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KANSAS STATE UNIVERSITY

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1960-1961 and 1961-1962

General Catalog Issue

KANSAS STATE UNIVERSITY-MANHATTAN

KANSAS STATE UNIVERSITY BULLETIN



GENERAL CATALOG 1960-1962

AUGUST 1, 1960

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OF AGRICULTURE AND APPLIED SCIENCE
MANHATTAN, KANSAS

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Business Directions

General information about the University is obtainable from the President.

Prospective students should communicate with the Director of Admissions.

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, 1960-61

Sept. 1, Thurs. Beginning of pay period for 9-months staff.
Sept. 5, Mon. Holiday—Labor Day.
Sept. 11, 3:00 p.m., Sun. Convocation for new students and their parents.
Sept. 12-14, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
Sept. 15, Thurs. Classes begin. Late enrollment fee, \$2.50.
Sept. 17, Noon, Sat. Regular registration closes for University staff, elementary and secondary school teachers.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Sept. 24, Noon, Sat. Last day to enroll without special permission from student's dean (2nd week).
Oct. 29, Noon, Sat. Deficiency reports due in deans' offices (7th week).
Nov. 12, Noon, Sat. Last day for dropping courses without a Wd or failure being recorded (9th week).
Nov. 22, 10:00 p.m., Tues. Thanksgiving student recess begins.
Nov. 24, Thurs. Holiday—Thanksgiving Day.
Nov. 28, Mon. Classes resume.
Dec. 21, 10:00 p.m., Wed. Christmas student recess begins.
Dec. 26, Mon. Holiday for Christmas Day.
Jan. 2, Mon. Holiday for New Year's Day.
Jan. 5, Thurs. Classes resume.
Jan. 14, Noon, Sat. Last day subject may be dropped before end of semester.
Jan. 21-27, Sat. Begin 1:00 p.m. End Fri. Noon. Semester examinations for all students.
Jan. 30, 5:00 p.m., Mon. Grade reports to Registrar for all students including candidates for degrees.
Feb. 1, 8:00 a.m., Wed. Reports of failures from Registrar to deans' offices.

SECOND SEMESTER, 1960-61

Feb. 2-4, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
Feb. 6, Mon. Classes begin. Late enrollment fee, \$2.50.
Feb. 7, 4:00 p.m., Tues. Senate meeting to approve candidates for degrees, fall semester.
Feb. 11, 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. 18, Sat. Last day to enroll without special permission from student's dean (2nd week).
Mar. 25, Noon, Sat. Deficiency reports due in deans' offices (7th week).
Apr. 8, Noon, Sat. Last day for dropping courses without a Wd or failure being recorded (9th week).
Apr. 8, Noon, Sat. Spring student recess begins.
Apr. 17, Mon. Classes resume.
May 20, Noon, Sat. Last day a subject may be dropped before end of semester.
May 27-June 2, Noon, Sat.-Fri. Noon. Semester examinations for all students excepting graduating seniors.
May 29, Noon, Mon. Grades to Registrar for all candidates for degrees.
June 1, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
June 4, 2:00 p.m., Sun. Commencement, Fieldhouse.
June 5, 5:00 p.m., Mon. Grade reports to Registrar.
June 8, 8:00 a.m., Thurs. Reports of failures from Registrar to deans' offices.

8-WEEK SUMMER SESSION, 1961

June 12, 8:00 a.m., Mon.—Registration of all students including physical examinations, testing, and orientation for new students.
June 13, 7:30 a.m., Tues. Classes begin. Late enrollment fee, \$2.50.
June 17, Noon, Sat. Regular registration closes for University staff.
End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
Last day to enroll without special permission from student's dean.
July 4, Tues. Holiday—Independence Day.
July 7, 5:00 p.m., Fri. Deficiency reports due in deans' offices (4th week).
July 14, 5:00 p.m., Fri. Last day for dropping courses without a Wd or failure being recorded (5th week).
Aug. 1, 4:00 p.m., Tues. Last day subject may be dropped before end of session.
Aug. 4, 5:00 p.m., Fri. Last day for examinations.
Aug. 5, Noon, Sat. Grade reports to Registrar.

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

CALENDAR (Continued)

FIRST SEMESTER, 1961-62

Sept. 1, Fri. Beginning of pay period for 9-months staff.
 Sept. 4, Mon. Holiday—Labor Day.
 Sept. 10, 3:00 p.m., Sun. Convocation for new students and their parents.
 Sept. 11-13, Mon.-Wed. Registration of all students including physical examinations, testing, and orientation for new students.
 Sept. 14, Thurs. Classes begin. Late enrollment fee, \$2.50.
 Sept. 16, Noon, Sat. Regular registration closes for University staff, elementary and secondary school teachers.
 End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
 Sept. 23, Noon, Sat. Last day to enroll without special permission from student's dean (2nd week).
 Oct. 28, Noon, Sat. Deficiency reports due in deans' offices (7th week).
 Nov. 11, Noon, Sat. Last day for dropping courses without a Wd or failure being recorded (9th week).
 Nov. 21, 10:00 p.m., Tues. Thanksgiving student recess begins.
 Nov. 23, Thurs. Holiday—Thanksgiving Day.
 Nov. 27, Mon. Classes resume.
 Dec. 20, 10:00 p.m., Wed. Christmas student recess begins.
 Dec. 25, Mon. Holiday—Christmas Day.
 Jan. 1, Mon. Holiday—New Year's Day.
 Jan. 4, Thurs. Classes resume.
 Jan. 13, Noon, Sat. Last day subject may be dropped before end of semester.
 Jan. 20-26, Sat. Begin 1:00 p.m. End Fri. Noon. Semester examinations.
 Jan. 29, 5:00 p.m., Mon. Grade reports to Registrar for all students including candidates for degrees.
 Jan. 31, 8:00 a.m., Wed. Reports of failures from Registrar to deans' offices.

SECOND SEMESTER, 1961-62

Feb. 1-3, Thurs.-Sat. Registration of all students including physical examinations, testing, and orientation for new students.
 Feb. 5, Mon. Classes begin. Late enrollment fee, \$2.50.
 Feb. 10, Noon, Sat. Regular registration closes for University staff, elementary and secondary teachers.
 End of first week. Late enrollment fee, \$5.00 for subsequent enrollment.
 Feb. 17, Sat. Last day to enroll without special permission from student's dean (2nd week).
 Mar. 24, Noon, Sat. Deficiency reports due in deans' offices (7th week).
 Apr. 7, Noon, Sat. Last day for dropping courses without a Wd or failure being recorded (9th week).
 Apr. 7, Noon, Sat. Spring student recess begins.
 Apr. 16, Mon. Classes resume.
 May 19, Noon, Sat. Last day a subject may be dropped before end of semester.
 May 26-June 1, 1:00 p.m., Sat.-Fri. Noon. Semester examinations.
 May 28, Noon, Mon. Grades to Registrar for all candidates for degrees.
 May 31, 11:00 a.m., Thurs. Senate meeting to approve candidates for degrees.
 June 3, 2:00 p.m., Sun. Commencement, Fieldhouse.
 June 4, 5:00 p.m., Mon. Grade reports to Registrar.
 June 7, 8:00 a.m., Thurs. Reports of failures from Registrar to deans' offices.

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 3,611 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 4,485 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 interrelations of the natural and social sciences, and the impact of science on society.

4. Comprehend and evaluate the processes and institutions in society at home and abroad, and develop a dynamic sense of his personal responsibilities as an effective citizen in a democratic society.
 5. Develop habits of self-evaluation, responsibility, and enterprise which will increase the effectiveness of the educative process in college, and provide the basis for continued self-improvement.
 6. Develop a well-adjusted personality, good character traits, and a sound philosophy of life.
 7. Prepare for effective participation in family life.
 8. Utilize actively and fully his capacity for esthetic appreciation and enjoyment.
 9. Promote high standards of personal and community health.
- IV. To stimulate the faculty and students to extend the boundaries of knowledge through critical and creative thinking and experimentation.
- V. To provide the facilities for extending education outside the boundaries of the campus to the members of the community which the institution serves.
-

Undergraduate Degrees

To graduate, a student must complete a prescribed curriculum. Under special conditions such substitutions are allowed as the interests of the student demand. The total requirement for four-year undergraduate curriculums ranges from 120 to 148 semester hours, according to the curriculum taken. (A semester hour is one hour of recitation or lecture work, or two or three hours of laboratory a week, for one semester. When no ambiguity is involved, the term "hour" is used for "semester hour" in this catalog.) For each semester hour of work a student gets points, according to the grades he makes, as follows: A, 4; B, 3; C, 2; D, 1; F, 0. To be awarded an undergraduate degree, students, who enter after 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 course work taken for resident credit and applied toward a degree. In addition, a 1.7 overall average in all resident work 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 work 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 work 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 have taken 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.

Candidates for degrees must make application to the Registrar at least 30 days before the date of graduation unless the candidate is enrolled in the semester immediately preceding graduation. The candidate is responsible for complying with all requirements.

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 candi-

dates for degrees. Summer and fall graduates are invited to participate 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 11.

IN THE SCHOOL OF AGRICULTURE

- (E) Agriculture, B. S. in Agriculture, B. S. in Agricultural Journalism, page 51.
 - (Agricultural Economics major), page 52.
 - (Agricultural Journalism major), page 55.
 - (Agronomy major), page 52.
 - (Animal Husbandry major), page 53.
 - (Dairy Husbandry major), page 53.
 - (Entomology major), page 54.
 - (Horticulture major), page 54.
 - (Poultry Husbandry major), page 55.
- (E) Agricultural Education (Teachers), B. S. in Agriculture, page 60.
- (E) Dairy Manufacturing, B. S. in Agriculture, page 56.
- (E) Feed Technology, B. S. in Feed Technology, page 57.
 - (Administration option), page 57.
 - (Chemistry option), page 57.
 - (Operation option), page 57.
- (E) Landscape Design, B. S. in Landscape Design, page 59.
- (E) Milling Technology, B. S. in Milling Technology, page 58.
 - (Administration option), page 58.
 - (Chemistry option), page 58.
 - (Operation option), page 58.

IN THE SCHOOL OF ARTS AND SCIENCES

- (A) Applied Music, Bachelor of Music, page 96.
- (E) Biological Science (except Pre-veterinary), Bachelor of Science, page 86.
- (B) Business Administration, B. S. in Business Administration, page 88.
- (A) Education, B. S., B. S. in Elementary Education, B. S. in Music Education, B. S. in Physical Education, page 89.
- (D) General (Biological Sciences major), Bachelor of Arts, pages 93-94.
- (E) General (Physical Sciences, Pre-medicine, Pre-dentistry majors), B. A., pages 93-94.
- (A) General (Social Sciences, Humanities majors), B. A., pages 93-94.
- (A) Humanities, B. A., page 95.
- (D) Pre-veterinary (Biological Science), pages 86-87.
- (E) Physical Sciences, Bachelor of Science, page 97.
- (B) Social Sciences, B. A., page 98.

IN THE SCHOOL OF ENGINEERING AND ARCHITECTURE

- (F) Agricultural Engineering, B. S. in Agricultural Engineering, page 178.
- (F) Architectural Engineering, B. S. in Architectural Engineering, page 179.
- (F) Architecture (five years), Bachelor of Architecture, page 180.
- (F) Chemical Engineering, B. S. in Chemical Engineering, page 181.
- (F) Civil Engineering, B. S. in Civil Engineering, page 182.
- (F) Electrical Engineering, B. S. in Electrical Engineering, page 183.
 - (Power option), page 183.
 - (Communication and Electronics option), page 183.
 - (in connection with second degree in Business Administration), page 183.
- (F) Industrial Engineering, B. S. in Industrial Engineering, page 184.
- (F) Mechanical Engineering, B. S. in Mechanical Engineering, page 185.
 - (Aeronautical option), page 185.
 - (Design option), page 185.
 - (Management option), page 185.

(Petroleum Production option), page 185.

(F) Nuclear Engineering, B. S. in Nuclear Engineering, page 186.

IN THE SCHOOL OF HOME ECONOMICS

- (C) Home Economics with options. B. S. in Home Economics, page 217.
 (Art, Costume Design, Interior Decorating, Teaching Art, Crafts), page 219.
 (Clothing Retailing, Designing, Textiles Research), page 220.
 (Family and Child Development), page 220.
 (Foods and Nutrition, Research, Foods Demonstrating), page 222.
 (Home Economics Agent in Extension), page 218.
 (Household Equipment, Housing, Home Management), page 221.
 (Homemaking, Family Economics, or Finance), page 221.
 (Home Economics Secondary Education—Voc. & Non-vocational, page 218.
 (Home Economics Secondary Education, Non-vocational only), page 218.
- (C) Dietetics and Institutional Management, B. S. in Home Economics, page 224.
- (C) Home Economics and Journalism, B. S. in Home Economics and Journalism, page 226.
- (C) Home Economics with Liberal Arts, B. S. in Home Economics, page 223.
- (C) Home Economics and Nursing, B. S. in Home Economics, page 227.
- (C) Restaurant Management, B. S. in Restaurant Management, page 225.

IN THE SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine, D. V. M., page 238.

(For completion of six-year combination of pre-veterinary curriculum 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 Director of Admissions.

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 should write to the Director 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 Director of Admissions.

If the applicant is a high school graduate when the application for admission is received, the Director of Admissions will request a transcript from the high school principal. Upon receipt of the transcript, the Director 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 Director of Admissions will send the student a provisional acceptance. Near the close of the student's senior year,

the Director 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 are not required to take entrance examinations, but it is recommended that they 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 Director 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 to entering freshmen and other students in any subject if a satisfactory examination is passed.

In general, permission to take examinations is given by the student's dean after consultation with the head of the department in which the course is given, and a small fee is charged. A special examination may be given only to a currently enrolled student. (See page 17.)

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

A student who is not a graduate of an accredited high school or academy may enter the freshman class if he has completed 15 acceptable units of high school work, including the fixed requirements. One who offers 14 such units will be admitted, but will be deficient in one unit. The de-

iciency must be made up during the first year of attendance. In addition to the fixed requirements of the particular curriculum the student wishes to enter, he must offer the remainder of the units in subjects acceptable to the Director of Admissions. For details, non-graduates should write to the Director 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 Director 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 Director 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 to 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 of \$5.00. (See the 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. 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. The 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 recommendations 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 of 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. The incidental fee, the student health fee, the student union building fee, the student union equipment fee, and the student activities fee must be paid in full during registration at the beginning of

each semester or summer session. Checks on out-of-town or local banks are accepted to the amount of the fees.

All students, including scholarship recipients who expect a governmental or other organization to pay their fees, must arrange for this payment by the enrollment period or furnish a statement signed in behalf of the organization indicating its commitment to pay the fees.

Tuition. There is no tuition fee. Fees are charged for personal services such as individual lessons in music but not for class instruction. (See Personal Service Fees.)

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 27.

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. The fund so collected is used to retire the student union building revenue bonds.

Student Union Equipment Fee. This fee is used to provide additional special equipment for the student union.

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 (musical, etc.)

Fees for Regular Semesters

For students enrolling in more than six hours in a regular semester of 16 weeks or more the following schedule of fees will apply.

	<i>Residents of Kansas or staff members</i>	<i>Non-residents of Kansas</i>	
		<i>Under-graduate</i>	<i>Graduate</i>
Incidental			
All except Veterinary Medicine students	\$ 70.00	\$165.00	\$120.00
Veterinary Medicine students	80.00	175.00	120.00
Student Health	10.00	10.00	10.00
Student Union Building	5.00	5.00	5.00
Student Union Equipment	2.50	2.50	2.50
Student Activities (incl. Union operations)	16.50	16.50	16.50
Totals—All except Veterinary Medicine students ..	<u>\$104.00</u>	<u>\$199.00</u>	<u>\$154.00</u>
Totals—Veterinary Medicine students	<u>\$114.00</u>	<u>\$209.00</u>	<u>\$154.00</u>

Fees for Summer Sessions

For students enrolling in more than three semester hours in a summer session the following schedule of fees will apply.

	<i>Residents of Kansas or staff members</i>	<i>Non-residents of Kansas</i>	
		<i>Under-graduate</i>	<i>Graduate</i>
Incidental			
All except Veterinary Medicine students	\$ 40.00	\$ 90.00	\$ 70.00
Veterinary Medicine students	45.00	95.00	70.00
Student Health	5.00	5.00	5.00
Student Union Building	2.00	2.00	2.00
Student Union Equipment	1.00	1.00	1.00
Student Activities	5.00	5.00	5.00
Totals—All except Veterinary Medicine students ..	<u>\$ 53.00</u>	<u>\$103.00</u>	<u>\$ 83.00</u>
Totals—Veterinary Medicine students	<u>\$ 58.00</u>	<u>\$108.00</u>	<u>\$ 83.00</u>

Fees for Pro-rata Enrollments

For students enrolling in six credit hours or less in a regular semester or three credit hours or less in a summer session the following schedule of fees will apply.

	<i>Residents of Kansas or staff members</i>	<i>Non-residents of Kansas</i>	
		<i>Under-graduate</i>	<i>Graduate</i>
Incidental Per Credit Hour			
All except Veterinary Medicine students	\$ 5.00	\$ 12.00	\$ 8.00
Veterinary Medicine students	6.00	13.00	8.00
Student Health	Not elig.	Not elig.	Not elig.
Student Union Building			
Regular Semester	3.25	3.25	3.25
Summer Session	1.25	1.25	1.25
Student Union Equipment			
Regular Semester	1.75	1.75	1.75
Summer Session	.75	.75	.75
Student Activities (incl. Union operations)			
Regular Semester	2.00	2.00	2.00
Summer Session	1.00	1.00	1.00

Definition of Residence. 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 payments of matriculation and incidental fees: Provided further, That no person shall be deemed to have gained a residence in this state for the aforesaid purpose while 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.”

Definition of Staff Fees. Staff fees (the equivalent of residence fees) shall be applied to all members holding faculty rank in the following categories: Fellow, Graduate Assistant, Graduate Research Assistant, Research Assistant, Research Associate, Assistant Instructor, Instructor, Assistant Professor, Associate Professor, and Professor. Wives and dependent children of such persons, but not husbands, are also entitled to staff fees.

Staff members holding positions in the classified civil service also are entitled to staff fees. Wives and dependent children, but not husbands, of staff members in the classified civil service having a monthly salary of \$415.00 per month (a salary at which classified employees automatically achieve classification in the administrative bracket) shall likewise be entitled to staff fees.

Personal Service Fees. 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 full semester incidental fee</i>	<i>Students not paying full semester 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 for all students, which is the additional amount required from 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 personal service, if any.)

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 school term, the following schedule of refunds shall apply:

	<i>Amount of Refund</i>	
	<i>Regular semester</i>	<i>Summer session</i>
During first week of semester or session	100%	100%
To the end of the second week	90%	75%
To the end of the third week	80%	50%
To the end of the fourth week	70%	no refund
To the end of the fifth week	60%	no refund
To the end of 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.

Graduate Research Work in Absentia. The fee for graduate research work in *absentia* is \$3.00 a semester 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.

Special Examination. The fee for taking a special examination to obtain college credit in lieu of attending classes is \$2.50 per credit hour in which examined for residents of Kansas or staff members; \$7.50 per credit hour for undergraduate non-residents of Kansas and \$5.50 for graduate students who are non-residents of Kansas. **This fee must-be-paid before taking the examination and is not subject to refund; this service is available only to enrolled students.** 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.

Auditing Fee. An auditor who is neither an enrollee paying full incidental fee nor a staff member shall be assessed \$1.00 a semester hour for courses audited. Laboratory courses may not be audited. This fee shall not be 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 255.

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.

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.

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.

Assemblies

About eight times a semester, as announced, regular classes of the morning will be shortened to permit insertion of an hour for an all-University assembly. In these University-wide programs of general education, nationally famous speakers will address the students and faculty on problems of critical importance. At other times the program will be musical or literary in nature. When suitable for broadcasting, the assemblies are carried direct over the 5,000-watt University-owned and -operated radio station KSAC.

Course Description Key

In the course description in the catalog, the following abbreviations and codes are used. 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.

The parentheses () following the course title include the value in semester hours of the course, followed by the terms it is offered. Each unit usually represents one lecture or recitation, or three hours of laboratory work, per week for a semester. I, II, S indicate the terms in which 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 undergraduate students, graduate students, and research in all subject fields. The Library, consisting of 230,000 cataloged volumes, plus periodicals, newspapers, maps, and other printed materials, is 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 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 4,000 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	Home Study Catalog	Agricultural Experiment
Student Catalog	President's Report	Station Bulletins
Graduate Catalog	Financial Report	Engineering Experiment
Summer Catalog	Extension Bulletins	Station Bulletins

Student publications include these:

The Kansas State Collegian—newspaper published five days a week.

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 all 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 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. His adviser and his dean will help him plan his work, but do not assume responsibility for his mistakes. 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.

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 cal-

endar. 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.

