation for Second Semester 1959-60

SCHOOL OF AGRICULTURE													
	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	97	1	61	.....	61	.....	32	.....	1	.....	252	1	253
Agricultural Administration .....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	.....	2
Agricultural Economics	16	.....	32	.....	24	.....	23	.....	.....	.....	95	.....	95
Agric. Economics (Tech.)	1	.....	1	.....	1	.....	.....	.....	.....	.....	3	.....	3
Agricultural Education	25	.....	24	.....	15	.....	32	.....	.....	.....	96	.....	96
Agricultural Journalism	2	.....	3	.....	.....	.....	.....	.....	.....	.....	5	.....	5
Dairy Manufacturing	1	.....	5	.....	2	.....	6	.....	.....	.....	14	.....	14
Feed Technology	15	.....	22	.....	21	.....	18	.....	.....	.....	76	.....	76
Horticulture (Specialized)	2	.....	1	.....	3	.....	6	.....	.....	.....	12	.....	12
Landscape Design	8	1	6	.....	8	.....	6	.....	.....	.....	28	1	29
Milling Technology	8	.....	4	.....	11	.....	8	.....	.....	.....	31	.....	31
Technical Agronomy	5	.....	12	.....	12	.....	10	.....	.....	.....	39	.....	39
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	1
TOTAL	180	2	171	.....	158	.....	143	.....	2	.....	654	2	656
SCHOOL OF ARTS AND SCIENCES													
Biological Science	74	22	82	18	17	7	16	5	1	1	190	53	243
Humanities	23	55	27	37	34	37	23	18	.....	2	107	149	256
Physical Science	47	11	48	7	42	9	43	11	2	1	182	39	221
Social Science	43	36	50	30	45	21	32	16	5	5	175	108	283
Education	81	151	91	155	72	133	68	87	5	2	317	528	845
General	67	53	23	17	20	5	14	4	2	.....	126	79	205
Business Administration	126	27	146	22	107	15	108	5	6	.....	493	69	562
Applied Music (Instr. Maj.) ..	.....	1	1	2	1	.....	.....	.....	.....	.....	2	3	5
Applied Music (Voice Maj.) ..	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Chemistry (Professional) .....	.....	.....	.....	1	.....	.....	2	1	.....	.....	2	2	4
Geology (Professional)	2	.....	.....	.....	3	.....	16	.....	.....	.....	21	.....	21
Physics (Professional) .....	.....	.....	1	.....	2	.....	1	.....	.....	.....	4	.....	4
Technical Journalism .....	.....	.....	1	.....	5	2	6	2	.....	.....	12	4	16
Special Students .....	.....	1	3	.....	.....	.....	.....	.....	25	28	28	29	57
TOTAL	463	357	473	289	348	229	329	150	46	39	1659	1064	2723
SCHOOL OF ENGINEERING AND ARCHITECTURE													
Agricultural Engineering	14	.....	17	.....	23	.....	12	.....	1	.....	67	.....	67
Architectural Engineering	11	1	14	.....	12	.....	13	.....	.....	.....	50	1	51
Architecture	55	2	69	1	41	.....	71	.....	7	.....	243	3	246
Chemical Engineering	39	.....	28	.....	13	.....	15	.....	1	.....	96	.....	96
Civil Engineering	53	.....	64	.....	40	.....	35	.....	3	.....	195	.....	195
Electrical Engineering	89	.....	87	.....	128	.....	119	.....	4	.....	427	.....	427
Industrial Education .....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	.....	2
Industrial Engineering	8	.....	9	.....	18	.....	26	.....	1	.....	62	.....	62
Industrial Technology	1	.....	9	.....	8	.....	6	.....	.....	.....	24	.....	24
Mechanical Engineering	67	.....	70	.....	81	.....	66	1	1	.....	285	1	286
Nuclear Engineering	39	.....	29	.....	20	.....	10	.....	2	.....	100	.....	100
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	2	1	3
TOTAL	376	3	396	1	384	.....	375	1	22	1	1553	6	1559
SCHOOL OF HOME ECONOMICS													
Home Economics .....	.....	119	2	76	.....	82	.....	57	.....	2	2	336	338
Diet. and Inst. Mngt. ....	.....	8	.....	6	.....	13	.....	7	.....	.....	.....	34	34
Home Econ. and Journ. ....	.....	7	.....	6	.....	5	.....	1	.....	.....	.....	19	19
Home Econ. and Nursing .....	.....	25	.....	21	.....	.....	.....	.....	1	.....	.....	47	47
Restaurant Management	1	.....	2	.....	.....	1	2	.....	.....	.....	5	1	6
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	5	5
TOTAL	1	159	4	109	.....	101	2	65	.....	8	7	442	449
SCHOOL OF VETERINARY MEDICINE													
Veterinary Medicine	60	1	56	2	66	.....	68	2	1	.....	251	5	256
SUMMARY													
Net Total Undergraduates	1080	522	1100	401	956	330	917	218	71	48	4124	1519	5643
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	595	129	724
GRAND TOTAL .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4719	1648	6367

Tabulation for Summer Session 1960

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	3		5		11		4		2		25		25
Agricultural Economics	1		1		3		1				6		6
Agricultural Education			3		4		4				11		11
Agricultural Journalism			1								1		1
Dairy Manufacturing							1				1		1
Feed Technology	1		1		5		3				10		10
Horticulture (Specialized)					1		2				3		3
Landscape Design			1		5		1				7		7
Milling Technology	1				2		1				4		4
Technical Agronomy					4						4		4
TOTAL	6		12		35		17		2		72		72

SCHOOL OF ARTS AND SCIENCES

SCHOOL OF ARTS AND SCIENCES													
Biological Science	10	5	18	5	6	.....	5	.....	3	.....	42	10	52
Humanities	1	9	5	8	9	11	6	5	.....	1	21	34	55
Physical Science	5	2	12	2	20	2	20	.....	1	.....	58	6	64
Social Science	4	5	10	9	12	4	3	1	1	1	30	20	50
Education	7	16	11	35	21	75	24	59	2	19	65	204	269
General	6	9	5	7	4	3	3	.....	1	.....	19	19	38
Business Administration	11	.....	22	4	35	6	24	.....	1	.....	93	10	103
Applied Music .....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	1
Chemistry (Professional) .....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	1
Geology (Professional) .....	.....	.....	.....	.....	3	.....	4	.....	.....	.....	7	.....	7
Technical Journalism .....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	2	.....	2
Special Students .....	.....	1	.....	.....	.....	.....	.....	.....	39	68	107	1	108
TOTAL	44	47	84	70	113	101	89	65	48	89	378	372	750

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering		1		7		2			10		10	
Architectural Engineering	1	3		3		1			8		8	
Architecture	2	8		15		31		1	56	1	57	
Chemical Engineering	2	6		4		2			14		14	
Civil Engineering	5	6		14	1	8		2	35	1	36	
Electrical Engineering	11	21		40		29		2	103		103	
Industrial Engineering	2	2		4		4		1	13		13	
Industrial Technology		1		1		2			4		4	
Mechanical Engineering	2	9		28		14		2	55		55	
Nuclear Engineering	1	7		9		3			20		20	
Special Students								8	8		8	
TOTAL	26	64		125	1	96		15	1	326	2	328

SCHOOL OF HOME ECONOMICS

Home Economics	17	9	28	5	4	63	63	
Diet. and Inst. Mngt.	2	1	2			5	5	
Home Econ. and Journ.	1	2	3			6	6	
Home Econ. and Nursing	5	17				22	22	
Restaurant Management		1			1		1	
Special Students					5	5	5	
TOTAL	25	1	29	33	5	9	101	102

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine			1								1		1
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SUMMARY

Net Total Undergraduates	76	72	162	99	273	135	195	77	65	99	778	475	1253
Graduate School											664	202	866
GRAND TOTAL											1442	677	2119

Tabulation for First Semester 1960-61

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	151		76		54		64		3		348		348
Agricultural Economics	3		16		25		26				70		70
Agric. Economics (Tech.)	1		1		1		1				4		4
Agric. Education (Tech.)	21		16		12		22				71		71
Agricultural Journalism	3		2		2						7		7
Dairy Manufacturing	3		2		5		3				13		13
Feed Technology	16		17		19		28		1		81		81
Horticulture (Specialized) ..	2				1	1	5				8	1	9
Landscape Design	6	2	6		7		7				26	2	28
Milling Technology	14		7		4		11		1		37		37
Technical Agronomy	1		3		12		14		1		31		31
Special Students					1				1		2		2
TOTAL	221	2	146		143	1	181		7		698	3	701