Penalties are provided for failure to enroll during the regularly scheduled registration periods or failure to complete registration by payment of fees before the dates set for that purpose. See the calendar, or the section on Late Enrollment Fees, page 17, for these penalties.

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. 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.

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.

Last day for dropping courses without a Wd or F being recorded (9th week).

Students desiring to transfer from one school to another 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 withdraws from the University not later than the ninth week of the semester, no mark shall be reported to the registrar. If he withdraws after the ninth week, 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.)

Auditing Classes

An auditor is one who attends a class regularly without participating in class work and without getting 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 for courses audited. 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 required 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 in the calendar.

If a student drops a subject before the end of the ninth week, no mark is reported to the Registrar. An official drop slip from the student's dean constitutes the record of performance.

If a student drops a subject after the ninth week, either a mark of Wd or a full semester grade of failure is reported, depending on whether the student was passing or failing, respectively, at the time of dropping the subject, except that 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 a 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 must leave all class books on file 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. For students entering after June 1, 1954, the graduation requirement is 1.7 as many points as credit hours in which the student has received a grade of A, B, C, D, or F in resident work.

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 readmis-

sion 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 be accepted by Kansas State University.

ABSENCES

Each student is expected to attend all meetings of the classes to which he is assigned.

EXCUSING ABSENCES

Absences may be excused only by the student's dean except that a student who misses classes while under the care of Student Health will be issued an excuse from those classes by Student Health. The copy of the excuse issued to the student by Student Health or by the student's dean shall be shown to each instructor concerned, and left finally with the ROTC department if the student has classes there. The student is permitted to make up work missed during excused absences.

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.

EXCESSIVE ABSENCES

A student may be withdrawn from the 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.

REPORTING ABSENCES

Each instructor shall report at least weekly all absences from his classes to the student's dean. This is to be done whether or not the student has the optional attendance privilege.

ABSENCE THE DAY BEFORE OR AFTER A HOLIDAY OR STUDENT RECESS

A dean's excuse will be granted only in case of emergency. Instructors will not grant excuses. All classes must convene as usual.

EXAMINATIONS

There is a final examination period 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. If required, the examinations are to be

given during the scheduled examination period for the first semester, but outside class during the week preceding the final examination week for the second semester. Such examinations may not be given during regular class periods, for candidates for degrees must attend regular class sessions up to the beginning of the scheduled final examination period for other students. Each instructor shall determine the manner in which his students who are candidates for degrees shall complete their work in his course in accordance with policies of the department.

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

Permission for special examination in subjects not taken in class, or for advanced credit, or to make up failures must be obtained, on recommendation of the head of the department in which the course is given, from the dean of the 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: 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

The Associate Dean of Students is responsible primarily for the welfare of the women students on campus. She supervises the residence hall program which is designed to contribute to the academic and social development of the students. This office is also responsible for assisting students living in sororities and off-campus housing. The Associate Dean is adviser to Associated Women Students and is available to assist staff and students of any group in problems of program and administration.

Housing for Women

The Associate Dean of Students has responsibility for the housing of women students. All unmarried, undergraduate minor women students at Kansas State University are required to live in halls or houses approved by the University.

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 four University-operated Residence Halls with accommodations for approximately 700 women students. Northwest Hall and Southeast Hall are reserved for freshmen, while Van Zile and Waltheim Halls are primarily for upperclass women. The Smurthwaite House which will open fall semester, 1960, will provide lower cost living for 50 women. Students residing there will do their own cooking and housekeeping.

Contracts signed by both student and parent or guardian are required. The contract in all Residence Halls is for both room and board and is for a college year of nine months. The University reserves the right to change room and board rates as food costs and operating expenses change. At the present time, the rates for room and board in all Residence Halls are \$330.00 per semester if paid in advance at the beginning of the semester or \$337.00 if paid in three installments at stated intervals: \$155.00 at the beginning of the semester, \$91.00 at the beginning of the second six-week period, and \$91.00 at the beginning of the third six-week period. A notice is sent to the resident by the Housing Office at the beginning of each period, and payments are made at the Cashier's Office. Those wishing to pay for a full semester may do so. Cost of Smurthwaite House will be \$50.00 per month.

Anyone wishing information about the residence hall living program or wishing to make application for a room in an off-campus house should write to the Office of the Associate Dean of Students, Kansas State University.

Office of Director of Housing

FOR MEN

The University provides on the campus 600 accommodations in a New Residence Hall for Men. The rent is \$330.00 per semester for board and room if paid in advance; \$337.00 per semester if paid in installments. The first installment is \$155.00; the second and third installments, \$91.00 each, not subject to refund. All rates are subject to change. Contracts for room and board are made for the entire nine-month school year. All unmarried, undergraduate, minor men students at Kansas State University are required to live in the University residence hall or in houses in the city of Manhattan approved by the University, or fraternity houses.

Several organized houses are privately operated off campus for unmarried men students. Other unmarried men live in private homes which have been approved by the University. All off-campus rooms are contracted for one semester. Rent for off-campus accommodations ranges from approximately \$15.00 to \$30.00 per month.

FOR FAMILIES

For married students, the University operates 456 permanent dormitory apartments. The rent is \$62.50 for one-bedroom units and \$67.50 for two-bedroom units, including furnishings and utilities. The utilities furnished include heat, water, and 140 KWH of electricity each month.

Fifty-two parking places for privately owned modern trailers are available for \$20.00 per month, including sewer, water, and 140 KWH of electricity per month. All rates are subject to change.

Apartments in private homes or apartments off campus provide additional housing for married students. Rent for off-campus apartments ranges from approximately \$55.00 to \$75.00 a month, depending on the size of the apartment and the location in Manhattan.

Lists of available rooms for single men and apartments for married students are kept up to date and may be used by those who wish to call at the Housing Office, Room 121, Anderson Hall.

Inquiries should be addressed to the Director of Housing, 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 snack bar, 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.

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 the Union Committees, which provide an extensive program of interesting activities. These activities are coordinated by the Program Council. The Union Committees are: Dance, Movies, Games, Hospitality, Music and Library, Art, Campus Entertainment, Coffee Hours, Flash Cards, Jazz, Personnel and Research, and Y-Orpheum. All students are invited to apply for membership on one of these committees.

Student Counseling Center

The Counseling Center is a student service agency designed to help students to help themselves in living and learning more effectively. A staff of counselors with specialized psychological training is available to talk over with students their plans for the future, ability to study effectively, appropriateness of vocational goals, and degree of satisfaction with their personal lives. Many times students will be aided in solving their problems by taking tests which enable them to obtain objective comparisons of their college skills, aptitudes, vocational interests and personality characteristics with those of other students. Students who have not acquired efficient reading and study habits may be helped through their voluntary participation in special groups organized for this purpose. The Counseling Center maintains a library of occupational information for students who wish to explore a number of alternate vocational opportunities.

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 hundred 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 always on duty with an adequate medical supporting staff to care for the students. The hospital has a capacity of 40 beds. An additional number of beds are available for epidemics by utilizing other areas of the building.

The Student Health Center is located directly west of the Library in the center of the campus. The clinic is open to students 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. Emergency cases may be cared for 24 hours a day at the Emergency Room.

Those who are able to walk should go to the clinic unless there is a possibility that they have a contagious disease, in which event they should present themselves to the hospital at once. The physicians of the Student Health Center make no private calls to students' rooms.

Any student may be admitted to the University Hospital by a staff physician. A rate of \$3.00 a day will be charged, this rate to be in effect for only 21 days of hospitalization. All days in excess of 21 will then be charged for at current Blue Cross rates. The student health fund is supplemented by small charges, made while the student is under care, for special expensive medicines and laboratory procedures. These charges are, for the most part, the actual cost price of the extra service rendered and are consistently far lower than prevailing commercial rates.

The University Hospital may be closed during the summer session, but provision is made for the clinic to be open at the regular clinic hours and for a physician to be on call at all times other than regular clinic hours. Cases needing hospitalization will be cared for by one of the University physicians at either of the Manhattan city hospitals of the student's choice.

In the event of the necessity of major surgery, the patient will elect his own surgeons and be transported at his own expense to one of the Manhattan hospitals. After surgery whenever advisable and requested, the student may be returned to the University Hospital for convalescence except during the summer session. Any services rendered by other physicians and any medicines given while there will be at the student's own expense. Naturally, Blue Cross or other commercial health and accident insurance carried by the student will be expected to pay for a student's hospitalization, either here or at any Manhattan hospital.

A supplementary hospital and medical care plan provided by Blue Cross is available to students to defray costs of illness and injury not covered by the student health fee. This supplementary insurance is heartily endorsed for its material aid to students as a worthwhile investment.

Each student is required to have a physical examination prior to enrollment in the University for the first time, as required by State Board of Regents ruling, to be performed either by the University physicians or the student's family physician. Periodic physical examinations, although optional, are recommended by the Health Center. Seniors especially are advised to have at least a chest X ray several months prior to graduation. Physical examinations such as for life insurance, CAA, and civil service, or any other which the student may need, will be given if time permits and it does not interfere with care of ill or injured students. Employment physicals will be charged for at standard rates.

Foreign Student Adviser

The Assistant Dean of Student 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, Government, and Philosophy.

The Religious Coordinating 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 annual Religious Emphasis Week, 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, College 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 College 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 COORDINATING COUNCIL

The Religious Coordinating Council of Kansas State University, a committee of the Student Governing Association, is composed of representatives of the YWCA and all church student groups that wish to cooperate. Each year the Council sponsors Religious Emphasis Week, 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
American Nuclear Society
Arnold Air Society
Block and Bridle Club (Animal Husbandry)
Chancery Club (Pre-law)
Club Cervantes (Spanish)
Dairy Science Club
Entomology Club
Extension Club
Geology Gems
Graduate Students Association
Home Economics Art Club
Home Economics Clothing and Retailing Club
Home Economics Extension Club

Home Economics Family-Child Development Club
Home Economics Journalism Club
Home Economics Nursing Club
Home Economics Teaching Club
Horticulture Club
Industrial Education Association
Klond and Kernel Klub (Agronomy)
Margaret Justus Home Economics Club
Mathematics Club
Milling Association
Phems
Plow and Pen Club
Political Science Club
Poultry Science Club
Psychology Club
Student Education Association

Student Government

Arts and Sciences Council
Associated Women Students
Board of Student Publications
Engineering Association Council
Interdorm Council
Interfraternity Council

Interfraternity Pledge Council
Panhellenic Council
Student Council
Student Governing Association
Union Governing Board

Professional

American Chemical Society
 American Guild of Organists
 American Institute of Architects
 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
 American Veterinary Medical Association
 Auxiliary
 Institute of Aeronautical Sciences
 Institute of Radio Engineers
 Professional Foods Club
 Society for the Advancement of Management
 Steel Ring

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
 K-Fraternity (Varsity Lettermen)

Mortar Board (Senior Women)
 Mu Phi Epsilon (Women, Music)
 Pershing Rifles (Military)
 Phi Delta Gamma (Graduate Women)
 Pi Epsilon Delta (Dramatics)
 Scabbard and Blade (Cadet ROTC Officers)
 Sigma Alpha Eta (Speech Therapy)
 Sigma Xi (Scientific Investigation)

Scholastic Honorary

Alpha Delta Theta (Medical Technology)
 Alpha Epsilon Rho (Radio-TV)
 Alpha Kappa Psi (Business Administration)
 Alpha Lambda Delta (Freshmen Women)
 Alpha Mu (Milling)
 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 (Freshmen 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)

AFROTC Association
 Alpha Phi Omega (Scouting)
 Amateur Radio Club
 American Military Engineers
 Angel Flight
 Arab-American Club
 Astronomy Club
 Chaparajos Club
 Collegiate 4-H
 Cosmopolitan Club

Dames Club
 Flying Club
 Independent Student Association
 K-State Players
 K-State Sports Car Club
 Masonic Club
 Soccer Club
 Veterans' Organizations
 Young Democrats
 Young Republicans

Interest Groups (Membership Selected)

Cheerleaders
 Frog Club
 Future Farmers of America
 Orchestras

Purple Pepsters
 Touchstone
 Wampus Cats
 Whi-Purs

Religious

Alpha Iota
 Baptist Student Union
 Canterbury Association
 Christian Fellowship
 Disciple Student Fellowship
 EUB Student Fellowship
 Gamma Delta
 Grace Baptist Student Fellowship
 Hillel Foundation
 Kappa Phi
 Latter Day Saints
 Lutheran Students Association

Mennonite Fellowship
 Miniwanca Club (Religious Education)
 Newman Club
 Religious Coordinating Council
 Roger Williams Fellowship
 Sigma Theta Epsilon
 United Student Fellowship
 Wesley Foundation
 Westminster Fellowship
 YWCA
 United Student Christian Council

SORORITIES AND FRATERNITIES

There are 22 Greek letter fraternities for men at Kansas State University and 10 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 the selection of new members are sent to all prospective students by the Interfraternity Council and the Panhellenic Council. Additional information about sororities may be obtained from

the Faculty Adviser of Sororities and about fraternities from the Faculty Adviser of Fraternities.

SORORITIES

Alpha Chi Omega, Alpha Delta Pi, Alpha Xi Delta, Chi Omega, Clovia, Delta Delta Delta, Gamma Phi Beta, 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-College 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 Manage-

ment, 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 fields 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; maintains a loan fund; assists at Round-up and has contributed to the building of the State 4-H Club Center and the K-State Union.

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 more 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 plays for all home games and rallies, and takes one trip each year for an important conference game. The Concert Band 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.

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.

Loan Funds

Kansas State University now has five loan programs. These are the Emergency Loan Program, the Student Loan Fund, the Alumni Association Loan Fund, the Endowment Loan Fund, and the National Defense Education Act Loan Program. Any student enrolled as a full-time student and in good academic standing may apply for a loan.

The Emergency Loan Unit amounts to approximately \$11,000 which has an average turn-over of once a month and is utilized by nearly 1,200 students during a school year.

The Alumni Association Loan Fund, KSU Student Loan Fund, and the Endowment Loan Fund amount to approximately one-third of a million dollars, of which two-thirds has been loaned to students at an average loan rate of \$300 per student per year. These funds are also utilized as the source of the institutional matching one-ninth contribution required for NDEA Federal grants.

The National Defense Education Act Loan program funds, granted to Kansas State University, have been loaned completely to students each academic year since 1958. According to the Act, the maximum amount which may be granted to an institution is \$250,000 per year. The average loan has been \$700 per student.

Each Student Loan Fund is to help needy qualified students to pursue a college education with the objective of maximizing their contribution to society according to their ability. In apply for a loan, the student obligates himself to present his needs realistically and accurately, being fully aware of his responsibilities to himself and to the society from which the loan is received.

General Eligibility Requirements

The student loan program is operated on a business basis, giving the borrower an experience (in many cases his first) in such methods of financing.

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 session (semester) at Kansas State University and be a sophomore; except that:

a. Graduating high school seniors in the upper quarter of their graduating class may apply for a National Defense Education Act Loan for their freshman year.

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

c. Second-semester freshmen may apply for an alumni or student loan not in excess of \$300, the repayment of the loan to be made prior to the beginning of the next academic year.

The student must have a real 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 included in the budget.

The loan is to be used primarily for college expenses.

The amount of the loan will be governed by the finances necessary for the student to continue or pursue the course of study.

Alumni Association Loan Program Endowment Association Loan Program Student Loan Program

Each applicant is limited to a maximum amount of \$1,000 in outstanding loans during attendance at Kansas State University. The student must budget the income and expenses for the academic year; he must be realistic and analyze his financial needs. Loans from these funds accrue interest at the rate of three (3%) percent per year, beginning upon the date of the receipt of the money. The repayment date is set by the applicant, and he may repay at any time; it is mandatory that the loan be repaid in full within two years after graduation or leaving the University.

All loans must have a satisfactory co-signer (endorser). The use of a parent or guardian as co-signer is encouraged. The wife or husband of an applicant or other students enrolled at the University are not considered satisfactory co-signers.

The National Defense Education Act Loan Program

The National Defense Education Act Loan Program was authorized by the enactment of Public Law 85-864, the National Defense Education Act of 1958. It is one of several features of this act designed, in the words of the law itself, "to identify and educate more of the talent of our Nation," and "to insure trained manpower of sufficient quality and quantity to meet the national defense needs of the United States."

NDEA provides for the creation, at American colleges and universities, of loan funds from which needy undergraduate and graduate students may borrow on reasonable terms for the purpose of completing their higher education.

The law provides that special consideration in the selection of loan recipients be given to students with a superior academic background who express a desire to teach in elementary or secondary schools, and whose academic background indicates a superior capacity or preparation in sciences, mathematics, engineering, or a modern foreign language.

A student may borrow in one academic year a sum not exceeding \$1,000 and during his entire course in higher education a sum not to exceed \$5,000. The borrower must sign a note for his loan. Interest accrues at 3 % per year beginning twelve months after the borrower ceases to be a full-time student.

Repayment of the loan begins in the second year after the borrower ceases to be a full-time student and will be completed within 10 years thereafter. The borrower's obligation to repay his loan is to be canceled in the event of his death or permanent and total disability. If the borrower enters the teaching profession, public elementary or secondary school, he may have 10 % of the loan canceled for each year of teaching up to five years, or a maximum of 50 % of his total loan.

Emergency Loan Program

The basis of the Emergency Loan Program is to provide for small loans (normally less than \$100) for a short-term period (usually 30 days) at a fifty-cent (50c) per loan charge. The purpose of this fund is to help students meet emergency and immediate expenses incident to their college attendance, and to provide a practical developmental business-educational experience for maturing students by giving them an opportunity to undertake a credit obligation.

Emergency loans are made for use in meeting current educational or cost of living expenses. Common reasons for needing a loan from the Emergency Fund are to pay fees, living expenses, personal incidental expenses, to buy books and supplies, and for interviewing trips of graduating students.

Loan Application Processing

Students desiring a loan may receive the necessary application forms by either writing or making a personal visit to:

University Loan Officer
KSU Student Loan Fund Committee
Anderson Hall
Kansas State University
Manhattan, Kansas

Gifts, Memorials, and Bequests

The Kansas State University Endowment Association is incorporated under the laws of Kansas to accept and administer gifts and bequests to the University. Anyone wishing information about the Association may write to the Director of Development, Kenneth M. Heywood, Kansas State University, who will be happy to send a booklet of information and to answer any specific questions that may be asked.

The booklet outlines some of the principal needs of the University, and

explains fully how friends of the University may perpetuate their interest in Kansas State by sharing in the activities of the Association.

Scholarships

Kansas State University has a fully developed scholarship program in which approximately 400 scholarships are awarded annually to both upperclassmen and incoming students.

Students desiring application blanks or information relative to scholarships should write to the Secretary, 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, 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 three-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 Director of Admissions.

The Graduate School

HAROLD HOWE, *Dean*

OFFERINGS OF THE GRADUATE SCHOOL

Major Fields for Master's Degree

Major work leading to the Master's degree is offered in the following departments or fields:

Accounting	General Speech
Agricultural Economics	Genetics
Agricultural Education	Geography
Agricultural Engineering	Geology
Agronomy (Crops and Soils)	History
Anatomy	Home Economics Education
Animal Husbandry	Horticulture
Applied Mechanics	Industrial Education
Architectural Engineering	Industrial Engineering
Architecture	Institutional Management
Art (Architecture)	Landscape Design
Art (Home Economics)	Mathematics
Bacteriology	Mechanical Engineering
Botany and Plant Pathology	Milling Industry
Business Administration	Modern Languages
Chemical Engineering	Music
Chemistry (Analytical, Biochemistry, Inorganic, Organic, Physical)	Nuclear Engineering
Civil Engineering	Parasitology
Clothing and Textiles	Pathology
Dairy Manufacturing	Philosophy
Dairy Production	Physical Education for Men
Economics	Physical Science Teaching
Education	Physics
Electrical Engineering	Physiology
English	Political Science
Entomology	Poultry Husbandry
Extension Education	Psychology
Family and Child Development	Radio and Television (Speech)
Family Economics	Sociology
Farm Mechanics	Statistics
Feed Technology	Surgery and Medicine
Foods and Nutrition	Technical Journalism
General Home Economics	Zoology

Minor graduate work is offered in each of the above departments or fields and in General Studies, Library Service, and Physical Education for Women.

Major Fields for Doctor of Philosophy

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

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

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 nine-months-a-year or twelve-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 this time is given to advanced study. No half-time assistant may receive more than ten 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 twelve hours of credit a semester. Assistants on the twelve-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, Botany and Plant Pathology, Business Administration, Chemical Engineering, Chemistry, Civil Engineering, Clothing and Textiles, Dairy Husbandry, Economics, Education, Electrical Engineering, English, Entomology, Family and Child Development, Family Economics, Flour and Feed Milling Industries, Foods and Nutrition, Genetics, Geology and Geography, Government, 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, Poultry Husbandry, 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 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 is closely related or supporting subjects must also be adequate to sustain advanced work in the field of the applicant's choice.