SCHOOL OF ARTS AND SCIENCES

Biological Science	158	33	96	16	17	11	24	2	8	2	303	64	367
Humanities	24	46	27	45	17	32	27	39	3	3	98	165	263
Physical Science	49	13	52	12	52	7	68	7	2		223	39	262
Social Science	38	37	47	35	57	24	43	19	3	1	188	116	304
Education	70	173	83	142	89	166	89	152	6	9	337	642	979
General	82	75	47	34	14	14	21	4	5		169	127	296
Business Administration	148	34	118	19	138	13	128	11	11	2	543	79	622
Applied Music	1	3			2	1	2				5	4	9
Chemistry (Professional)							1				1		1
Geology (Professional)			1				3				4		4
Technical Journalism					1		5	2			6	2	8
Special Students		3	1				1		16	24	18	27	45
TOTAL	570	417	472	303	387	268	412	236	54	41	1895	1265	3160

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	23		16		16		26		1		82		82
Architectural Engineering	23		18		15		12				68		68
Architecture	80	2	77	4	56	1	87		3		303	7	310
Chemical Engineering	47		30		29		19		3		128		128
Civil Engineering	55		57	1	48		52		1		213	1	214
Electrical Engineering	124	1	107		95		138		3		467	1	468
Industrial Education							1				1		1
Industrial Engineering	8		10		15		21				54		54
Industrial Technology			3		6		9				18		18
Mechanical Engineering	101		75		62		95	1	4		337	1	338
Nuclear Engineering	38		38	1	22		22				120	1	121
Special Students									3		3		3
TOTAL	499	3	431	6	364	1	482	1	18		1794	11	1805

SCHOOL OF HOME ECONOMICS

Home Economics	2	187		97	1	77		84		5	3	450	453
Diet. and Inst. Mngt.		7		5		8		9				29	29
Home Econ. and Journ.		5		4		5		4				18	18
Home Econ. and Nursing		28		12		4						44	44
Restaurant Management	1		1		2		1	1	1		6	1	7
Special Students										7		7	7
TOTAL	3	227	1	118	3	94	1	98	1	12	9	549	558

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	65	4	62	1	58	2	65		1		251	7	258
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SUMMARY

Net Total Undergraduates	1358	653	1112	428	955	366	1141	335	81	53	4647	1835	6482
Graduate School											671	112	783
GRAND TOTAL											5318	1947	7265

Tabulation for Second Semester 1960-61

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	132	2	77	.....	55	.....	53	1	8	.....	325	3	328
Agricultural Administration .....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Agricultural Economics	3	.....	23	.....	23	.....	15	.....	.....	.....	64	.....	64
Agric. Economics (Tech.) .....	.....	.....	1	.....	1	.....	1	.....	.....	.....	3	.....	3
Agricultural Education	22	.....	17	.....	13	.....	16	.....	1	.....	69	.....	69
Agricultural Journalism .....	.....	.....	1	1	1	.....	.....	.....	.....	.....	2	1	3
Dairy Manufacturing	2	.....	3	.....	5	.....	3	.....	.....	.....	13	.....	13
Feed Technology	14	.....	15	.....	17	.....	21	.....	.....	.....	67	.....	67
Horticulture (Specialized)	2	.....	2	.....	2	.....	1	.....	.....	.....	7	.....	7
Landscape Design	7	1	5	.....	9	.....	5	.....	1	.....	27	1	28
Milling Technology	14	1	11	.....	7	.....	8	.....	.....	.....	40	1	41
Technical Agronomy .....	.....	.....	4	.....	11	.....	9	.....	1	.....	25	.....	25
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	3	.....	3
TOTAL	196	4	160	1	144	.....	132	1	14	.....	646	6	652

SCHOOL OF ARTS AND SCIENCES

Biological Science	134	31	87	17	20	14	18	2	7	2	266	66	332
Humanities	19	51	35	45	17	35	26	35	1	6	98	172	270
Physical Science	44	13	60	12	57	5	58	6	.....	.....	219	36	255
Social Science	53	34	56	29	52	27	31	18	8	3	200	111	311
Education	87	177	87	138	99	158	80	124	14	19	367	616	983
General	87	73	38	26	17	10	18	2	6	3	166	114	280
Business Administration	156	24	130	20	145	17	108	12	11	.....	550	73	623
Applied Music	2	3	.....	.....	2	1	2	.....	.....	1	6	5	11
Chemistry (Professional) .....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	1
Geology (Professional) .....	.....	.....	1	.....	.....	.....	3	.....	.....	.....	4	.....	4
Technical Journalism .....	.....	.....	.....	.....	1	.....	5	2	.....	.....	6	2	8
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	17	40	17	40	57
TOTAL	582	406	495	287	410	267	349	201	64	74	1900	1235	3135