The applicant who does not meet all the requirements for admission to full standing in the Graduate School may be admitted to *provisional standing*

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

Correspondence regarding admission to graduate study should be addressed to the Dean of the Graduate School, who will on request supply the required application blanks. Two copies of a transcript from each institution attended must be sent to the Dean of the Graduate School. The application and transcript should be filed with the Graduate Office 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.) They obtain their assignments from the Dean of the Graduate School. All new students, including graduate students, are required to take a physical examination at the University prior to their initial enrollment.

Not more than sixteen 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 seventeen hours during a semester or nine hours during a summer session. Full-time staff members of the University may not be assigned 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 apply to the Dean of the Graduate School.

Fees.* Graduate students are subject to the same fees as other students.

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 of the Dean of the Graduate School, be assigned one or more courses for graduate credit. In no case may such combination of courses exceed seventeen hours during a semester or nine hours during a summer session. A student may accumulate graduate credit not to exceed twelve 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 400 to 799 are open to both graduate and undergraduate students. For graduate credit in such courses, 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.

Grades. Graduate students' work is graded in seven classes: A, B, C, D, Incomplete, F, and Withdrawn. A candidate for an advanced degree

* See section headed Fees under General Information.

must make a grade of B or better in three-fourths of the credit hours taken for the degree. For graduate credit the grade in a course must be C or better.

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.

Major and Minor Subjects. 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 advisory committee. For doctor's candidates, the approval is made by the Dean upon recommendation of the supervisory committee.

Master's Degree. Candidates for the degree, 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 thirty semester hours of graduate credit *including a master's thesis* of six to eight semester hours; (2) A minimum of thirty-two 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, and upon its completion it is submitted in duplicate to the major instructor for his approval and for that of the head of the major department and the Dean of the Graduate School. (See Graduate Calendar for dates on which thesis or report must be submitted.)

The subject of the master's thesis must be approved by the major instructor, the head of the department, and the Dean of the Graduate School. The completed thesis 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. 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 major and minor subjects and the thesis or report, 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. 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.

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 ninety semester hours, including fifty 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 the Graduate School) and has charge of all examinations except those on the language requirements. Before preliminary examinations are arranged, the student should 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, *written preliminary examinations* must be passed by him 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.

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.

Graduate Work in the Summer School

All schools of the University offer graduate work in the Summer School. Only in certain departments, however, can a student complete requirements for the master's degree without spending one or two semesters in residence. For information about these cases, one should address the Dean of the Graduate School.

Students who enroll in three-week 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 three-week 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 Director of Admissions of the University.

GRADUATE CALENDAR

(Graduate students should refer also to the Calendar, page 5.)

FIRST SEMESTER, 1960-1961

September 12-14, Monday-Wednesday—Physical examinations for all graduate students enrolling for the first time at Kansas State University. Registration.
 September 15, Thursday—Classes begin. Late enrollment fee, \$2.50.
 September 17, Noon, Saturday—Regular registration closes for University staff, elementary and secondary school teachers. Late enrollment fee, \$5.00 for subsequent enrollment.
 October 29, Noon, Saturday—Deficiency reports due in deans' offices (7th week).
 November 12, Noon, Saturday—Last day for dropping courses without a withdrawal or failure being recorded (9th week).
 November 22, 10:00 p.m., Tuesday—Thanksgiving student recess begins.
 November 28, Monday—Classes resume.
 November 28, Monday—Tentative copy of doctors' dissertations due in departmental offices.
 December 5, Monday—Tentative copy of doctors' dissertations due in graduate dean's office.
 December 13, Tuesday—Tentative copies of masters' theses and reports due in departmental offices.
 December 21, 10:00 p.m., Wednesday—Christmas student recess begins.
 January 5, Thursday—Classes resume.
 January 5, Noon, Thursday—Final copies of doctors' dissertations due in graduate dean's office.
 January 5, 3:00 p.m., Thursday—Tentative copies of masters' theses and reports due in graduate dean's office.
 January 14, Noon, Saturday—Last day subject may be dropped before end of semester.
 January 21-27, Noon, Saturday-Noon, Friday—Semester examinations for all students.
 January 23, 3:00 p.m., Monday—Final copies of masters' theses and reports due in graduate dean's office. End of period for masters' oral examinations.

SECOND SEMESTER, 1960-1961

February 2-3, Thursday-Friday—Physical examinations for all graduate students enrolling for the first time at Kansas State University. Registration.
 February 6, Monday—Classes begin. Late enrollment fee, \$2.50.
 February 11, Noon, Saturday—Regular registration closes for University staff, elementary and secondary school teachers. Late enrollment fee, \$5.00 for subsequent enrollment.
 March 25, Noon, Saturday—Deficiency reports due in deans' offices (7th week).
 April 3, Noon, Monday—Tentative copy of doctors' dissertations due in departmental offices.
 April 8, Noon, Saturday—Last day for dropping courses without a withdrawal or failure being recorded (9th week).
 April 8, Noon, Saturday—Spring student recess begins.
 April 17, Monday—Classes resume.
 April 19, Wednesday—Tentative copy of doctors' dissertations due in graduate dean's office.
 April 26, Wednesday—Tentative copy of masters' theses and reports due in departmental offices.
 May 3, Wednesday—Tentative copies of masters' theses and reports due in graduate dean's office.
 May 4, Thursday—Final copies of doctors' dissertations due in graduate dean's office.
 May 20, Noon, Saturday—Last day a subject may be dropped before end of semester.
 May 27-June 2, Noon, Saturday-Noon, Friday—Semester examinations.
 May 29, 3:00 p.m., Monday—Final copies of masters' theses and reports due in graduate dean's office. End of period for masters' oral examinations.
 June 4, 2:00 p.m., Sunday—Commencement, Fieldhouse.

EIGHT-WEEK SUMMER SESSION, 1961

June 12, 8:00 a.m., Monday—Physical examinations for all graduate students enrolling for the first time at Kansas State University. Registration.
 June 13, 7:30 a.m., Tuesday—Classes begin. Late enrollment fee, \$2.50.
 June 17, Noon, Saturday—Regular registration closes for University staff, elementary and secondary school teachers. Late enrollment fee, \$5.00 for subsequent enrollment.
 June 21, Wednesday—Tentative copy of doctors' dissertations due in departmental offices.
 June 28, Wednesday—Tentative copy of doctors' dissertations due in graduate dean's office.
 July 4, Tuesday—Holiday, Independence Day.
 July 7, Noon, Friday—Tentative copies of masters' theses and reports due in departmental offices.
 July 7, Friday—Final copy of doctors' dissertations due in graduate dean's office.
 July 7, 5:00 p.m., Friday—Deficiency reports due in deans' offices (4th week).
 July 14, Friday—Tentative copies of masters' theses and reports due in the office of graduate dean.
 July 14, 5:00 p.m., Friday—Last day for dropping courses without a withdrawal or failure being recorded (5th week).
 July 31, 3:00 p.m., Monday—Final copies of masters' theses and reports due in graduate dean's office. End of period for masters' oral examinations.
 August 1, 4:00 p.m., Tuesday—Last day subject may be dropped before end of session.
 August 4, 5:00 p.m., Friday—Last day for examinations.
 August 5, Noon, Saturday—Grades to Registrar.

FIRST SEMESTER, 1961-1962

September 11-13, Monday-Wednesday—Physical examinations for all graduate students enrolling for the first time at Kansas State University. Registration.
 September 14, 8:00 a.m., Thursday—Classes begin. Late enrollment fee, \$2.50.
 September 16, Noon, Saturday—Regular registration closes for University staff, elementary and secondary school teachers. Late enrollment fee, \$5.00 for subsequent enrollment.
 October 28, Noon, Saturday—Deficiency reports due in deans' offices (7th week).
 November 11, Noon, Saturday—Last day for dropping courses without a withdrawal or failure being recorded (9th week).
 November 21, 10:00 p.m., Tuesday—Thanksgiving student recess begins.
 November 27, Monday—Classes resume.
 November 27, Monday—Tentative copy of doctors' dissertations due in departmental offices.
 December 4, Monday—Tentative copy of doctors' dissertations due in graduate dean's office.
 December 12, Tuesday—Tentative copies of masters' theses and reports due in departmental offices.
 December 20, 10:00 p.m., Wednesday—Christmas student recess begins.
 January 4, Thursday—Classes resume.
 January 4, Noon, Thursday—Final copies of doctors' dissertations due in graduate dean's office.
 January 4, 3:00 p.m., Thursday—Tentative copies of masters' theses and reports due in graduate dean's office.
 January 13, Noon, Saturday—Last day subject may be dropped before end of semester.
 January 20-26, Noon, Saturday-Noon, Friday—Semester examinations for all students.
 January 22, 3:00 p.m., Monday—Final copies of masters' theses and reports due in graduate dean's office. End of period for masters' oral examinations.

SECOND SEMESTER, 1961-1962

February 1-2, Thursday-Friday—Physical examinations for all graduate students enrolling for the first time at Kansas State University. Registration.
 February 5, Monday—Classes begin. Late enrollment fee, \$2.50.
 February 10, Noon, Saturday—Regular registration closes for University staff, elementary and secondary school teachers. Late enrollment fee, \$5.00 for subsequent enrollment.
 March 24, Noon, Saturday—Deficiency reports due in deans' offices (7th week).
 April 2, Noon, Monday—Tentative copy of doctors' dissertations due in departmental offices.
 April 7, Noon, Saturday—Last day for dropping courses without a withdrawal or failure being recorded (9th week).
 April 7, Noon, Saturday—Spring student recess begins.
 April 16, Monday—Classes resume.
 April 18, Wednesday—Tentative copy of doctors' dissertations due in graduate dean's office.
 April 25, Wednesday—Tentative copy of masters' theses and reports due in departmental offices.
 May 2, Wednesday—Tentative copies of masters' theses and reports due in graduate dean's office.
 May 3, Thursday—Final copies of doctors' dissertations due in graduate dean's office.
 May 19, Noon, Saturday—Last day a subject may be dropped before end of semester.
 May 26-June 1, Noon, Saturday-Noon, Friday—Semester examinations.
 May 28, 3:00 p.m., Monday—Final copies of masters' theses and reports due in graduate dean's office. End of period for masters' oral examinations.
 June 3, 2:00 p.m., Sunday—Commencement, Fieldhouse.

Agriculture

ARTHUR D. WEBER, *Dean*

The total program in agriculture at Kansas State University consists of three phases of work. These are resident instruction, research, and extension. The program is coordinated through the Dean of Agriculture, with directors of each of the three phases of work administratively responsible to him. The three administrative officers are the Dean of the School of Agriculture, the Director of the Agricultural Experiment Station, and the Director of Extension.

The School of Agriculture

C. PEAIRS WILSON, *Dean*

CLYDE W. MULLEN, *Assistant Dean*

The instructional program of the School of Agriculture has two objectives. First is to develop in students the qualities of an educated person, including capacity for leadership and human understanding and a philosophy for personal, family, and community living. Second is to prepare the student to enter and advance in the occupation of his choice. Accordingly, curriculums in the School of Agriculture are designed to promote both the liberal and the practical education of the student.

Modern agriculture is based upon the application of science, technology, and sound business management to the production, marketing, processing, and distribution of food and fiber. Through a variety of offerings, the School of Agriculture prepares students for farming and ranching, for the scientific investigation of agricultural problems, for agricultural extension work, for the teaching of vocational agriculture in high schools and agriculture in colleges, for responsible positions in industries and governmental agencies related to agriculture, and for a variety of other public and private services of an agricultural nature.

The University has available approximately 4,000 acres of land which are used for experimental work and instruction. University herds and flocks include high-quality representatives of important breeds of dairy and beef cattle, poultry, hogs, horses and sheep. The student becomes familiar with types and breeds by actual work with the stock. In addition to the usual classrooms and laboratories, the School of Agriculture has specialized teaching facilities for students in particular fields. These specialized facilities include greenhouses for horticultural and field crops, a dairy manufacturing plant, a flour mill, a feed mill, a livestock slaughter and meats processing plant, and specialized laboratories for soils, field crops, horticultural crops, entomology, poultry and poultry products, and statistical computations.

More than half of the permanent full-time faculty of the School of Agriculture hold the Ph. D. degree and virtually all the remainder hold the Master of Science degree. Members of the faculty of the School of Agriculture are actively engaged in research and publish regularly in scientific and scholarly journals, and in Agricultural Experiment Station publications.

Each entering student will be assigned a freshman faculty adviser to assist him with academic and personal problems in the transition from high school to university work.

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

CURRICULUMS AND DEGREES AWARDED BY THE SCHOOL OF AGRICULTURE

The School of Agriculture offers six, four-year curriculums. The Curriculum in Agriculture is designed as a broad and flexible curriculum, which, by appropriate choice of electives, can accommodate students with 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 Design. 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.

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 Design leads to the degree Bachelor of Science in Landscape Design.

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 51)

The Curriculum in Agriculture is intended to be broad and flexible. It is designed for those preparing for farming and ranching, for professional work in the field of agriculture, and for work in industries and governmental agencies related to agriculture. Students choosing this curriculum may major in Agricultural Economics, Agronomy, Animal Husbandry, Dairy Husbandry, Entomology, Horticulture, or Poultry Husbandry in the School of Agriculture, or 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 as early as possible, but 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 in Agriculture.

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: Education 202 and 605, and Agricultural Economics 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 major in a department outside the School of Agriculture, a student must include in his electives, not only his major electives, but also a minimum of 12 hours in one department of the School of Agriculture.

* See pages 246-263 for description of the Extension Service.

All electives must be approved by the head of the major department, the head of the department in which the student is taking his agricultural specialization, and the Dean of the School of Agriculture.

A student majoring 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 their credits for evaluation.

Curriculum in Dairy Manufacturing (Page 56)

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 57, 58)

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 Design (Page 59)

The Curriculum in Landscape Design is planned for students who wish to be employed by professional landscape firms and various other private and public agencies. Special emphasis is given to plant materials, planting design, and the preparation of landscape plans. Those completing the curriculum are eligible to receive the degree of Bachelor of Science in Landscape Design.

Curriculum in Agricultural Education (Page 60)

The Curriculum in Agricultural Education is intended for those 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 husbandry.

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 for teaching 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 in order to provide mechanical training necessary for the handling of 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 would qualify 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			
		<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	3
Chem.	210	Chemistry I	5	Ec. So.	110	Economics I	3
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. 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.	010	Physical Education	0	Ph. Ed.	010	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
D. H.	200	Nutr. & Mgt. Fm. An. ¹ ..	4	A. H.	400	Genetics	3
P. H.	200			Ento.	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	6				
PHYSICAL SCIENCE				COMMUNICATIONS			
Chem.	190	El. of 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				PHYSICAL EDUCATION			
		Air or Mil. Sci.	2	Ph. Ed.	010	Physical Education	2R
STATISTICS				ELECTIVES			
Stat.	320	El. of Statistics ⁶	3			Credit Hours ⁷	35
Total hours required for graduation, 136.							

1. Students in floriculture or ornamental horticulture may substitute courses in their field.
2. Students taking Chem. 250, Chemistry II Lab., as freshman elective may take Chem. 350, General Organic Chemistry.
3. Students may substitute Tech. Journ. 306, Reporting I, Engl. 205, Business Letter Writing, or Engl. 416, Scientific Report Writing, depending on their special interests.
4. Students may choose among the following three courses to meet this requirement:
P. Sci. 120, Modern Democracy; P. Sci. 220, American Government I; P. Sci. 150, Constitutional Democracy in America I.
5. Students may choose among the courses listed under Humanities Electives listed on page 188 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, also a department outside the school may be selected: 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
Ag. Marketing I	3	Prin. Acctg.	3
Land Econ.	3	Money & Banking	3
Ag. Policy	3	Lvst. Prod.	3
Ag. Econ. Summary	2	Forage Crops	3
Ag. Econ. Statistics	3	Landscape Gardening	3
		Contemporary Wld. Hist.	2
		Intro. to Philosophy	3

Program of study in Agricultural Business and Industries

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Farm Management	3	Econ. II	3
Ag. Marketing I	3	Prin. Acctg.	3
Ag. Marketing II	3	Money & Banking	3
Ag. Policy	3	Business Finance	3
Ag. Econ. Summary	2	Cost Acctg.	3
Land Econ.	3	Bus. Law I	3
		Contemporary Wld. Hist.	2
		Intro. to Philosophy	3

Program of study in Technical Agricultural Economics

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Production Econ.	3	Econ. II	3
Ag. Marketing I	3	Prin. Acctg.	3
Market Prices	3	Money & Banking	3
Ag. Policy	3	Intro. to Econometrics	3
Ag. Econ. Summary	2	Contemporary Wld. Hist.	2
		Intro. to Philosophy	3
		Anal. Geom. & Calc. I	4
		Anal. Geom. & Calc. II	4

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		NON-MAJOR ELECTIVES	
Prin. of Feeding	3	Anat. & Physiology	3
Animal Nutrition	3	Forage Crops	3
Beef Cattle, Swine, or Sheep Production, any two	6	Feed Mfg. Processes	3
Elem. of Meat Proc.	3	Livestock Marketing	3
Animal Breeding	3	Milk Production	3
Prin. Lvst. Selection	3	Business Law	3
		Diseases of Large Animals	2

Program of study in Meats

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Beef Cattle, Swine, or Sheep Production, any two	6	Anat. & Physiology	3
Animal Nutrition	3	Livestock Marketing	3
Elem. Meat Processing	3	Prin. of Accounting	3
Prin. Lvst. Selection	3	Chem. II Lab.	2
Meat Practicums	2	Organic Chem. Lab.	2
Class. & Grading Meats	1	Quantitative Analysis	4
Tech. Prin. of Meat Proc.	2	Salesmanship	2
Meat Pkg. Plant Operation	2		

Program of study in Fundamental Animal Husbandry

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Beef Cattle, Swine, or Sheep Production, any two	6	Chem. II Lab.	2
Animal Nutrition	3	Org. Chem. Lab.	2
Population Genetics	3	Endocrinology	3
Animal Breeding	3	Milk Secretion & Reprod.	3
Prin. Lvst. Selection	3	Histology I	3
El. of Meat Processing	3	Cytology	3
An. Husb. Lit.	2		
Tech. Prin. of Meat Proc.	2		

MAJOR IN DAIRY HUSBANDRY**Program of study in Dairy Production**

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Dairy Cattle Nutrition	3	Principles of Feeding	3
Dairy Cattle Management	2	Feed Manufacturing Processes	3
Dairy Cattle Breeding	3	Livestock Production	3
Dairy Cattle Judging	2	Animal Breeding	3
Milk Secretion & Reprod.	3	Elements of Meat Processing	2
Market Milk & Dairy Inspec.	4	Farm Crops	4
Dairy Seminar	1	Farm Power	3

Program of study in Dairy Management

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Dairy Cattle Nutrition	3	Business Law	3
Dairy Cattle Management	2	Production Economics	3
Dairy Cattle Breeding	3	Business Organization & Finance	3
Dairy Cattle Judging	2	Dairy Marketing	3
Milk Secretion & Reprod.	3	Personnel	3
Market Milk & Dairy Inspec.	4	Principles of Accounting	3
Dairy Seminar	1	Money and Banking	3
		Salesmanship	2

Program of study in Dairy Science

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Dairy Cattle Nutrition	3	Chemistry II Lab.	2
Dairy Cattle Management	2	Organic Chemistry Lab.	2
Dairy Cattle Breeding	3	Biochemistry	5
Dairy Cattle Judging	2	Animal Nutrition	3
Milk Secretion & Reprod.	3	Anatomy & Physiology	3
Market Milk & Dairy Inspec.	4	Qualities of Feed Ingred.	3
Dairy Seminar	1	Statistical Methods II	3

MAJOR IN ENTOMOLOGY

Program of study in Applied Entomology

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Insect Morphology & Physiology	3	Chem. II Lab.	2
Adv. General Entomology	3	Plant Pathology	3
Insect Ecology	2	Animal Parasitology	3
Prin. of Taxonomy	1	Spraying	3
Taxonomy of Insects I	2	Weed Control	3
Adv. Applied Entomology I	3	Hort. Food Crops	3
Adv. Applied Entomology II	3	Small Business Operations	3
Bee Culture	2		

Program of study in Professional Entomology

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Advanced Gen. Entomology	3	Chemistry II Lab.	2
Insect Ecology	2	Plant Pathology	3
Adv. External Insect Morph.	3	Zoological Technique	2
Adv. Intern. Insect Morph.	3	Foreign Language	12
Prin. of Taxonomy	1		
Taxon. of Insects I	2		
Entom. & Zoological Lit.	2		
Bee Culture	2		

MAJOR IN HORTICULTURE

Program of study in Fruit and Vegetable Production

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Horticulture Feed Crops	3	Farm Crops	4
Vegetable Crops I	3	Plant Physiology	3
Systematic Olericulture & Pomology	3	Plant Pathology	3
Spraying	3	Soil Fertility	3
Storage	3	Hort. Crop Diseases	3
Fruit Science I	3	Chemistry II Lab.	2
Prin. of Fruit Growing I	3	Organic Chem. Lab.	2
Plant Science Lit.	2		

Program of study in General Horticulture

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Landscape Gardening	3	Plant Pathology	3
Horticulture Food Crops	3	Plant Physiology	3
Plant Propagation	3	Chemistry II Lab.	2
Plant Science Lit.	2	Organic Chem. Lab.	2
Spraying	3	Plant Ecology	3
Prin. of Fruit Growing I	3	Farm Crops	4
Vegetable Crops II	3	Soil Fertility	3
Prin. of Floriculture	3		

Program of study in Floriculture & Ornamental Horticulture

MAJOR ELECTIVES		NON-MAJOR ELECTIVES	
Floral Arrangement	2	Taxonomic Botany	3
Plant Materials I	3	Prin. of Accounting	3
Greenhouse Constr. & Mgt.	3	Plant Ecology	3
Prin. of Floriculture	3	Plant Physiology	3
Nursery Management	3	Plant Pathology	3
Arboriculture	3	Soil Fertility	3
Plant Science Lit.	2		
Plant Propagation	3		

MAJOR IN POULTRY HUSBANDRY**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

MAJOR IN AGRICULTURAL MECHANIZATION**Program of study in Agricultural Engineering****MAJOR ELECTIVES**

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

NON-MAJOR ELECTIVES

Dry Land Soil Management	2
Management of Irrig. Soils	4
Chemical Properties of Soils	2
Soil Physics	3
Farm Crops	4
Hort. Food Crops	3
Production Economics	3
Principles of Feeding	3

MAJOR IN TECHNICAL JOURNALISM**Program of study in Agricultural Journalism****MAJOR ELECTIVES**

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

NON-MAJOR ELECTIVES

Principles of Feeding	3
Animal Breeding	3
Beef Cattle Production	3
Swine Production	3
Farm Crops	4
Agr. Policy	3
Contemporary Wld. Hist.	2

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	Written Comm. I	3	Ec. So.	110	Economics I	3
Math.	100	College Algebra	3	Engl.	120	Written Comm. 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.	010	Physical Education	0			Air or Military Science ..	1
				Ph. Ed.	010	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	D. H.	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	Ph. Ed.	010	Physical Education	0
Ph. Ed.	010	Physical Education	0				
Total			17	Total			16

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
D. H.	210	Dairy Technology	3	Ag. Ec.	160	Mkt'g Dairy Prod.	3
Engl.	205	Bus. Letter Writing	3	D. H.	220	Dairy Prod. Eval. I	1
Phys.	211	Gen. Physics I	4	D. H.	690	Ice Cream & Conc. Milk ..	5
Engl.	090	English Proficiency	0	Ag. E.	455	Dairy Mechanics	3
		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
D. H.	460	Dairy Prod. Eval. II	1	D. H.	205	Milk Production	3
D. H.	680	Butter and Cheese	5	D. H.	500	Dairy Seminar	1
Stat.	320	El. of Statistics	3	D. H.	660	Dairy Plant Mgt.	2
		Elective	8	D. H.	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 and Calculus II	4
Organic Chemistry	5	Analytic Geometry and Calculus III	4
Biochemistry	3	Microbiology of Foods	5
General Physics II	4	Sanitary Bact. Lab.	2
Analytic Geometry and Calculus I	4		

ADMINISTRATION ELECTIVES

Economics II	3	Marketing	3
Principles of Accounting	3	Personnel	3
Business Law I and II	3-3	Personnel Psychology	3
Cost Accounting	3	Business Finance	3
Administration	3	Small Business Operation	3
Accounting I and II	3-3	Money & Banking	3
Oral Reading	2	Business Policy	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
Prin. of Accounting	3	Personnel	3
Cost Accounting	3	Business Organization & Finance	3
Business Law I, II	6	Money and 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	Written Comm. I	3	Ec. So.	110	Economics I	3
Math.	100	College Algebra	3	Engl.	120	Written Comm. 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.	010	Physical Education	0			Air or Military Science ..	1
				Ph. Ed.	010	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
Gn. St.	121	Biology I	4	Gn. St.	122	Biology II	4
		Air or Military Science ..	1			Air or Military Science ..	1
Millg.	010	Milling Seminar	0	Millg.	010	Milling Seminar	0
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	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 Ingrid.	3
A. H.	200			Ec. So.		Social Science	3
D. H.	200	Nutr. & Mgt. Fm. An.	4	Millg.	010	Milling Seminar	0
P. H.	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	Ento.	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	B. A.	410	Bus. Finance	3
Chem.	351	Gen. Org. Chem. Lab.	2	Stat.	320	El. of Stat.	3
Chem.	300	Gen. Quan. Analysis	4	Stat.	510	Stat. Qual. Control	3
B. A.	170	Prin. of Accounting	3	Engl.	205	Bus. Letter Writing	3
B. A.	325	Business Law I	3	Ag. Ec.	130	Grain Marketing	3
Millg.	450	Fl. and Fd. Anal.	4	Ec. So.	430	Money & Banking	3
B. A.	541	Salesmanship	3			Electives	9
Millg.	680	Feed Tech. II	4				
Phys.	211	Gen. Physics I	4				
Phys.	212	Gen. Physics II	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. and Feed Anal.	4			Electives	9
Phys.	211	Gen. Physics I	4				
Phys.	212	Gen. Physics II	4				

OPTION C (Operation)

Math.	220	Anal. Geom. and Calc. I ..	4	E. E.	400	Elec. Engg. C Rec.	2
Math.	221	Anal. Geom. and Calc. II ..	4	E. E.	402	Elec. Engg. C Lab.	1
Math.	222	Anal. Geom. and Calc. III ..	4	Millg.	680	Feed Tech. II	4
M. E.	216	Engg. Graphics II	2	Millg.	610	Fl. & Fd. 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. Phys. I	5			Electives	11
Phys.	311	Engg. Phys. II	5				

Curriculum in Milling Technology
B. S. in Milling Technology

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	Written Comm. I	3	Ec. So.	110	Economics I	3
Math.	100	College Algebra	3	Engl.	120	Written Comm. 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.	010	Physical Education	0			Air or Military Science ..	1
				Ph. Ed.	010	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
Gn. St.	121	Biology I	4	Gn. St.	122	Biology II	4
		Air or Military Science ..	1			Air or Military Science ..	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
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 semester 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.	541	Salesmanship	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	Millg.	670	Milling Technology II	4
Math.	221	Anal. Geom. & Calc. II ..	4	Millg.	640	Adv. Fl. Sheets	2
Math.	222	Anal. Geom. & Calc. III ..	4	Millg.	610	Fl. & Fd. Mill Constr.	3
M. E.	216	Eugg. Graphics II	2	Millg.	600	Adv. Fl. & Fd. Tech.	3
M. E.	310	Eugg. Graphics III	2	E. E.	400	Elec. Engg. C Rec.	2
Ap. M.	305	Statics	3	E. E.	402	Elec. Engg. C Lab.	1
Ap. M.	415	Mech. of Materials	3			Electives	7
Chem.	350	Gen. Organic Chem. Rec.	3				
Chem.	351	Gen. Organic Chem. Lab.	2				
Phys.	310	Engg. Physics I	5				
Phys.	311	Engg. Physics II	5				

Curriculum in Landscape Design*B. S. in Landscape Design***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	3
Chem.	210	Chemistry I	5	Ec. So.	110	Economics I	3
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. II	3
Math.	100	College Algebra	3	Math.	150	Plane Trig.	3
Psych.	110	Gen. Psychology	3	Bot.	200	Gen. Botany	4
		Air or Military Science ..	1			Air or Military Science ..	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
Total			17	Total			17

SOPHOMORE

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Gl. Gg.	100	Gen. Geology	3	Hort. Agron.	200	Plant Science	4
Hort.	100	Lands. Gardening	3	Arch.	202	Basic Drawing	2
Arch.	202	Basic Drawing	2	Arch.	208	Arch. Graphics II	2
Arch.	207	Arch. Graphics I	2	Arch.	216	Intro. to Arch.	1
Hort.	260	Plant Materials I	3	C. E.	220	Survey I	2
Spch.	105	Oral Comm. I	2	Hort.	270	Plant Materials II	3
		Air or Military Science ..	1	Arch.	285	Hist. of Ptg. & Sculp.	3
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
Total			16	Total			18

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Arch.	235	El. of Arch. Design	4	Arch.	235	El. of Arch. Design	4
Hort.	780	Theo. of Lands. Design ..	2	Hort.	440	Planting Design	2
Engl.	090	English Proficiency	0	Arch.	222	Water Color Ptg.	2
Arch.	211	Sketching	2	Entom.	200	Gen. Econ. Entom.	3
Bot.	690	Tax. Botany	3	Arch.	200	Apprec. of Arch.	3
Agron.	270	Soils	4	Bot.	470	Plant Ecology	3
Bot.	605	Plant Path. I	3				
Total			18	Total			17

SENIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Hort.	430	Lands. Constr.	3	Hort.	420	Comm. Planning	3
Hort.	760	Lands. Design I	4	Hort.	770	Lands. Design II	4
Ec. So.	608	Urban Soc.	3	Journ.	350	Ag. Journalism	3
Arch.	450	Sculpture	2			Electives	7
		Electives	4				
Total			16	Total			17

Number of hours required for graduation, men 136, women 132.

Suggested electives for students pursuing special training for landscape nurserymen.

Hort.	104	Plant Propagation	3	Hort.	160	Small Fruits	3
Hort.	414	Nursery Management	3	Hort.	182	Greenhouse Cons. & Mgt.	3
Hort.	415	Turf Management	3	B. A.	400	Administration	3
Hort.	404	Spraying	3	B. A.	325	Business Law I	3
Hort.	418	Aboriculture	3	Engl.	205	Business Letter Writing	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	Written Comm. I	3	Ec. So.	110	Economics I	3
Math.	100	College Algebra	3	Engl.	120	Written Comm. II	3
Psych.	110	Gen. Psychology	3	Math.	150	Plane Trig.	3
		Air or Military Science ..	1			Air or Military Science ..	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	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	D. H.	200		
Zool.	200	Gen. Zool.	4	P. H.	200	Educ. Psych. II	3
Ag. E.	210	Farm Mechanics	2	Educ.	400		
		Air or Military Science ..	1	Spch.	105	Oral Comm. I	2
Ph. Ed.	010	Physical Education	0			Elective—Agriculture	4
Total			17	Ph. Ed.	010	Air or Military Science ..	1
						Physical Education	0
Total			17	Total			18

JUNIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Ag. Ec.	200	Prin. of Ag. Econ.	4	Ag. E.	220	Farm Power	3
Educ.	702	Voc. Education	3	Educ.	201	Prin. of Sec. Educ.	3
Ag. E.	415	Agr. Engg. Applic.	2			Elective—Animal Sci.	5
Engl.	090	English Proficiency	0			Lit. or Language	4
		Elective—Animal Sci.	3			Elective—Plant Sci.	2
		Lit. or Language	2	Total			17
		Elective—Social Science ..	3	Total			17
Total			17	Total			17

SENIOR

Gn. Ag.	003	Agr. Seminar	0	Gn. Ag.	003	Agr. Seminar	0
Educ.	500	Meth. Tchg. Agr.	3	Ag. E.	215	Farm Mach. Repair	3
Educ.	501	Tchg. Partic. Agr.	5			Elective—Agriculture	3
Journ.	350	Agr. Journalism	3			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.

AGRICULTURAL ECONOMICS

Section of

Economics and Sociology

GEORGE MONTGOMERY, *Head of Department*

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.

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.
- 110. Farm Accounting.** (3) I, II. Double and single entry systems of farm accounts. Analysis and interpretation of farm records. Farm income tax returns. Practice in analyzing a farm record and making a tax return. Pr.: Ec. So. 110.
- 120. Marketing of Farm Products.** (3) I, II. An introduction to marketing functions, types of agencies involved in marketing, market organization and regulation, marketing efficiency and price-making forces. Pr.: Ec. So. 110.
- 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.
- 140. Agricultural Finance.** (3) II. Sources and use of credit for purchase of farm land and to finance farm operations. 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.
- 160. Marketing of Dairy Products.** (3) II. Factors affecting prices; dairy marketing organizations. Three hours rec. a week. Pr.: Ec. So. 110.
- 170. Egg and Poultry Marketing.** (3) I. Offered in even years. Marketing organization, regulations, and efficiency; factors influencing prices. Three hours rec. a week. Pr.: Ec. So. 110.
- 180. Rural Sociology.** (3) I, II, S. 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. 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, Agron. 270, A. H. 230.

230. Agricultural Marketing I. (3) I. The organization and structure of the market for agricultural products, with special emphasis on principles and methods of analysis of marketing forces. Pr.: Ec. So. 120, Ag. Ec. 200.

240. Rural Bank Operations and Services. (4) II. A study of the organization and services of banks in rural areas, and legal phases of bank operations. The day-to-day operations of individual banks, including management and personnel problems. Lectures from rural banks. Pr.: Ec. So. 430 and enrollment in Rural Banking option or consent of instructor.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

400. Agricultural Marketing II. (3) II. Advanced principles of marketing and techniques of market analysis, with emphasis on solving problems which arise in the marketing system. Pr.: Ag. Ec. 230.

410. Advanced Farm Organization. (3) II. Advanced studies of factors affecting the successful organization and operation of farms. Two hours rec. and three hours lab. a week. Pr.: Ag. Ec. 100 or 220.

430. World Agriculture. (3) II. Evaluation of world resources for agricultural production; present and potential world consumption of agricultural commodities; tenure of agricultural resources; programs aiding in the development of rural economies of the world. Pr.: Ec. So. 110, junior or senior standing.

440. 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.

450. Land Economics. (3) I, II. Control and use of land resources: relation of population to land supply; property rights in land; land taxation. Emphasis on agricultural lands. Three hours rec. a week. Pr.: Ec. So. 110.

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, which special reference to agricultural economics data. Pr.: Ec. So. 110.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Advanced Agricultural Marketing. (3) Offered on sufficient demand. Emphasis on application of advanced techniques of economic analysis to particular areas of agricultural marketing. Student will select for concentrated study one of the following fields: Livestock Marketing, Grain Marketing, Dairy Marketing, Egg and Poultry Marketing, Demand and Price Analysis, Cooperative Marketing. Pr.: Ag. Ec. 400 or consent of instructor.

610. Agricultural Policy. (3) I. 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, senior standing.

620. Production Economics. (3) I, II. The principles underlying the combination of elements of production, with particular reference to agriculture. Three hours rec. a week. Pr.: Ec. So. 110; 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 land resources. Problems would include acquiring and transferring property rights, easements, zoning, leasing; problems of flood control, water-

shed development, irrigation, wind erosion; other problems which may arise. Two hours rec. a week. Pr.: Ag. Ec. 450 or consent of instructor.

Land Law. (See B. A. 520.)

640. Market Prices. (3) II. Explanation of price analysis and forces determining prices. Three hours rec. a week. Pr.: Ec. So. 110.

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 Use and Resource Conservation. (4) II. Economic evaluation of land use by time periods, the alternative uses of land, and an analysis of conservation as related to land use and the demands on land by time periods. Analyses are from the viewpoints of individuals and groups of persons, including public projects and programs. 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. Four hours of rec. a week. 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. 640 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*

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.

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., one three-hour lab. a week. Pr.: Bot. 200. Taught in co-operation 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 Gn. St. 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 Gn. St. 122.
- 230. Grain Grading and Judging.** (2) II, S. Application of the Federal Standards for grading farm crops and judging of grains and other crop products. Six hours lab. a week. Pr.: Agron. 220.
- 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. 220.
- 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. Pasture Management.** (3) II. Establishment, management, and utilization of tame and native pastures. Three hours rec. a week. Pr.: Agron. 220.
- 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. 220.
- 430. Special Crops.** (2) I. Growth habits, production methods, and classification of fiber, sugar, root, tuber, oil, stimulant, and sedative crops. Two hours rec. a week. Pr.: Agron. 220.

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. 220, 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 as applied to plant species. 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. 220, 270, or consent of instructor.

710. Identification of Pasture Plants. (1) II. Offered 1961-'62 and alternate 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 Ecology and Survey. (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. 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. 220, 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.

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. 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. 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. Introduction to the relationships between genetic and biochemical systems, with emphasis on the "nature of the gene." Three hours lec. a week. Pr.: Agron. 680, 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, or Gn. St. 112.
- 280. Soil Management.** (3) I, II. 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. 220, 270.
- 290. Dryland Soil Management.** (2) I, II. Water conservation, wind erosion control, soil management and soil use under low rainfall conditions in Kansas. Two hours rec. a week. Pr.: Agron. 220, 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.

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. 220, 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. 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.

- 910. Wind Erosion.** (3) I. A study of the physics and dynamics of erosion of soil by wind and its relation to soil properties. 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*

The courses in the Department of Animal Husbandry give the student special 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.

FOR UNDERGRADUATE CREDIT

- 100. Elements of Animal Husbandry.** (2) I, II and alt. S. A survey 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.
- 110. Elements of Animal Husbandry Laboratory.** (1) I, II, and alt. S. A study of market types and classes of livestock. Three hours lab. a week.
- 200. Nutrition and Management of Farm Animals.** (4) I, II. Basic and applied nutrition and management of beef cattle, dairy cattle, horses, poultry, sheep, and swine. Three hours lec. and three hours lab. a week. Pr.: Zool. 200 and Chem. 190 or 350. Taught in cooperation with the Department of Dairy Husbandry and the Department of Poultry Husbandry.
- 205. Principles of Livestock Selection.** (3) I, II. 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. 110 or 200 and junior standing. Second semester offering strictly for students not majoring in animal husbandry.
- 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, S. 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. 435.
- 250. Elements of Meat Processing.** (2) I, II, S. Meat consumption, principles of processing, curing, and freezing. Two hours lec. and rec. a week. Pr.: A. H. 100, 110, 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. 100, 110, 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, S. 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 and scoring fleeces. 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.
- 460. Institutional Meats.** (2) Spring semester, 1960-'61, and alternate 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.
- 470. 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.

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, II. 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.
- 640. 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.
- 650. Animal Husbandry Literature.** Credit arranged. I, II, S. Preparation of abstracts and reports from scientific journals on current research in the field of animal husbandry. Pr.: Graduate standing or permission of instructor.
- 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.
- 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.
- 810. Problems in Beef Cattle Production.** (3) S. Offered 1961 and every third year thereafter. Eighteen hours rec. a week. Pr.: Graduate standing and one year's experience in county agent work or in teaching vocational agriculture.
- 820. Problems in Sheep Production.** (3) S. Offered 1962 and every third year thereafter. Eighteen hours rec. a week. Pr.: Graduate standing and one year's experience in county agent work or in teaching vocational agriculture.
- 830. Problems in Swine Production.** (3) S. Offered 1960 and every third year thereafter. Eighteen hours rec. a week. Pr.: Graduate standing and one year's experience in county agent work or in teaching vocational agriculture.
- 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 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.

DAIRY HUSBANDRY

C. L. NORTON, *Head of Department*

The Department of Dairy Husbandry 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.

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. Pr.: D. H. 180 and 190, 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 Animal Husbandry and Department of Poultry Husbandry.

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 Gn. St. 121.

210. Dairy Technology. (3) I. The relationship of physical and chemical properties of the various components of milk to handling and processing of dairy products. Two hours rec. and three hours lab. a week. Pr.: Chem. 350, 351.

220. Dairy Products Evaluation I. (1) II. Three hours lab. a week.

300. Artificial Breeding. (2) I. Offered 1961-'62 and in alternate years. 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 D. H. 195; visits to some of the best farms in the state. Three hours lab. a week. Pr.: D. H. 195.

- 460. Dairy Products Evaluation II.** (1) I. Cont. of D. H. 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 husbandry.

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 husbandry, or consent of instructor.
- 610. Dairy Cattle Nutrition.** (3) I. Application of principles of nutrition to practical feeding of dairy cattle; exercises in practical feeding problems; designing and balancing rations. Two hours lec. and three hours lab. a week. Pr.: D. H. 180 and 190, or 200.
- 620. Dairy Cattle Management.** (2) II. Offered 1961-'62 and in alternate years. Production practices, record keeping, labor-saving equipment, milking systems, stabling methods, dairy farm planning and analysis, field study trip. One hour lec. and three hours lab. a week. Pr.: D. H. 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.: D. H. 180 and 190, or 200; A. H. 400; Stat. 320; Physi. 131, or consent of instructor.
- 640. Dairy Production Problems.** Credit arranged. I, II, S. Pr.: Junior standing.
- 650. Dairy Manufacturing Problems.** Credit arranged. I, II, S. Pr.: Junior standing in dairy manufacturing.
- 660. Dairy Plant Management.** (2) II. Offered in 1960-'61 and alternate years thereafter. Two hours rec. a week. Pr.: D. H. 210.
- 670. Quality Control of Dairy Products.** (3) II. Coordination of the role of the dairy control laboratory in maintaining constant check in quality, purity, and wholesomeness of all dairy products and ingredients most commonly used in their manufacture; efficiency of sterilizing agents, washing powders, and related materials; plant sanitation. Two hours rec. and three hours lab. a week. Required of all students pursuing the Curriculum in Dairy Manufacturing. Pr.: D. H. 210, senior standing in dairy manufacturing or graduate standing.
- 680. Butter and Cheese.** (5) I. 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. 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.