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	15	.....	15	.....	13	.....	20	.....	.....	.....	63	.....	63
Architectural Engineering	14	.....	13	.....	11	.....	13	.....	2	.....	53	.....	53
Architecture	86	1	74	4	57	1	73	.....	3	.....	293	6	299
Chemical Engineering	38	.....	26	.....	29	.....	17	.....	1	.....	111	.....	111
Civil Engineering	50	.....	54	1	51	.....	39	.....	.....	.....	194	1	195
Electrical Engineering	107	1	89	.....	91	.....	87	.....	2	.....	376	1	377
Industrial Engineering	12	.....	14	.....	15	.....	17	.....	.....	.....	58	.....	58
Industrial Technology .....	.....	.....	2	.....	6	.....	6	.....	.....	.....	14	.....	14
Mechanical Engineering	72	.....	65	.....	59	.....	61	1	5	.....	262	1	263
Nuclear Engineering	30	.....	31	1	20	.....	17	.....	.....	.....	98	1	99
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	5	1	5	1	6
TOTAL	424	2	383	6	352	1	350	1	18	1	1527	11	1538

SCHOOL OF HOME ECONOMICS

Home Economics .....	.....	174	.....	91	1	71	.....	76	1	5	2	417	419
Dietetics and Inst. Mngt. ....	.....	6	.....	6	.....	8	.....	8	.....	1	.....	29	29
Home Econ. and Journ. ....	.....	4	.....	6	.....	7	.....	4	.....	.....	.....	21	21
Home Econ. and Nursing .....	.....	25	.....	13	.....	2	.....	.....	.....	1	.....	41	41
Restaurant Management	6	.....	1	.....	2	.....	1	1	2	.....	12	1	13
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	5	5
Home Ec. with Liberal Arts ..	.....	3	.....	3	.....	1	.....	.....	.....	.....	.....	7	7
TOTAL	6	212	1	119	3	89	1	89	3	12	14	521	535

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	61	3	62	1	58	2	63	1	245	6	251
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SUMMARY

Net Total Undergraduates	1269	627	1101	414	967	359	895	292	100	87	4332	1779	6111
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	750	121	871
GRAND TOTAL .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5082	1900	6982

Tabulation for Summer Session 1961

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	17		5		9		6		3		40		40
Agricultural Economics			3		1		2				6		6
Agricultural Education	1				5		3				9		9
Agricultural Journalism			1								1		1
Dairy Manufacturing					1						1		1
Feed Technology	1		3		3		7				14		14
Landscape Design	1		1		3		2				7		7
Milling Technology			1		2		3				6		6
Technical Agronomy			1		1						2		2
Special Students									2	1	2	1	3
TOTAL	20		15		25		23		5	1	88	1	89

SCHOOL OF ARTS AND SCIENCES

Biological Science	17	9	21	5	11	7	3		2		54	21	75
Humanities	3	14	2	8	8	17	5	8	1	5	19	52	71
Physical Science	4	4	15	4	22	2	24	1	1		66	11	77
Social Science	5	4	11	7	20	10	17	1	1	3	54	25	79
Education	8	38	14	34	31	90	23	73	3	6	79	241	320
General	8	9	1	2	2	2	5		3	4	19	17	36
Business Administration	14	3	23	4	39	5	24		1		101	12	113
Music, Applied		1			2	1					2	2	4
Technical Journalism					1						1		1
Special Students		2							48	77	48	79	127
TOTAL	59	84	87	64	136	134	101	83	60	95	443	460	903

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering			3		3		3				9		9
Architectural Engineering	4		1		1		4		1		11		11
Architecture	6		8	3	14		32				60	3	63
Chemical Engineering	6		2	1	1				1		10	1	11
Civil Engineering	5		10		16		14		1		46		46
Electrical Engineering	15		18	1	26		17		4		80	1	81
Industrial Engineering	1		1		4						6		6
Industrial Technology					1		2				3		3
Mechanical Engineering	5		12		18		19		1		55		55
Nuclear Engineering	4		8		8	1	4				24	1	25
Special Students									6	1	6	1	7
TOTAL	46		63	5	92	1	95		14	1	310	7	317

SCHOOL OF HOME ECONOMICS

Home Economics		25		18		22		18		5		88	88
Diet. and Inst. Mngt.		3		3		2		1		1		10	10
Home Econ. and Journ.		1		2		1						4	4
Home Econ. and Nursing		6		12		2						20	20
Restaurant Management		1					1				2		2
Special Students		1								11		12	12
TOTAL	1	36		35		27	1	19		17	2	134	136

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	3		2		2	1			1		8	1	9
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SUMMARY

Net Total Undergraduates	129	120	167	104	255	163	220	102	80	124	851	603	1454
Graduate School											704	240	944
GRAND TOTAL											1612	848	2460

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