FOR GRADUATE CREDIT

- 800. Research in Dairy Husbandry.** 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 Husbandry. (1) I, II. A study of current literature in the field of dairy husbandry. One hour rec. a week. Pr.: Graduate standing.

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*

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, 210, 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, the following courses should be completed: 200 or 210, and five or six additional credit hours.

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.

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, S. 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 1960-'61 and alternate 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 1960-'61 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. 1961. 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 1960-'61 and alternate 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 or equiv.
- 630. Insect Ecology.** (2) II. Offered in 1960-'61 and alternate 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. 1962 and alternate 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 1961-'62 and alternate 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 1961-'62 and alternate 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.
- 680. Advanced Insect Physiology.** (4) II. Offered on sufficient demand. Physiological aspects of the integument, transport mechanisms, nutrition, respiration, metabolism, excretion, nervous and muscular systems, reproduction, and growth of insects; physiological literature and report writing. Two hours lec. and six hours lab. a week. Pr.: Entom. 200, a course in biochemistry, and consent of instructor.
- 690. Principles of Taxonomy.** (1) II. Not offered in 1960-'61. The methods and principles of systematic entomology and zoology; characterization of taxonomic categories; international rules of zoological nomenclature. Pr.: Entom. 200 or 211, Entom. 700, or Zool. 200, 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 1961-'62 and alternate 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 1961-'62 and alternate 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. Not offered in 1960-'61. 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 alternate years, beginning 1961-'62. 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, 211 or equiv.
- 780. Advanced Applied Entomology II.** (3) II. Offered alternate years, beginning 1961-'62. 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, 211 or equiv. 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.
- 840. Advanced Insect Morphology.** (1 to 3) I, II. Intensive study of a special phase of insect morphology. Pr.: Entom. 660 or 670, or equiv. and 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 or 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*

The Department of Flour and Feed Milling Industries prepares students for careers in the various phases of cereal technology. The Curriculum in Milling Technology provides options in Operation, Chemistry, and Administration. The Curriculum in Feed Technology provides options in Operation, Quality Control, and Administration. (See outline of curriculum on pages 57, 58.)

The department has a new completely pneumatic mill of 200 hundred-weight daily capacity as well as several experimental mill units. These are especially equipped for student training and research in milling technology.

A completely modern pilot plant bakery for student training and research is available. This plant is fully equipped with dough mixers, proofing cabinets, oven, and other equipment required for baking tests. The physical dough-testing laboratory offers special opportunities for student training and research. The chemical laboratories have the usual chemical

apparatus for wheat, flour, and feed testing and special equipment for advanced problems.

A modern building houses a pilot plant formula-feed mill which includes various types of grinders, pelleting machines, blenders, packaging machines, and laboratories.

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. 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 assembling 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.: Gn. St. 121 and Millg. 210.

450. 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.

490. Feed Manufacturing Processes. (3) I. 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. (Effective fall, 1961.) Pr.: Math. 100, 150; A. H. 230; or consent of instructor.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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. 450.

630. Experimental Baking. (4) 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. Offered odd years. 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.
- 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 the cereal industry. 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

C. PEAIRS WILSON, *Director*

CLYDE W. MULLEN, *Assistant Dean*

- 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.

HORTICULTURE

WM. F. PICKETT, *Head of Department*

The Department of Horticulture offers training in either practical or professional work in floriculture, fruit growing, ornamental horticulture, and vegetable crops. The Curriculum in Landscape Design leads to the degree Bachelor of Science in Landscape Design, and is intended for students who wish training in design and drafting.

The horticultural farm, the campus, the greenhouses, and the research laboratories provide plant materials and equipment for instructional and research use. The Master of Science degree may be earned in any of the fields mentioned above.

COURSES IN GENERAL HORTICULTURE

FOR UNDERGRADUATE CREDIT

- 112. Preserving Foods by Freezing.** (3) I. Selection and preparation of foods for freezing, managing and operating frozen food locker plants, selecting and using home-frozen food cabinets, judging of frozen foods

prepared and stored by various methods. Two hours rec. and three hours lab. a week.

- 200. Plant Science.** (4) I, II. Offered fall, 1961. 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.
- 205. Elements of Horticulture Recitation.** (2) I, II, S. Principles and practices related to the culture of horticultural plants and their use. Two hours rec. a week. Pr.: Bot. 200 or Gn. St. 121.
- 210. Elements of Horticulture Laboratory.** (1) I, II. Practical exercises related to the identification, care, propagation, transplanting, and use of horticultural plants. Three hours lab. a week. Pr.: Bot. 200 or Gn. St. 121.
- 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. Offered spring, 1961. A basic study of the underlying principles of growing and harvesting of fruits and vegetables. Two hours lec. and three hours lab. a week. Pr.: Hort. 200 or Gn. St. 121 and 122.
- 250. Introduction to Floriculture and Ornamental Horticulture.** (3) I. Offered fall, 1961. Principles, practices, and techniques of floriculture and ornamental horticulture. Pr.: Hort. 200 or Gn. St. 121 and 122.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 410. 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 640. Horticultural Problems.** Credit arranged. I, II, S. Problems and reports in floriculture, landscape design, olericulture, ornamental horticulture and pomology. Pr.: Advanced undergraduate standing and consent of instructor.
- 670. Systematic Olericulture and Pomology.** (3) I. Offered 1960-'61 and alternate 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.
- 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 design. Data collected may form basis for a master's thesis. 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 FLORICULTURE

FOR UNDERGRADUATE CREDIT

- 130. Floral Arrangement.** (2) I. 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 fall, 1961. 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 FRUIT CROPS

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 650. Principles of Fruit Growing I.** (3) I. Offered in 1961-'62 and alternate 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. 205, 210.
- 660. Principles of Fruit Growing II.** (3) II. Offered in 1961-'62 and alternate years. Moisture relations, nutrition, fruit setting, and temperature effects. Two hours rec. and three hours lab. a week. Pr.: Hort. 205, 210.

FOR GRADUATE CREDIT

- 830. Advanced Pomology.** (1-3) I, II, S. Morphological and physiological changes occurring in fruit plants. Pr.: Consent of instructor.

COURSES IN LANDSCAPE DESIGN

FOR UNDERGRADUATE CREDIT

- 100. Landscape Gardening.** (3) I, S. An introductory course in the fundamental principles of landscape design. Three hours rec. a week.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 420. Community Planning.** (3) II. Offered in 1961-'62 and alternate years. Growth and development of cities and towns, land subdivision. One hour rec. and six hours lab. a week.
- 430. Landscape Construction.** (3) I. Offered in 1960-'61 and alternate years. Topographic maps, grading plans, structures, sewerage, water supply, lighting, and drainage. Two hours rec. and three hours lab. a week.
- 440. Planting Design.** (2) II. Offered in 1960-'61 and alternate years. The use of plants in landscape composition. Perspective and elevational sketches and plans. Six hours lab. a week. Pr.: Hort. 270.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 760. Landscape Design I.** (4) I. Elementary designing of the home grounds, country estates, special gardens, sketch problems. Twelve hours lab. a week. Pr.: Hort. 100, 270.
- 770. Landscape Design II.** (4) II. Advanced course in designing of large parks, cemeteries, golf courses, educational groups, and high-class land subdivisions. Sketch problems. Twelve hours lab. a week. Pr.: Hort. 760, 780.

- 780. Theory of Landscape Design.** (2) I. Offered in 1961-'62 and alternate years. The economic and esthetic theory of design; taste, character, historic style, and composition; natural elements in design. Two hours rec. a week. Pr.: Hort. 100.

COURSES IN ORNAMENTAL HORTICULTURE

FOR UNDERGRADUATE CREDIT

- 260. Plant Materials I.** (3) I. Perennials, annuals, and evergreens for general ornamental planting. Two hours rec. and three hours lab. a week. Pr.: Bot. 200.
- 270. Plant Materials II.** (3) II. Trees, shrubs, vines for ornamental planting; planting plans 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 1961-'62 and alternate years. Fundamental principles of layout and management of the modern nursery. Two hours rec. and three hours lab. a week. Pr.: Hort. 220.
- 610. Turf Management.** (2) I. Offered in 1960-'61 and alternate 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.: 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. 620 or consent of instructor.

COURSES IN VEGETABLE CROPS

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 690. Vegetable Crops I.** (3) I. Offered 1960-'61 and alternate 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 and Hort. 240.
- 700. Vegetable Crops II.** (3) I. Offered 1961-'62 and alternate years. Major vegetable crops grown as cash crops and the underlying principles of production. Three hours lec. a week. Pr.: Hort. 200, 240.

FOR GRADUATE CREDIT

- 820. Advanced Vegetable Crops.** (1 to 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.

POULTRY HUSBANDRY

THOMAS B. AVERY, *Head of Department*

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.

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) I, 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.: P. H. 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 Husbandry 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.: P. H. 100, 101, or 200.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. Poultry Products Technology.** (3) I. Offered in 1961-'62 and alternate 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.: P. H. 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.: P. H. 100, 101, or 200.
- 620. Avian Metabolism.** (3) I. Offered in 1960-'61 and alternate years. Special emphasis on the physiological processes in reproduction, digestion, absorption, circulation, respiration, excretion and internal secretions. Three hours rec. a week. Pr.: P. H. 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.: P. H. 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.: P. H. 100, 101, or 200; senior or graduate standing.
- 650. Poultry Seminar.** (1) I. Required of all juniors majoring in poultry husbandry and continued into the senior year. Also required of graduate students. One hour rec. or conference a week. Pr.: P. H. 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.: P. H. 100, 101, or 200.
- 670. Poultry Genetics.** (3) II. Offered in 1960-'61 and alternate 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 Husbandry. Credit arranged. I, II, S. Investigations which may form the basis of a master's or doctor's thesis. Conferences by appointment. Pr.: P. H. 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

ARTHUR D. WEBER, *Dean*

GLENN H. BECK, *Director*

C. PEAIRS WILSON, *Assistant Director*

March 4, 1887, the Kansas legislature accepted conditions of the Hatch Act, passed two days earlier by the U. S. Congress. These legislative acts established the Kansas Agricultural Experiment Station and vested responsibility for carrying out provisions of the acts in the Board of Regents. It has been supported since then by both Federal and State funds. Later acts of Congress authorizing grants (always subject to state legislative assent) included 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 provides funds to operate the experiment station. Fees and commercial organizations also provide some support, as do sales of experimental crops and animals.

The unique responsibility of the Agricultural Experiment Station is to conduct original research in the broad field of agriculture and to publish and disseminate the results of agricultural research. Attention is devoted largely to the solution of problems related to agriculture, including farm homes. Departments of the Agricultural Experiment Station are as follows: Agronomy, Animal Husbandry, Dairy Husbandry, Economics and Sociology, Entomology, Flour and Feed Milling Industries, Horticulture, Poultry Husbandry, Agricultural Engineering, Bacteriology, Botany and Plant Pathology, Chemical Engineering, Chemistry, Home Economics, Physics, Psychology, 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 the rural home and rural life; 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 agricultural press, and released through 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. By act of the state legislature, approved February 7, 1901, the act of Congress donating this land and imposing the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a fund 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, dairy herd management, 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 110-acre station experimental work is conducted for the benefit of the surrounding western territory. Special attention is paid to the problems of producing crops under conditions of limited rainfall.

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 at Mankato, Belleville, Hiawatha, Wathena, St. John, Hutchinson, Newton, Ottawa, Dodge City, Thayer, Columbus, and Scandia.

The School of Arts and Sciences

THOMAS MARSHALL HAHN, JR., *Dean*

PAUL M. YOUNG, *Associate Dean*

ORVAL EBBERTS, *Assistant Dean*

JOHN P. MURRY, *Academic Adviser*

The School of Arts and Sciences through its 22 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.

In each of the curriculums there are certain requirements in General Education which can be satisfied by taking comprehensive courses or approved substitutions. The policy on substitutions is as follows:

Biology: A minimum of eight hours in at least three of the following sub-groups: I. Bacteriology; II. Botany; III. Entomology; IV. Zoology.

Physical Science: A minimum of eight hours in at least two of the following sub-groups: I. Mathematics; II. Chemistry, Physics; III. Geology, Physical Geography, Astronomy, Meteorology.

Social Science: A minimum of eight hours in at least three of the following four sub-groups: I. Economics, Business; II. History; III. Political Science, Geography; IV. Sociology, Anthropology, Psychology.

Humanities: A minimum of eight hours in at least three of the following sub-groups: I. Literature (in English or a foreign language); II. Art, Architecture; III. Music; IV. Philosophy, History.

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

Biological Science	Humanities
Business Administration	Music
Education	Physical Science
General	Social Science

A list of the areas in which a student may major in each of the 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 86-98.

TABULATION OF CURRICULUMS AND MAJORS

CURRICULUM :	Biological Science B.S.	Physical Science B.S.	Humanities B.A.	Social Science B.A.	General B.A.	Business Administration B.S. in Bus. Ad.	Education B.S. in Ed.	Music B. Music
DEGREE :								
MAJORS AND PRE- PROFESSIONAL PROGRAMS :	Bacteriology	Chemistry	Art	Economics	Area	Business Administration	Elementary Education	Applied Music
	Biogeography	Geography	English	Geography	Biological Science	Accounting	Music Education	
	Botany	Geology	History	History	Humanities			
	Entomology	Geophysics	Mathematics	Political Science	Physical Science		Physical Education	
	Psychology	Mathematics	Modern Languages	Psychology			Secondary Education ¹	
	Speech	Physics	Music	Sociology	Social Science		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. 100)	Speech (p. 163)
Biogeography (p. 131)	Technical Journalism (p. 169)
Botany (p. 102)	Wildlife Conservation (p. 87)
Entomology (p. 72)	Zoology (p. 171)
Psychology (p. 159)	

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

III. General Education: Introductory Social Sciences, or approved substitutions, eight hours; Introduction to Humanities, or approved substitutions, 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

Course	Hours	Course	Hours
Genetics or Heredity and Eugenics ⁴	2-3	General Organic Chemistry	5
General Chemistry or Chemistry I ⁵	5	General Botany ⁸	5
Nature and Development of Plants ⁶	3	General Entomology ⁸	3
Bacteriology ⁷	5	General Entomology Laboratory ⁸	1
General Geology or Geography elective	3	General Microbiology 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; D. H. 180, 190; P. H. 100, 101; Phys. 120; 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
Introductory Social Science I	4	Introductory Social Science II	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	5
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	17 or 18

CURRICULUM IN BUSINESS ADMINISTRATION

Bachelor of Science in Business Administration

Hours required for graduation, men 124, women 120

This curriculum offers professional training for the student who expects to enter industry or commerce upon graduation. He may concentrate his work in one of the fields of marketing, finance, labor management, or general business.

Because of the demand for competent accountants this curriculum also offers a major in accounting. This major provides all of the academic work needed to qualify for the examination for a certified public accountant. Qualified accountants find extensive employment opportunities in government and industry and many establish their own accounting firms.

Major Fields

Business Administration (p. 105) Accounting (p. 105)

REQUIREMENTS

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

II. General Algebra: Five hours.

III. General Education: Man's Physical World I and II, or approved substitutions, eight hours; Biology I and II, or approved substitutions, eight hours; Introduction to Humanities I and II, or approved substitutions, eight hours.

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

V. Economics I and II, Economic Geography,* American Government, American Industrial History, General Psychology, Introduction to Sociology,* Public Finance. Total: 24 hours.

VI. Social Science Elective.

VII. Remaining Hours in Major, Additional Tool and Related Courses, and Free Electives. For major requirements, see catalog statement for Department of Business Administration 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
Oral Communication I	2	General Algebra	5
Man's Physical World I	4	Man's Physical World II	4
Accounting I	3	Accounting II	3
American Industrial 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

* Not required of accounting majors.

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

Hours required for graduation, men and women 126*

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

This curriculum provides the following major fields: art education, elementary education, secondary education, music education, physical education. Special curriculums exist in Agricultural Education, page 60, and Home Economics Teaching, page 218.

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 instrumentau music. The students 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 cerification 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:

1. Social Sciences (including history): Introductory Social Sciences I and II, or approved substitutions, plus elective, 10 hours.
2. Humanities (literature, language, art): Introduction to Humanities I and II, or approved substitutions, plus elective,² 10 hours.
3. Physical and Biological Sciences (must include courses in both): Man's Physical World I and II, or approved substitutions, eight hours. Biology I and II, or approved substitutions, eight hours.
4. 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 (four 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.

Music Education: Music 201, 202, 231, 232, 233, 234, 250, 304, 305, 401, 402, 412, 413, 421, 422, 501, 502, 505, 510, and 515; Educ. 416 (six hours); and Phys. 125. All students must include Spch. 535 as part of their electives, and those with an instrument option must also include Music 630. Each student must take 20 hours of Applied Music, of which eight hours must be in the major instrument or voice; eight hours of other applied music courses, chosen in consultation with a departmental adviser; two hours in the Laboratory Orchestra and two hours in the Laboratory Choir. Two years of work in Piano Ensemble are 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, 270, 271, 360, 371, 405, 440; Econ. 110, 120, 430; Engl. 205; Math. 110; Hist. 176; P. Sci. 220; Soc. 240.

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, 205, 215, 685; Geol. 100, 685; Phys. 135; P. Sci. 220; three hours of American history and 12 hours of geography.

Geology: Bot. 200; Chem. 210, 230; Econ. 110; Geog. 205; Geol. 100, 420, 430, 450, 460; Math. 100, 150, 220; Phys. 210, 211; P. Sci. 220; Zool. 200.

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, 335; Arch. 202; M. E. 211, 212.

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, 570, 611; Stat. 320; and three hours in mathematics.

Modern Languages: Arch. 200; Engl. 251, 256, 270, 275; Hist. 115, 130; Music 250; six hours in English, six hours in history; 24 hours in one modern language.

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: Econ. 110, 120; Engl. 251, 270; Hist. 115, 130; Math. 100 or 110; P. Sci. 220; Soc. 220; three hours in political science, six hours in American history, three hours in sociology; 18 hours in psychology beyond curricular requirements.

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
Man's Physical World I	4	Man's Physical World II	4
General Psychology	3	Art for Elementary Teachers	3
Oral Communication I	2	Personal and Community Health	3
Elective	3	Elective	3
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	15 or 16

* Recommended but not required.

SECONDARY EDUCATION
FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Physical Science	4	Physical Science	4
Elective and Major	8	General Psychology	3
Air or Military Science	1	Oral Communication I	2
Physical Education	0	Elective and Major	3
		Air or Military Science	1
		Physical Education	0
Total	15 or 16	Total	15 or 16

MUSIC EDUCATION
FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Biology I	4	Biology II	4
Theory of Music I	3	Theory of Music II	3
Orch. Instr. I (String)	1	Orch. Instr. (String)	1
Appreciation of Music	2	Oral Communication I	2
Applied Music	2	Applied Music	2
Air or Military Science	1	Air or Military Science	1
Physical Education	0	Physical Education	0
Total	15 or 16	Total	15 or 16

PHYSICAL EDUCATION (MEN)
FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Man's Physical World I	4	Man's Physical World II	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	5
Oral Communication I	2	Air or Military Science	1
Air or Military Science	1	Physical Education	0
Physical Education	0		
Total	16	Total	16

PHYSICAL EDUCATION (WOMEN)
FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
<i>Course</i>	<i>Hours</i>	<i>Course</i>	<i>Hours</i>
English Composition I	3	English Composition II	3
Applied Nutrition	2	Phys. Ed. Orientation	1
Man's Physical World I	4	Man's Physical World II	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 (four 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.)

Area 1: Biological Science. Biology I and II, or approved substitutions, and an additional course in the area, preferably General Microbiology, General Entomology, or any approved introductory biological science course including a laboratory. 11-13 hours.

Area 2: Physical Science. Man's Physical World I and II, or approved substitutions, and either Descriptive Astronomy, Introductory Meteorology, or Historical Geology. 11 hours.

Area 3: Humanities. Introduction to Humanities I and II, or approved substitutions, and an additional six hours in literature, normally either American Literature I and II, English Literature I and II, or Books and Men I and II. At the discretion of student and adviser, the additional six-hour requirement may be satisfied by other literature courses in any language. 14 hours.

Area 4: Social Sciences. Introductory Social Science I and II, or approved substitutions, and an additional six hours in geography (other than Physi-

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.

cal Geography), Economics, Social Psychology, or courses above the introductory level in government or sociology. 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 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 Sciences:** 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. 200 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
Man's Physical World I or Biology I	4	Man's Physical World II or Biology II	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		Total	
16 or 17		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. 228)	Music (p. 147)
English (p. 125)	Philosophy (p. 139)
History (p. 134)	Speech (p. 163)
Mathematics (p. 141)	Statistics (p. 168)
Modern Languages (p. 145)	

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

V. General Education: Man's Physical World I and II, or approved substitutions, eight hours; Biology I and II, or approved substitutions, eight hours; Introductory Social Science I and II, or approved substitutions, eight hours.

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
Man's Physical World I	4	Man's Physical World II	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. 149.

REQUIREMENTS

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

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

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

IV. General Education: Man's Physical World I and II, or approved substitutions; or Biology I and II, or approved substitutions; or Introductory Social Science I and II, or approved substitutions, eight 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. 148.

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
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. 108)	Mathematics (p. 141)
Geography (p. 130)	Physics (p. 157)
Geology (p. 130)	Statistics (p. 168)
Geophysics (p. 130)	Technical Journalism (p. 169)

REQUIREMENTS

- I. Communications: English Composition I and II, six hours; Oral Communication, two hours; English Proficiency.
- II. Analytical Geometry and Calculus I and II, 14 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: Biology I and II, or approved substitutions, eight hours; Introductory Social Sciences I and II, or approved substitutions, eight hours; Introduction to Humanities I and II, or approved substitutions, eight hours.
- VII. Physical Education (four 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	
Course	Hours	Course	Hours
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. 114)	Psychology (p. 159)
Geography (p. 131)	Sociology (p. 115)
History (p. 135)	Speech (p. 163)
Political Science (p. 137)	Technical Journalism (p. 169)

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

V. General Education: Man's Physical World I and II, or approved substitutions, eight hours; Biology I and II, or approved substitutions, eight hours; Introduction to Humanities I and II, or approved substitutions, eight hours.

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
Man's Physical World I	4	Man's Physical World II	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

GORDON K. STALLINGS, *Head of Department*

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 free of charge complete 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 at present has an Air Force ROTC offering a four-year program. 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 Air ROTC in any of its programs.

Students enrolled in the Advanced Course may sign a Deferment Agreement which serves to exempt 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 the Deferment Agreement and accept conditional enrollment in Advanced Air ROTC which will serve, within established quotas, to exempt him from selective service induction so long as he continues in college and satisfactorily pursues his academic 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 all courses are three semester hours each. 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

- 111. Air Vehicles 1A.** (1) I. Introduction to the AF ROTC program, followed by a history of aviation, and a study of the air power concept emphasizing the fundamentals of global geography. Two hours rec. and one hour leadership lab. a week.
- 112. National Security 1B.** (1) II. A study of those geographic factors which form the basis of world political and military power, the factors underlying current world tensions, the nature of the world security problems, and the international alignments associated with these tensions. A study of the evolution of U. S. defense structure, and the roles,

capabilities, and potentialities of the Armed Forces within this structure. Two hours rec. and one hour leadership lab. a week.

121. Aerial Warfare 2A. (1) I. The purpose, process, and primary elements of aerial warfare: targets, weapons, and the air ocean; purpose and provisions of the USAF officer career program; survey of occupational fields open to USAF officers. Two hours rec. and one hour leadership lab. a week.

122. Air Operations 2B. (1) II. The characteristics of military aircraft, aircraft design, and production processes; the evolution of and significance of bases; background of United States air policies and a study of the missions of the major Air Force commands. Two hours rec. and one hour leadership lab. 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 equivalent to that required for a private pilot's license. Concurrent 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) Concurrent 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

H. B. LEE, *Head of Department*

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*

Students majoring in bacteriology should enroll in the Curriculum in Biological Science. (See p. 86.)

For a major (VI, p. 87), the following courses should be completed: Bact. 250 or equivalent, 610, 670, 675 (or 710), and eight additional hours which may include Zool. 250 and/or any selection of bacteriology courses above the introductory level; Chem. 210, 230, 250, 300, 350, 351,

and 420; Geog. 115; Phys. 210, 211; Spch. 200; and A. H. 400; Math. 100, 150 should be taken to satisfy requirement IV (p. 87).

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

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. 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.: Chem. 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.

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.
- 650. Sanitary Bacteriology Laboratory.** (2) II, S in odd years. Theory and practice of bacteriologic testing of water and sewage; microbiological phenomena involved in water and sewage treatment; disinfectants;

bacteriologic examination of surfaces and air. 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; Chem. 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*

Students majoring in botany should enroll in the Curriculum in Biological Science. (See p. 86.)

For a major in botany (VI, p. 87), the requirements are Bot. 200 and 19 hours of botany courses above the introductory level.

FOR UNDERGRADUATE CREDIT

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. 200.

200. General Botany. (5) I, II, S. Plant groups and their evolutionary development. Physiology, anatomy, ecology, and identification of seed plants. Economic applications. Three hours rec. and six hours lab. a week.

NOTE: In September 1961 Bot. 200 will be Bot. 210, 4 credit hours, with two hours of rec. and six hours of lab. a week.

300. Elementary Plant Physiology. (3) I. A brief survey of the physiological processes of higher plants. Pr.: Bot. 200.

FOR UNDERGRADUATE AND GRADUATE CREDIT

600. Plant Physiology. (4) I. Detailed consideration of the physiological processes of higher plants. Two hours rec. and six hours lab. a week. Pr.: Bot. 200 and a course in organic chemistry.

605. Plant Pathology. (3) I, S. Important diseases of crops and the organisms which cause them. Two hours rec. and three hours lab. a week. Pr.: Bot. 200.

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. 200 or Zool. 200.

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. 200.

630. Paleobotany. (3) II. Fossil plants, their taxonomy and use in the recognition of geological strata. Two hours rec. and two hours lab. a week. Pr.: Geol. 430.

670. Plant Ecology. (3) II. Structure and dynamics of vegetation. Two hours rec. and three hours field 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 a week of combined rec. and lab. work. Pr.: Bot. 200.

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. 200.
- 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.
- 780. Virus Diseases of Plants.** (2) I. Economic importance, nature, transmission, effect on host, and control of virus plant diseases. 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.
- 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 even 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.

BUSINESS ADMINISTRATION

C. CLYDE JONES, *Head of Department*

The Department of Business Administration offers curriculums for men and women desiring a career in commerce, industry, or certain of the professions. Students may major in either business or accounting.

In the business curriculum subject matter is developed from the administrative point of view. Students have the opportunity to develop

areas of special interest in management, marketing, finance, personnel, or secretarial science.

Accounting majors have an opportunity to prepare for careers in either public or private accounting.

A secondary education curriculum for business administration, for those persons preparing to teach commerce subjects in high school, will be found on page 90.

To graduate in business administration, students, except dual-degree candidates, must comply with the core curriculum, p. 88. Items I, II, and IV of the curriculum are specified. The following paragraphs detail the course work necessary to complete Items II, V, VI, and VII:

Business: For a major in business the requirements are: Item II, p. 88, Math. 110; Item V, p. 88, Geog. 215, Hist. 176, P. Sci. 220, Psych. 110, and Econ. 110, 120, Soc. 220; Item VI, p. 88, Econ. 430; Item VII, p. 88, B. A. 270, 271, 305, 325, 326, 400, 405, 431, 440, 600, Stat. 320, Engl. 205, nine semester hours of special business electives chosen with the approval of the Business Administration Department and sufficient additional work to fulfill the graduation requirement of 124 hours for men and 120 hours for women.

Accounting: For a major in accounting the requirements are: Item II, p. 88, Math. 110; Item V, p. 88, Hist. 176, P. Sci. 220, Psych. 110, Econ. 110, Soc. 120; Item VI, p. 88, Econ. 430; Item VII, p. 88, B. A. 270, 271, 325, 326, 361, 371, 400, 405, 431, 461, 470, 471, 480, 491, 600, Stat. 320, Engl. 205 and sufficient additional work to fulfill the graduation requirements of 124 hours for men and 120 hours for women. Students preparing for the examination for Certified Public Accountant should include elective accounting courses, selected with the help of the accounting staff, for a portion of the work necessary to complete Item VII.

Dual Degree: Students desiring to earn a B. S. Degree in Business Administration in addition to another undergraduate degree (see p. 183) should complete the following course work: B. A. 170, 325, 326, 361, 400, 405, 431, 440, 600, Econ. 110, 120, 430, and six hours of business electives chosen with the approval of the Business Administration Department.

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

COURSES IN BUSINESS ADMINISTRATION

FOR UNDERGRADUATE CREDIT

- 100. Introduction to Business.** (3) I, II. A survey of the content of the Business Administration Curriculum. The course establishes a framework for the curriculum, develops vocabulary, and gives purpose and objectivity to the study of business administration.
- 101. Fundamentals of Business for Professional People.** (2) I. A survey course of selected business principles designed to acquaint students in professional curriculums with the business institutions and techniques of major importance in establishing and maintaining a professional practice.
- 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.
- 131. Personal Typing.** (2) I, II. Fundamental technique of typewriting, basic styles of business letters, introduction to tabulation, and preparation of general office forms. Speed 30 to 40 words per minute.
- 141. Institutional Accounting.** (2) II. Accounting principles and their application to cafeteria, lunch and tea rooms, restaurants, dormitories, clubs, and other institutions. Two two-hour rec. and lab. periods a week. Not open to students in business administration.

- 170. Principles of Accounting.** (3) I, II, S. 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.
- 231. Typewriting II.** (3) I, II, S. Cont. of Typewriting I. Pr.: B. A. 230.
- 235. Shorthand I.** (4) I, II, S. Fundamentals of Gregg Shorthand. Meets five hours each week.
- 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.
- 270. Accounting I.** (3) I, II, S. An introduction to basic accounting principles, financial statements, special journals, and controlling accounts. Six hours rec. and lab. a week.
- 271. Accounting II.** (3) I, II, S. Accounting for partnerships and corporations, including asset accounts, bonds, manufacturing accounts, payrolls, and miscellaneous items. Six hours rec. and lab. a week. Pr.: B. A. 270.
- 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. 350.
- 305. Managerial Accounting.** (3) I, II. 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. 271 or 170.
- 325. Business Law I.** (3) I, II, S. Contracts, agency, and sales.
- 326. Business Law II.** (3) I, II, S. Negotiable instruments, partnerships, and corporations.
- 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. 271 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. 271.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 400. Administration.** (3) I. 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.: B. A. 100 or consent of instructor.
- 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. 110, 430; B. A. 271 or 170.
- 431. Personnel Administration.** (3) I, II, S. Development and use of principles of management as applied to the 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, 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. Standard costs, estimated costs, budgets and distribution costs. Pr.: B. A. 361.

471. Advanced Accounting. (3) I, II. Home office and branch accounting, consolidated statements, receiverships, and other special topics. Pr.: B. A. 470 or conc. enrollment.

472. Valuation Accounting. (3) I, II, S. Valuation of balance sheet accounts. Pr.: B. A. 371.

480. Tax Accounting. (3) II. Accounting problems in federal and state income taxes, estate, gift, and other taxes. Pr.: B. A. 361 or 470 or conc. enrollment.

491. Auditing I. (3) I. Theory and procedure used in simple balance sheet audits. A short audit case will be used. Pr.: B. A. 470 and consent of instructor.

500. 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.

505. Investments. (3) I, II. A study of investment institutions, and principles and practices from the individual viewpoint. Corporate, civil, foreign, real estate investment are compared as to risk, return, and intrinsic value. Pr.: B. A. 170 or 271 and 405.

512. Property Insurance. (2) I. Fire, marine, automobile, title, credit insurance, and corporate bonding; also other forms of property insurance. Pr.: Econ. 110.

514. Life Insurance. (2) II. Nature and uses of life insurance, kinds of policies, determination of premiums, reserves, surrender values, and dividends. Pr.: Econ. 110.

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.

516. Advanced Business Finance. (2) I. Principles and practices of finance applied to the solution of representative problems in business finance. The case method of instruction is used. Pr.: B. A. 405.

520. 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.

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.

541. 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.

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. 470.

575. Accounting Internship. (3) I. Provides five 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, 491, 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. The case method supplements extensive reading. Written reports are required. Pr.: Open only to graduating seniors and graduate students.

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.

670. C. P. A. Problems. (3) 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.

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

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.

822. 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. 491 and consent of instructor.

870. Accounting Theory Seminar. (3) II. A critical examination of accounting literature, with emphasis upon accounting theory and intensive study of current issues in accounting theory. Pr.: Consent of instructor.

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.

CHEMISTRY

THOMAS D. O'BRIEN, *Head of Department*

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 (junior and senior years). 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.

Lister 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.

COURSES IN GENERAL CHEMISTRY

FOR UNDERGRADUATE CREDIT

- 095. Chemistry Seminar.** (0) I, II. Required of all juniors and seniors 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.
- 120. Introductory Organic and Biological Chemistry.** (5) II. For students in home economics and nursing. Three hours lec., rec. and six hours lab. a week. Pr.: Chem. 110.
- 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 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.*
- 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.

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

FOR GRADUATE CREDIT

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

COURSES IN INORGANIC CHEMISTRY

FOR UNDERGRADUATE AND GRADUATE CREDIT

606. Inorganic Chemistry. (3) I and alt. S. Facts of chemistry and their present theoretical interpretations; properties of the elements as a basis for methods of classification. Pr.: Chem.*

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 lab. hours a week. Pr.: Chem.*

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.:*

822. Chemistry of Metals I. (3) I and alt. S. Descriptive and theoretical chemistry of the common metals; periodic relationships, the metallic state, alloys, metallurgy and representative compounds. Pr.:*

824. Chemistry of Metals II. (2) II and alt. S. Descriptive and theoretical chemistry of the inner transition and less familiar transition elements; preparation, classification, and characterization of the elements. 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.:*

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.

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 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, 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.:*

* See page 109.

- 603. Quantitative Microanalysis.** (2) S. Theories and techniques of quantitative microanalysis. Six hours lab. a week. Pr.:*
- 604. Instrumental Analysis.** (3) I, II, S. Theory and application of modern instruments in the field of chemistry. Laboratory practice in the use of optical and electrical instruments. Two hours rec. and three 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-numbered 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-numbered years. Theory of ion exchange, extraction, precipitation, distillation and electrochemical separations. Lesser known analytical technics. Pr.:*

COURSES IN ORGANIC CHEMISTRY

FOR UNDERGRADUATE CREDIT

- 190. Elementary Organic Chemistry.** (3) I, II, S. An introduction to the principles of organic chemistry. Conc. enrollment in Chem. 191 is required in most curricula. Pr.: Chem. 110.
- 191. Elementary Organic Chemistry Laboratory.** (2) I, II, S. Pr.: Chem. 190 or conc. enrollment.
- 350. General Organic Chemistry.** (3) I, II, S. Principles of aliphatic and aromatic chemistry. For agriculture, pre-veterinary, medical technician, pre-medical (see also 511), and chemical and nuclear engineering students. Conc. enrollment in Chem. 351 is required in most curricula. Pr.: Chem. 230.
- 351. General Organic Chemistry Laboratory.** (2) I, II, S. Pr.: Chem. 350 or conc. enrollment.

FOR UNDERGRADUATE 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, 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.:*

* See page 109.

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 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.

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.:*

* See page 109.

- 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.

COURSES IN AGRICULTURAL AND BIOLOGICAL CHEMISTRY

FOR UNDERGRADUATE AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 410. General Plant Biochemistry.** (4) I. Occurrence and functions of organic compounds, such as enzymes, plant pigments, vitamins, and plant acids in plants. Three hours lec. and three hours lab. a week. Pr.: Chem. 190 or 350.
- 420. General Biochemistry.** (5) I, II, S. Basic course for students in Veterinary Medicine, Agriculture, Home Economics, and Medical Technology. Pr.: Chem. 191 or 351.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 605. Vitamins.** (2) II, S. Pr.: Chem. 660.
- 660. Biochemistry.** (3) I; II on sufficient demand. Basic course for graduate students in chemistry. Three hours lec. a week. Pr.:*
- 661. Biochemistry Laboratory.** (2) I; II on sufficient demand. Six hours lab. a week. Pr.: Chem. 660 or conc. enrollment.
- 670. Principles of Animal Nutrition.** (3) II. The nutrients, requirements of animals, balances and metabolism; methods in animal nutrition; nutritive value of feeds. Pr.: Chem. 660.
- 690. Lipids.** (3) II of even years. Pr.: Chem. 660.
- 706. Animal Nutrition Techniques.** (2) II. Care of animals, diets, and design of animal nutrition studies, practical experience in nutritional investigations. Six hours lab. a week. Pr.: Chem. 660 or 670, or conc. enrollment.
- 710. Intermediary Metabolism.** (3) II; S on sufficient demand. Metabolism of carbohydrates, fats, and proteins; biological oxidations and energy production. Pr.: Chem. 660.
- 725. Advanced Biochemistry Laboratory.** (2) II. Cont. of Chem. 661, emphasizing techniques which employ specialized apparatus. Pr.: Chem. 661.
- 745. Hormones.** (2) I. Pr.: Chem. 660.

FOR GRADUATE CREDIT

- 805. Graduate Seminar in Agricultural and Biological Chemistry.** (0-1) I, II.

* See page 109.

- 810. Survey of Agricultural and Biological Chemistry.** (1) I, II, S. An independent study and outside reading course followed by a comprehensive written examination. Pr.:*
- 812. Proteins.** (2) I in odd years. Pr.: Chem. 660.
- 815. Plant Biochemistry.** (3) I. More advanced treatment of the material covered in Chem. 410. Two hours lec. and three hours lab. a week. Pr.: Chem. 660.
- 816. Chemistry of the Carbohydrates.** (2) I. Structural chemistry of carbohydrates, their general properties, biological and chemical reactions, and the methods used in their characterization. Pr.: Chem. 660.
- 818. Enzyme Chemistry.** (2) II. Chemical nature of enzymes and their reactions. Pr.: Chem. 710.
- 819. Enzyme Laboratory.** (2) II. Six hours lab. a week. Pr.: Chem. 818 or conc. enrollment.
- 825. Advanced Animal Nutrition.** (3) I. Even years or on sufficient demand. Advanced study of protein quality, protein and amino acid requirements and metabolism, energy metabolism, nutrient interrelationships, functions of trace minerals, problems in animal nutrition. Pr.: Chem. 660 and a course in nutrition.
- 890. Theoretical Biochemistry.** (2) II in even years. Pr.: Chem. 660 or consent of instructor.

ECONOMICS AND SOCIOLOGY

GEORGE MONTGOMERY, *Head of Department*

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

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 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 Sciences with a major in economics. (See page 98.) 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 90.) 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 Sciences with a major in economics (X, p. 98) are: Econ. 120, 430, 710; Stat. 320; B. A. 170; and 12 semester hours of courses numbered 400 or above in economics, agricultural economics or business administration selected in consultation with the student's adviser. Math. 147, 100 or 110 should be used to satisfy requirement III, p. 98. Econ. 110 should be taken to satisfy the three hours required in economics (VII, p. 98). Three hours of sociology and three hours of government should be taken to satisfy the Social Science elective requirement (IX, p. 98).

* See page 109.

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 Sciences with a major in sociology. (See page 98.) 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 91.)

The requirements in the Curriculum in Social Sciences with a major in sociology (X, p. 98) 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. 98). Three hours of economics and three hours of government should be taken to satisfy the Social Science elective requirement (IX, p. 98).

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.

625. Labor Legislation. (3) II, S in odd years. History and philosophy underlying labor legislation. Appraisal and evaluation of the economic, political, and social implications of federal and state labor law. Emphasis is placed on such federal statutes as the Taft-Hartley Act, the Fair Labor Standards Act, and the Social Security Act. Pr.: Econ. 620 or junior standing and consent of instructor.

631. Principles of Transportation. (3) II, S in odd years. 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, S in odd years. 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.
- 685. Business Cycles.** (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.
- 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.
- 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.
- 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. A survey of anthropology which introduces the fundamental concepts and perspectives of the field. A review of the sources and significance of man's biological uniqueness; development of man from more primitive types; meaning and significance of race differences. Prehistoric development of culture, and an analysis of cultural processes. Emphasis on fundamental concepts and relationships.
- 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. 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. Nature, extent, and causes of crime; programs for 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. Prehistoric development of culture, processes of cultural growth and change; culture areas of the world;

- detailed analysis of selected cultures; development of evaluation of major points of view in cultural anthropology. Pr.: Soc. 200 or 220.
- 658. Social Systems.** (3) I. Comparison of social systems in the Orient, Middle East, Europe, and the Americas. Pr.: Soc. 220.
- 661. Racial and Cultural Minorities.** (3) II. 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.)

EDUCATION

FINIS M. GREEN, *Head of Department*

The basic philosophy and objectives of the Department of Education are expressed by the departmental staff as follows: (1) We believe that the Department of Education at Kansas State University, Manhattan, is primarily responsible for the formal and informal activities and experiences that help to qualify a person to assume the responsibilities of a member of the educational profession. (2) We believe that professional education involves more than the achievement by its students of adequate knowledge and skill for the performance of their occupational duties. We conceive of professional education as including also the development of acceptable social and personal attitudes, ethical standards, ideals of service, and the acceptance of professional and social responsibility.

The implementation of our basic beliefs is to be achieved as the Department of Education gives primary consideration to the following objectives: (1) To prepare teachers for elementary schools and secondary schools; (2) to prepare elementary school principals, secondary school principals, and school superintendents; (3) to prepare guidance counselors and directors of guidance programs; (4) to give, within the resources of the department and University, preparation for work in the various

areas of special education of exceptional children; (5) to provide educational consultative services within the limits of the competencies of the staff and the resources of the department; (6) to cooperate in placement services; (7) to keep informed of conditions, needs, and developments in the above areas. Implicit in these statements of objectives are varying degrees of cooperation with other departments which naturally characterize the work of a teacher-education unit in a multi-purpose institution.

Kansas State University offers undergraduate curriculums and graduate programs for teachers so that they may qualify for these state certificates: Degree Elementary, Elementary Principal Provisional, Elementary Principal Five-Year, Secondary, Administrator's Provisional, and Administrator's Five-Year.

Each candidate for an original teaching certificate and each candidate for a renewal of a teaching certificate should maintain a close working relationship with the Department of Education as he plans his preparation for teaching. In order to give additional counsel to students planning to teach at the secondary level, special advisers are available in the subject-matter fields.

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: the certification requirements of the State Department of Public Instruction as they have been provided for in the applicant's curriculum in teacher education; speech habits; and health, both physical and mental.

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.
- 201. 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.: 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, 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 direction in the Manhattan schools. Appointments must be made at the time of registration for the semester and general arrangements made previous to the semester. Pr.: Educ. 400, Music 413.
- 461. School Music I.** (3) I, II, S. (See Music 412.)
- 462. School Music II.** (3) I, II, S. (See Music 413.)
- 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; the 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 Elementary Schools.** (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 Elementary Schools.** Credit arranged. I, II. Observation and teaching participation under the direction of competent elementary teachers. Application should be made through adviser during the second semester of the year preceding registration for this course. Pr.: Educ. 200, 470, 471, 472, 473; Engl. 090; conc. enrollment in Educ. 474; 90 hours of completed course work; and over-all grade-point average of 2.0.
- 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. 201, 400, and senior standing and consent of instructor.
- 477. Teaching Participation in the Secondary School.** Credit arranged. I, II. Observation and teaching under direction of regular teachers in junior and senior high schools. Appointments must be arranged at time of registration and general arrangements made previous to the semester. Pr.: Educ. 201, 400; Engl. 090, senior standing, September observation, a minimum point average of 2.0 in all course work and a minimum point average of 2.5 in all course work in teaching field, and consent of instructor.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

561. Occupational Information. (2) (See Psych. 530.)

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.: Senior standing and Educ. 201 or 12 hours of psychology.
- 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. 201, senior standing, and 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 Educ. 200 or 201.
- 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.: Educ. 201 or 200.
- 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 six hours of education. 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 and senior standing.
- 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.: Six hours of education.
- 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 and senior standing.
- 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 senior standing.
- 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 adminis-

- tration. 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. 800 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. Primarily for persons working to qualify for the Counselor's Five-Year Certificate. Pr.: Educ. 601 and at least one year of 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.
- 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. 601; Psych. 844, 600; 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.

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.

501. Teaching Participation in Agriculture. (5) I, II. Six weeks of observation and directed teaching in vocational agriculture classes in the Manhattan High School, and other high schools by arrangement; group study of classroom problems; lesson plans and presentation criticized by the college instructor and the vocational agriculture teacher. Pr.: Educ. 500.

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. 201 or 807.

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 Part-time and Adult Classes in Agriculture. (2 or 3) Offered on sufficient demand. Organization and preparation of materials, and methods used in teaching part-time and 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; courses 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. 501.
- 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. Workshop in the Vocational Agriculture Curriculum I.** (2 or 3) S. Curriculum problems; planning local programs of vocational agriculture; developing facilities and plans for meeting current and advanced problems in the teaching of vocational agriculture. Pr.: One year of teaching in vocational agriculture.
- 825. Workshop in the Vocational Agriculture Curriculum 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 vocational 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 individual and courses taught by dietitians. Pr.: Senior standing in Institutional Management and Dietetics.
- 552. Teaching Participation in Home Economics.** (5) I, II, S. Supervised observation and teaching carried on in the home economics classes of the Manhattan High School and other selected state high schools. Pr.: Educ. 550.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 750. Vocational Home Economics Curriculum.** (3) I, II, S. Philosophy and principles of vocational education as applied to home economics; characteristics of the high school vocational home economics curriculum; planning and supervising the home project program; sponsoring

the F. H. A. chapter; and developing teaching guides for the various courses. Pr.: Educ. 550 or conc. enrollment.

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. Extension Methods for Home Economics. (3) II. Recommended methods for extension work; application of these methods to the home economics program. 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.: Educ. 552 and experience in teaching home economics.

837. Seminar in Home Economics Education. (2 or 3) S. Recent trends in home economics education. Pr.: Educ. 552 and experience in teaching home economics.

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*

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. Specific requirements for the English Literature emphasis include Forms of Literature (300) Shakespeare, Chaucer, Milton, and American period or type course; and English Survey (600 and 605) or two type or period courses in English Literature. Specific requirements for the American Literature emphasis include Forms of Literature (300); Shakespeare; either Chaucer or Milton; one Twentieth Century American course; one English period or type course; American Survey (611 and 616) or two type or period courses in American Literature.

Students preparing to teach English in high school should consult the Secondary Education Curriculum and note the specific requirements listed for English majors (page 91). The department offers service courses beyond the freshman level: Engl. 205, 411, 416. General education courses aiming at introductory appreciation of literature for non-major students are: Engl. 230, 240, 251, 256, 270, 275, 350, 370, and 375. Many programs require basic literature courses, English, American, or the courses called 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 these hours must be selected from courses numbered 400 or above.

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.

- 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.
- 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. Required for English majors. 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.
- 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.

- 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.
- 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) II in alt. years. Pr.: Engl. 120.
- 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. English Survey I.** (2) I. History of English literature from Anglo-Saxon times down to the close of the Elizabethan period. Pr.: Junior standing.
- 605. English Survey II.** (2) II. Rise of Puritanism and its influence on English literature; classical movement; Romanticism and its development. Pr.: Junior standing.
- 611. American Survey I.** (2) I. History of American literature from the colonials to the Civil War. Pr.: Junior standing.
- 616. American Survey II.** (2) II. History of American literature from Whitman to the present. Pr.: Junior standing.
- 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. Offered 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 to 1642.** (3) II. Offered in alt. years with Medieval Narrative. A survey of the dramatic literature of Elizabethan and Jacobean times, exclusive of Shakespeare. 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.
- 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.
- 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 Brontes. Pr.: Engl. 120.
- 696. English Novel II.** (3) II. Survey of British fiction from Dickens and Thackeray to Galsworthy and Bennett. Pr.: Engl. 120.
- 699. English Seminar.** (3) II. Intensive study of the writings of a single major author, English or American. Pr.: Senior or graduate standing and consent of instructor.
- 705. The Romantic Movement.** (3) I. Pr.: Engl. 120.
- 710. Romanticism in America.** (3) I, S. Prose and poetry of Emerson and Thoreau, Transcendentalism, the Romanticism of Hawthorne, Poe, and Melville. Pr.: Engl. 120.
- 712. Hawthorne and Melville.** (2) II. Pr.: Junior standing.
- 720. The Victorian Era.** (3) II. Pr.: Engl. 120.
- 730. American Realism.** (3) II. Origins, conscious definition, and development of Realism through DeForest, Howells, Twain, James, and their successors. Pr.: Engl. 120.
- 732. Mark Twain and Walt Whitman.** (2) I. Pr.: Junior standing.
- 735. Henry James and William Faulkner.** (2) II. Pr.: Junior standing.
- 740. Twentieth Century English Novel.** (3) II in alt. years. British fiction from Conrad and Joyce to Greene and Waugh. Pr.: Engl. 120.
- 745. Twentieth Century American Novel.** (3) I, S. The modern American novel from Dreiser and Wharton to the present. 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.** (1) II. 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.

GENERAL STUDIES

EARL E. EDGAR, *Head of Department*

The courses in general studies are designed to introduce the student to the major areas of human knowledge: (1) Physical Science, (2) Biological Science, (3) Social Science, and (4) the Humanities. Each course is expected to integrate the component parts of the area covered, and is designed for students who are not planning to specialize in that area of study. Thus curriculums which require introductory courses in one or more of the four areas are not expected to include the general studies course in that area. The general studies courses are intended to be not only introductory in nature, but also terminal, in the sense that the student who is required to take a particular general studies course is not ordinarily required to take more courses in the same area. The following descriptions explain in more detail the content of the courses.

111. Man's Physical World I. (4) I, S. Pr.: High school mathematics as required for admission to the curriculum in which the student is enrolled.

112. Man's Physical World II. (4) II. Cont. of Man's Physical World I. Pr.: Gn. St. 111.

For these courses topics are selected from the physical sciences (astronomy, chemistry, geology, and physics) so as to help the student develop: a mental picture of the **universe**, and some ideas about how it evolved; a mental picture of the **earth**, and an acquaintance with earth history; an understanding of some important parts of **man's physical environment**; concepts of the nature of **matter and energy**, and of some of the relationships between them; an understanding of some ways man has modified his environment through **technology**. These topics are presented in such ways as to help the student acquire: an integrated picture of the physical world; an understanding of the general nature of science and some of its methods; an acquaintance with some relationships between science and society, and between science and philosophy; an appreciation of popular science books and articles, and of science hobbies.

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

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

In these courses one studies the fundamental relationships between plants and animals and other environmental factors. The structure of representative plants and animals, including man, is presented in some detail so that growth, food manufacture and utilization, reproduction, digestion, assimilation, circulation, respiration, and other life processes may be understood and their importance appreciated; also the relationship of structure to heredity and behavior. Principles which govern the classification and identification of various plants and animals are studied. The economic importance, both positive and negative, of plants and animals is considered; the relation of lower plants and animals to food production, food destruction, disease in lower plants and animals, and how these ravages may be controlled; the utilization, propagation, and conservation of plants and animals useful to man; finally, a detailed study of man himself—his anatomy, functioning, heredity, and future as a member of the community and the nation. Life is interpreted as an integrative process which results in a dynamic whole.

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

132. Introductory Social Science II. (4) I, II, S. Pr.: Gn. St. 131.

These courses present a study of society in a way that is considered meaningful to the student by integrating the various fields of social

science. Social institutions and processes are studied with the purpose of enabling the student to understand them intelligently and to realize that change in society is inevitable. The student is encouraged to develop his ability to apply objective thinking and to weigh alternative values in any social problem or situation. As a future citizen, the student is given the opportunity to recognize his responsibility in making decisions which determine social policy in a democratic society.

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. The materials in both semesters of the course are selected and presented to help the student develop the ability to understand and enjoy the arts, literature, and music; to acquaint him with some of the major philosophical and religious accounts of the nature of man, his relation to society and the universe, and the bases of morals and civilization; and to provide an understanding of the dominant characteristics of the major cultural epochs of Western civilization as expressed in and as influencing the form and purposes of the humanities produced in each age.

FOR GRADUATE CREDIT

801. 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; and treatment of the administrative context of teaching: organization, finance and control, student personnel services, and the problems of admission. Open to all graduate students, particularly for those expecting to teach at the college level.

802. 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. Open to all graduate students, and particularly for those expecting to teach at the college level.

GEOLOGY AND GEOGRAPHY

J. R. CHELIKOWSY, *Head of Department*

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. 97)

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

The requirements for a *major in Geophysics* are: Geol. 430, 440, 450, 460, 470, 530, 750; Geog. 605; Math. 222, 421; Phys. 421, 472, 473, 601, 602, and 621.

The requirements for a *major in Geography* are: Geog. 105, 205, 215,

605, 685; Geol. 420, 470, 750; Phys. 135; Agron. 400; and 12 additional hours in geography.

Curriculum in Biological Science (p. 86)

The requirements for a *major in Biogeography* (VI, p. 87) are: Bot. 670; Phys. 135; Zool. 645; three hours in American History; Geol. 100, 420; Geog. 205, 215, 685; and 15 additional hours in geography; Math. 100, 150 to satisfy IV, p. 86; Econ. 110; sociology or anthropology, 3 hours; and P. Sci. 220 to satisfy the Social Science requirement (III, p. 86).

Curriculum in Social Sciences (X, p. 98)

The requirements for a *major in Geography* are: Geog. 205, 215, 685; and 15 additional hours in 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.

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.

420. Geomorphology. (4) I, II, S. Various land-forms 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. Three hours rec. and three 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.

490. Geologic Reports and Illustrations. (2) I, II. Preparation and representation of geologic reports and illustrations. Two hours rec. a week. Pr.: Geology majors with junior standing.

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) 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.
- 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) II. Three hours rec. a week. Pr.: Geol. 510, 530.
- 630. Geologic Literature.** (3) I. 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) II. Pr.: Geol. 100, 460, 650.
- 660. Micropaleontology.** (3) I. 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) 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) 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. 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. 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) 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) 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) 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, land form, 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.
- 205. Introductory Physical Geography.** (3) I, II, S. A study of the geographic factors of our physical environment: map fundamentals, climatic factors, land forms, natural vegetation, soils, and water and mineral resources. Three hours rec. 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. 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. Students may not have credit for both this course and World Regional Geography.

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) 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, 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) 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. 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.

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

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

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

775. Urban Geography. (3) I, II. A study of geographic principles relating to the distribution, function, and structure of cities; a geographic analysis and classification of urban settlements. Three hours rec. a week. Pr.: Six hours of geography or consent of instructor.

785. Seminar in Geography. (Variable credit) I, II. 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*

Students planning to major in this department may enroll in History, in either the Social Science or Humanities curriculum; in Political Science, in the Social Science curriculum; or in Philosophy, in the Humanities curriculum. Students majoring in this department and planning to teach either history or political science in the secondary schools should take, in addition to their major requirements, the necessary courses in Education. Students who plan to teach, but who do not expect to meet the requirements for a Bachelor of Arts Degree, should enroll in the curriculum in Secondary Education leading to the degree of Bachelor of Science in Education.

Requirements for a major in this department consist of a minimum of 24 hours in one of the three disciplines or a minimum of 30 hours in an acceptable combination of any two disciplines. 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.

COURSES IN HISTORY

The requirements for a major in history are Hist. 115, 130, 165, 170, and a minimum of 15 hours of upper division subject-matter courses distributed among at least three of the following four fields.

- I. Ancient and medieval history
- II. Far East, India and Southeast Asia, Russia, and Latin America
- III. American history
- IV. Modern European history

Students majoring in history in the Humanities curriculum should use Hist. 115 and 130 to satisfy requirement VII and Hist. 165 and 170 to satisfy requirement IX, p. 95. Students majoring in history in the Social Science curriculum should use Hist. 115 and 130 to satisfy requirement X and Hist. 165 and 170 to satisfy requirement VIII, p. 98. P. Sci. 220 should be used to partially satisfy requirement IX, p. 98.

FOR UNDERGRADUATE CREDIT

- 115. Civilization I.** (3) I, II, S. Civilization of the world to 1650, with emphasis on Western civilization.
- 130. Civilization II.** (3) I, II, S. Civilization of the world since 1650, with emphasis on Western civilization.
- 145. Contemporary World History.** (2) I, II. World developments since 1930.
- 165. United States Before 1865.** (3) I, II, S. The significant forces, movements, and personalities in the development of American life before 1865.
- 170. United States Since 1865.** (3) I, II, S. The significant forces, movements, and personalities in the development of American life since 1865.
- 176. American Economic History.** (3) I, II. Development of American economic growth from colonial beginnings to the present; manufacturing, commerce, finance, labor, and agriculture. Not open to students who have credit in Hist. 170.
- 180. History of Kansas.** (2) II, S. Land, people, problems, and growth of culture in the development of Kansas.
- 399. Honors Seminar.** (1)

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 605. Early Americas.** (3) I and alt. S. Indians in North, South, and Central America before 1492; impact of Europeans upon aboriginal cultures; rise and development of European institutions in the American environment. Pr.: Three hours of American history.
- 610. The American Revolution and the Age of Washington.** (3) II and alt. S. A study of the foundations of the American Republic, 1763-1799. Pr.: Hist. 165.
- 620. The Age of Jefferson and Jackson.** (3) I and alt. S. A study of Jeffersonian and Jacksonian democracy and the development of sectionalism. Pr.: Hist. 165.
- 630. Civil War, Reconstruction, and the New South.** (3) II and alt. S. (omitted Spring 1961) The economic, diplomatic, political, military, and social history of the Civil War, the problems of reconstruction, and the postwar society of the South. Pr.: Three hours of American history.
- 635. Frontier America.** (3) I and alt. S. Environmental factors, peoples, settlements, and institutions of the United States frontier. Pr.: Hist. 165 or 170.
- 640. Foundations of Modern America.** (3) II and alt. S. (omitted Spring 1962) A study of the growth of industrial economy, the role of the

- entrepreneur, and the new intellectual forces in American life in the period 1865-1900. Pr.: Hist. 170.
- 645. Contemporary United States.** (3) I, II, S. Recent and contemporary history. Problems of the new nation from the Spanish-American War to the present. Pr.: Three hours of American history.
- 650. Constitutional History of the United States.** (3) I and alt. S. (omitted Fall 1960) Constitutional developments, issues, and problems in American history. Pr.: Hist. 165. Recommended Hist. 610.
- 655. Representative Americans.** (2) II and alt. S. (omitted Spring 1962) Lives of outstanding Americans. Pr.: Hist. 165 or 170.
- 660. American Intellectual History.** (3) II and alt. S. (omitted Spring 1961) The role of social, political, and economic ideas in American development. Intellectual institutions that have shaped American life. Pr.: Three hours of American history.
- 665. American Urban History.** (3) I. (omitted Fall 1961) The history of the city in America, with emphasis on the growth of urbanization in the Midwest. Pr.: Hist. 170.
- 670. American Social History.** (3) II. (omitted Spring 1961) An interpretative study of social changes and esthetic developments in American history. Pr.: Three hours of American history.
- 675. American Diplomatic History.** (3) II and alt. S. (omitted Spring 1961) Development of the foreign policy of the United States from 1763 to the present. Pr.: Three hours of American history.
- 690. Latin-American Nations.** (3) II and alt. S. (omitted Spring 1962) Economic, social, and political progress of the Latin-American nations, especially Argentina, Brazil, Chile, and Mexico, from the time of independence down to contemporary developments. Pr.: Three hours of American history.
- 700. History and Culture of Greece.** (3) I and alt. S. (omitted Fall 1961) A study of the political evolution of ancient Greece, its social and economic structure; the gradual development of Hellenic culture and its diffusion throughout the Mediterranean world and the Near East. Pr.: Hist. 115.
- 703. History and Culture of Rome.** (3) II and alt. S. (omitted Spring 1962) A study of the constitutional development of ancient Rome, its agrarian and social problems, the fall of the republic and growth of world empire; Rome's contribution to classical culture and its influence on the modern world. Pr.: Hist. 115 or Gn. St. 141.
- 705. Medieval Europe.** (3) I and alt. S. (omitted Fall 1960) Cultural and historical developments in Europe and the Near East from the decline of the Roman Empire to the Renaissance in Western Europe. Pr.: Hist. 115 or Gn. St. 141.
- 710. Medieval and Tudor England.** (3) I. (omitted Fall 1961) Celtic, Roman, and Teutonic Britain; early monarchies, feudal age; rise of the modern state. Pr.: Hist. 115.
- 715. Renaissance and Enlightenment.** (3) II and alt. S. Rise of humanism, religious revolt, and enlightenment, growth of nationalism and European empires from 1600 to 1800. Pr.: Hist. 130.
- 717. Europe in the Seventeenth Century.** (3) I. (omitted Fall 1960) Political, economic, and intellectual history of Europe from the Wars of Religion through the Age of Louis XIV. Emphasis will be placed upon developments in Western Europe. Pr.: Hist. 115.
- 718. Europe in the Eighteenth Century.** (3) II. (omitted Spring 1961) Political, economic, and intellectual history of Europe from the death of Louis XIV through the Congress of Vienna. Emphasis will be placed upon developments in Western Europe. Pr.: Hist. 130.
- 720. French Revolution and Napoleonic Period.** (3) I and alt. S. (omitted Fall 1960) The historical cycle of one of the world's greatest revolutions. Pr.: Hist. 130.

- 724. Europe, 1815-1914.** (3) II. Social, economic, and political developments during the century of optimism, progress, and peace. Pr.: Hist. 130.
- 728. Europe Since 1914.** (3) I and alt. S. The two World Wars, the rise and challenge of extremist ideologies, major economic, social, and political trends, and their influence upon the contemporary scene. Pr.: Hist. 130.
- 734. Modern England.** (3) I. Political, economic, and cultural history of modern and contemporary Britain. Pr.: Three hours of European history.
- 738. Modern Germany.** (3) I. Major developments in Central Europe from the Reformation to the present. Stress is placed upon the cultural, political, economic, and social forces that have shaped modern Germany. Pr.: Hist. 130.
- 744. Russia and the Soviet Union.** (3) I, II, and alt. S. Imperial Russia and the new regime since the Revolution of 1917. Pr.: Three hours of European history.
- 760. Far East.** (3) I and alt. S. Modern and contemporary Chinese, Japanese, and other peoples of Eastern Asia and the western Pacific areas.
- 765. India and Southeast Asia.** (3) II. Modern and contemporary institutions and culture of South Asia and Indonesia. Pr.: Hist. 115 or 130.
- 770. History of Religions.** (3) II and alt. S. Development of the world's living religions, the relation of each religion to its natural and cultural environment; dominant concepts, leaders, and historic growth which characterize each. Pr.: Hist. 115 or Gn. St. 141.
- 780. Historical Method and Bibliography.** (2) I, II, S. Survey of historical articles or theses. Required of graduate majors in history. Pr.: Consent of instructor and Hist. 115, 130, 165, 170.
- 785. Readings in History.** (1 to 3) I, II, S. Students will read primary and secondary materials on subjects selected by the student with the approval of the instructor. Discussions of reading will take place at varying intervals. Open to graduate students and seniors majoring in history.
- 790. Problems in History.** 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

- 850. Russian Intellectual History.** (2) II. (omitted Spring 1962) A study of intellectual developments in Russia from 1762. Pr.: Hist. 744.
- 883. Seminar in History.** (1 to 3). Pr.: Consent of instructor and five hours of credit basic to the field involved.
- 995. Research in History.** Credit arranged. I, II, S. Work offered in United States, Latin American, European, and Asiatic history. Pr.: Registration in the Graduate School, with sufficient training to carry on the line of research undertaken.

COURSES IN POLITICAL SCIENCE

Requirements for a major in political science in the Curriculum in Social Science are: P. Sci. 120 and 225 (or 155 and 225), and additional hours in political science, for a total of 21 semester hours. P. Sci. 150 or 220 should be used to partially fulfill the requirements (VII in the requirements for the Curriculum in Social Science); and the social science electives (IX) should be in economics and sociology.

FOR UNDERGRADUATE CREDIT

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

- 150. Constitutional Democracy in America I.** (3) I, II. An introduction to the principles and institutions of American democracy. Designed especially for freshmen and sophomores. Not open to students who have taken P. Sci. 220.
- 155. Constitutional Democracy in America II.** (3) II. Cont. of P. Sci. 150.
- 175. Effective Citizenship.** (2) I. Observation of, and participation in processes of government.
- 220. American Government I.** (3) I, II, S. National, state, and local governments, with emphasis on constitutional principles and basic structure. Designed especially for upperclassmen. Not open to students who have had P. Sci. 150.
- 225. American Government II.** (2) II. Functions and services of American government in modern society; cont. of American Government I. Pr.: P. Sci. 150 or 220.
- 320. State and Local Government.** (3) Government of American states and subdivisions.
- 399. Honors Seminar in Political Science.** (1)

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 600. American Political Ideas.** (3) I. 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. 150 or 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. 150 or 220.
- 620. State and Local Politics and Administration.** (2) II. A study of political and administrative processes at the state and local levels, with particular attention to the problems, attitudes, and pressures affecting those processes. Pr.: P. Sci. 150 or 220.
- 630. Federal Politics and Administration.** (2) I, S. A study of the political and administrative processes at the national level, with particular attention to the underlying pressures and organizational problems influencing those processes. Pr.: P. Sci. 150 or 220.
- 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).
- 645. International Law and Organization.** (3) II. Nature and scope of international law; the structure and functions of international institutions; the value and effectiveness of international law and organization in the modern world. Pr.: P. Sci. 120 and 150 (or 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 150 (or 120 and 220).
- 725. Governments of Continental Europe.** (3) I, S. Analysis of the major governments of Continental Europe. Pr.: P. Sci. 120 and 150 (or 120 and 220).
- 740. Political Parties and Pressure Groups.** (3) I. Relationship of interest groups in the United States to the development of public policy; nature and evolution of the American party system. Pr.: P. Sci. 150 or 220.
- 765. Constitutional Law.** (3) II. Development of the government of the United States through judicial interpretation of the Constitution. Case method used. Pr.: P. Sci. 150 or 220.

780. Soviet System. (3) II. Government and politics of the Soviet Union and other Communist-controlled nations. Pr.: P. Sci. 120 and 150 (or 120 and 220).

785. Readings in Political Science. (1 to 3) I, II, S. Students will read primary and secondary materials on subjects selected by the student with the approval of the instructor. Discussions of reading will take place at varying intervals. Open to graduate students and seniors majoring in government.

FOR GRADUATE CREDIT

830. Problems in Political Science. (1 to 3) I, II, S. Pr.: Six hours of credit basic to the field involved and consent of the instructor.

880. Seminar in Political Science. (1 to 3) I, II, S. Pr.: Six hours of credit basic to the field involved and consent of the instructor.

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

COURSES IN PHILOSOPHY

Requirements for a major in philosophy in the Curriculum in Humanities are 24 hours in philosophy and (1) successful completion of a comprehensive examination in the history of philosophy and (2) successful completion of examinations in any two of the following three areas: (i) history and philosophy of science, (ii) aesthetics and ethics, (iii) social and political philosophies.

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 Religion. (3) I, II, S. A course designed to acquaint the student with the nature of the religious experience, with the basic language and literature of religion, and with the similarities and differences in polity and belief among the major contemporary religious institutions and theologies. For freshmen and sophomores.

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.

399. Honors Seminar in Philosophy. (1)

FOR UNDERGRADUATE AND GRADUATE CREDIT

605. Inductive Methods. (2) I, II, S. A study of the common applications of logical processes in the empirical sciences.

610. Early Western Philosophy. (3) I. History of and readings in western philosophy from Thales to Thomas Aquinas.

620. Modern Western Philosophy. (3) II. History of and readings in western philosophy from Francis Bacon to Hegel.

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.

660. Philosophy of Religion. (3) I, II. An analysis of religion according to its function, reinterpretations, and techniques—to include a critical examination of Fundamentalism, Thomism (Catholicism), Transcendentalism, and Naturalism.

- 670. The Philosophy of Plato.** (3) II, S. Study of the dialogues, their major doctrines and methods, against the background of Greek thought and culture.
- 680. Philosophy of Science.** (3) II, S. Philosophic ideas and problems encountered by physicists, mathematicians, economists, psychologists, and biologists in basic and frontier areas of research. Pr.: One course in philosophy.
- 690. American Philosophy.** (3) 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.
- 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.
- 705. Ethics.** (2) I, II, S. Theories of conduct; ideas of right and wrong; what makes an act good or bad; the good life.
- 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.
- 730. Contemporary World Views.** (3) I and alt. S. Study of existentialism, analytic philosophy, and other current philosophies.
- 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.
- 750. Oriental Philosophy.** (2) Confucianism, Taoism, Carvaka, Buddhism, Vedanta, Yoga. Emphasis will be placed on basic assumptions, methods of reasoning, and ways of life associated with each.
- 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.

LIBRARY SERVICE

MELVIN J. VOIGT, *Head of Department*

Courses in Library Service are offered to meet state requirements for school librarians. These requirements specify that courses in the sub-

jects covered by 400, 410, and 442 must be taken by those who wish to qualify as school librarians in Kansas.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 400. Book Selection and Reference.** (3) S. Materials and techniques of reference work, principles of evaluation and selection of books for young people, sources of information about books and reading interests. Pr.: Junior standing.
- 410. Cataloguing and Classification.** (3) S. Fundamentals of the Dewey Decimal Classification and the basic cataloguing techniques necessary for organizing a library collection. Pr.: Junior standing.
- 442. School Library Administration.** (2) S. 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.
- 470. Literature for Children.** See Engl. 470.
- 472. Storytelling.** See Spch. 472.
- 475. Literature for Adolescents.** See Engl. 475.
- 602. Audio-visual Aids in Instruction.** See Educ. 602.

MATHEMATICS

RALPH G. SANGER, *Head of Department*

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 Sciences for a major in mathematics (VIII, p. 97) are: Math. 222, 240, Stat. 320, and 12 semester hours chosen from among courses in mathematics numbered 400 to 799. For a mathematics major in Humanities (IX, p. 95) the following courses are required: Math. 220, 221, 222, 240, Stat. 320, and 12 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 courses (III, p. 95).

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 Business Administration.
- 150. Plane Trigonometry.** (3) I, II, S. Pr.: Plane geometry and $1\frac{1}{2}$ units of high school algebra.
- 200. Mathematics of Finance.** (3) I. Pr.: Math. 110.
- 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. 230.
- 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; junior standing and consent of instructor.
- 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

- 421. Differential Equations.** (3) I, II, S. Pr.: Math. 222 or 232.
- 470. History of Mathematics.** (3) On sufficient demand. 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) On sufficient demand. 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.
- 616. Foundations of Mathematics.** (3) II. Postulates used in development of geometry and algebra. Pr.: Math. 222 or 232.
- 621. Advanced Calculus I.** (3) I, II, and alt. S. Partial differentiation, with applications to the geometry of three dimensions, envelopes, maxima and minima of functions of several variables, series. Pr.: Math. 222 or 232.
- 622. Advanced Calculus II.** (3) I, II, and alt. S. Line integrals, improper integrals, beta and gamma functions; integrals dependent on a parameter, elliptic integrals, uniform convergence of series and integrals. Pr.: Math. 222 or 232 and preferably Math. 355 or 421.
- 624. Elementary Partial Differential Equations.** (3) I alt. years. Solution of partial differential equations; applications to problems of physics and engineering. Pr.: Math. 355 or 421.
- 630. Fourier Series.** (3) II alt. years. Pr.: Math. 355 or 421.
- 651. Differential Equations of Mathematical Physics.** (3) II alt. years. Solution of Legendre's, Bessel's, and other differential equations including the properties and uses of the solutions. Pr.: Math. 355 or 421.
- 653. Operational Methods.** (3) I alt. years. Selected topics from Heaviside's operational calculus, Laplace transforms. Pr.: Math. 355 or 421.
- 661. Vector Analysis.** (3) On sufficient demand. Methods of vector algebra and geometry, with applications, and the elements of tensors. Pr.: Math. 355 or 421.

- 671. Higher Geometry I.** (3) I alt. years. An introduction to the projective geometry of one and two dimensions. Pr.: Math. 611.
- 672. Higher Geometry II.** (3) II alt. years. An introduction to the differential geometry of curves and surfaces. Pr.: Math. 421.
- 701. Theory of Matrices I.** (3) I alt. years. Pr.: Math. 421, 611.
- 702. Theory of Matrices II.** (3) II alt. years. Cont. of Math. 701. Pr.: Math. 701.
- 711. Abstract Algebra I.** (3) I alt. years. Pr.: Math. 421, 611.
- 712. Abstract Algebra II.** (3) II alt. years. Cont. of Math. 711. Pr.: Math. 711.
- 714. Structure of Abstract Algebras.** (3) On sufficient demand. An introduction to linear algebras over various fields. The algebra of classes. Pr.: Math. 701 or 711.
- 721. Theory of Functions of a Complex Variable I.** (3) I. Pr.: Math. 355 or 421 and 621 or 622.
- 722. Theory of Functions of a Complex Variable II.** (3) II. Pr.: Math. 721.
- 740. Calculus of Variations.** (3) On sufficient demand. Necessary and sufficient conditions for an extreme value; applications to geometry and mechanics. Pr.: Math. 421, 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. 355 or 421 and 621 or 622.
- 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 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.: Math. 355 or 421; and one of 621, 622, 624, 630, 651, 653.
- 762. Numerical Methods II.** (3) II 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 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 alt. years. Cardinal and ordinal numbers, general topological spaces, homeomorphic invariants of point sets, metrization, structure of Peano continua. Pr.: Math. 421, 621, 622.
- 772. Elementary Topology II.** (3) II 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 alt. years. Real number systems, theory of measure, theories of integration. Pr.: Math. 421, 621, 622.

822. Theory of Functions of a Real Variable II. (3) II 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

CARL F. LYONS, *Head of Department*

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 any 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.

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.

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.

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.

In the Advanced Course, students receive three credit hours each semester. 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, ROTC

BASIC COURSE

FOR UNDERGRADUATE CREDIT

- 111. Military 1A.** (1) I. Organization of the Army and ROTC; individual weapons and marksmanship; leadership, drill, and command. Two hours rec. and the equiv. of approximately one hour of practical work a week.
- 112. Military 1B.** (1) II. American military history; leadership, drill, and command. Two hours rec. and the equiv. of approximately one hour of practical work a week.
- 121. Military 2A.** (1) I. Map and aerial photograph reading; United States Army and National Security; leadership, drill, and command. Two hours rec. and the equiv. of approximately one hour of practical work a week.
- 122. Military 2B.** (1) II. Crew-served weapons and gunnery; leadership, drill, and command. Two hours rec. and the equiv. of approximately one hour of practical work a week.

ADVANCED COURSE

- 231. Military 3A.** (3) I. Leadership; military teaching methods, first aid and military sanitation; map reading; rifle marksmanship; branches of the Army; leadership, drill, and command. Four hours rec. and the equiv. of approximately one hour of practical work a week. Pr.: Mil. S. 111, 112, 121, 122.
- 232. Military 3B.** (3) II. Small unit tactics and communication; pre-camp orientation; leadership, drill, and command. Four hours rec. and the equiv. of approximately one hour of practical work a week. Pr.: Mil. S. 231.
- 241. Military 4A.** (3) Command and staff; estimate of the situation and combat orders; military intelligence; troop movements; the military team; training management; motor transportation; leadership, drill, and command. Four hours rec. and the equiv. of approximately one hour of practical work a week. Pr.: Mil. S. 232.
- 242. Military 4B.** (3) Military administration; military justice; role of the U. S. in world affairs; leadership; officers' indoctrination; leadership, drill, and command. Four hours rec. and the equiv. of approximately one hour of practical work a week. Pr.: Mil. S. 241.

MODERN LANGUAGES

FRITZ MOORE, *Head of Department*

Students majoring in language should enroll in the Curriculum in Humanities. (See p. 95.)

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

For a major (IX, p. 95), 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.

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.
- 430. French V.** (3) I or II. Pr.: Mod. L. 235 or equiv.
- 436. French Composition and Conversation.** (3) I. Pr.: Mod. L. 235 or equiv.
- 437. Advanced French Composition and Conversation.** (3) II. Pr.: Mod. L. 436 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

- 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*

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 96 and 90.

A major program of music in the Curriculum in Humanities may be selected, with emphasis on theory, composition, or history and literature. The general requirement is 30 semester hours subsequent to Music 100, 201, and 202. Specific requirements for music are: Instrument or Voice, eight hours; Music 233, 234, 250, 421, 422, 505, and eight elective hours. This major is not intended to prepare students to teach music as a major field in the public schools of Kansas.

Prerequisites for students taking a 30-hour major in music in the Curriculum in Humanities are the same as for candidates for the Bachelor of Science degree in Music Education. The requirements for this degree are given on page 90.

For a minor, the following courses are required: Music 060 (two semesters), 100, 201, 202, 231, 232, 233, 234, 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, 510, 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 will also find that a minor may be taken in any of the above applied fields. 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 233, 234, 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), two hours of Laboratory Choir (Music 441), 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, four hours of Laboratory Orchestra (Music 446), 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. Organ majors must register for Music 646 and 648. Elective courses in areas other than music must 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. Recital cards are kept, and 75 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 16.

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.

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 upon entrance and complete grade 10 by the end of the senior year.

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.

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 150. 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. Five hours rec. a week. Pr.: Music 202.
- 305. Theory of Music IV.** (3) II, S. Cont. of Music 160. Five hours rec. a week. Pr.: Music 223.
- 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 234.
- 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 and conc. enrollment in Music 501.
- 522. Composition II.** (2) II, S. Cont. of Music 210, 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 crea-

tive 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 510.
- 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 Gn. St. 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 Gn. St. 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) II. 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-College 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*

Each student receives a physical examination before enrollment in courses in the Department of Physical Education. Students should take courses 010 for men and 055 for women to satisfy the physical education requirement. Transfer students who enter this University with 15, 25, 44, or 59 hours of credit are excused from one, two, three, or four semesters respectively of Ph. Ed. 010 or 055.

For a major, a student should enroll in one of the curriculums in physical education. (See page 90.) For a minor, a student should enroll in the following courses: Ph. Ed. 205, 216,* 230, 235, 356, 450, 455, 480, sports elective, four hours chosen from 415, 420, 426, 430.

For a minor in Health Education a student should enroll in the following courses: Gn. St. 121, 122,** F. & N. 130, Ph. Ed. 356, 375, 410, 480, 485.

COURSES IN PHYSICAL EDUCATION FOR MEN

FOR UNDERGRADUATE CREDIT

010. Physical Education M. (0) I, II, S. Activities offered: Athletic sports, apparatus work, boxing, calisthenics, individual physical education, swimming, tumbling, and wrestling.

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.

206. Introduction to Physical Education. (1) I. Introductory survey of the field and study of the principles of health and physical education.

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. 205.

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.

* Option on Ph. Ed. 216 and 241.

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

- 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.
- 475. Swimming M.** (1) II, S. Theory and practice of various swimming strokes, diving, treading water, and floating. Methods of teaching swimming. Three hours lab. a week. Pr.: One semester of swimming or passing Red Cross intermediate swimmer's test.

FOR UNDERGRADUATE 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. Pr.: Zool. 615.
- 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.
- 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.** (2) II, S. Pr.: Ph. Ed. 400 or equiv.
- 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. 485 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 90.) For a minor, a student should enroll

in the following courses: Ph. Ed. 306, 320, 331, 351, 356, 366 or 515, 380, 480, 505 or 560, 526, 555, 556,* and 580.*

FOR UNDERGRADUATE CREDIT

- 055. Physical Education W.** (0) Required. I, II, S. Activities offered: Archery, basketball, bowling, folk and tap dancing, golf, hockey, individual and Danish gymnastics, modern dance; recreational sports. rifle, soccer, softball, social dancing, swimming, and tennis.
- 065. Physical Education W Lectures.** (0) I, II. Required of women enrolled in the Curriculum in Physical Education for Women. Orientation and general survey of health, physical education, and recreation.
- 306. Tumbling and Recreational Sports.** (2) I. Theory and practice of tumbling and recreational sports. One hour rec. and three hours lab. a week.
- 310. Physical Education Orientation.** (1) II. Self-testing activities and motor ability tests to determine exemption from courses in soccer, speedball, softball, volleyball, basketball, swimming, and tennis. For freshman women majors in Physical Education. 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.
- 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. 055, one semester of modern dance, or consent of instructor. May not be taken more than four semesters for credit.
- 366. Team Sports I.** (2) I. Methods of teaching softball, hockey, and volleyball. One hour rec. and three hours lab. a week. Pr.: Ability to play softball, volleyball, and hockey. Offered in odd-numbered years.
- 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.
- 385. Health and Safety Education W.** (2) S. Organization of material pertaining to health and hygiene, safety, and accident prevention, as recommended for the schools of Kansas.
- 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. Offered in even-numbered years.
- 526. Health Examinations and First Aid.** (3) I. 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.
- 530. Therapeutics and Massage.** (3) II. Postural defects studied and exercises given for correction of each; general and local massage practiced for cases which can be treated by the Department of Physical Education. Two hours rec. and three hours lab. a week. Pr.: Ph. Ed. 290, 526; Zool. 210.

* Optional.

- 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.: Junior 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.
- 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. Offered in odd-numbered years.

COURSES FOR MEN AND WOMEN

FOR UNDERGRADUATE CREDIT

- 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.
- 356. Personal and Community Health.** (3) I, II, S.
- 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. 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. 485.
- 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. 480.
- 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.

PHYSICS

ALVIN B. CARDWELL, *Head of Department*

The physical science curriculum (p. 97) 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. 97), are required: 410, 420, 432, 450, 460, 472, 473, 560, 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.

111. Descriptive Physics. (3) 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

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.

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.

450. Heat and Thermodynamics. (3) II and alt. S. Pr.: Math. 222 or 232; 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.

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.

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.
- 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.
- 845. Thermodynamics.** (3) Pr.: Math. 240 or 421; Phys. 450.
- 855. Statistical Mechanics.** (3) Pr.: Phys. 845.
- 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.
- 935. Theory of the Solid State.** (3) Pr.: Phys. 600, 865.
- 945. Advanced Nuclear Physics.** (3) Pr.: Math. 622; Phys. 675, 865.
- 955. Mathematical Physics.** (3) Pr.: Phys. 875.
- 999. Research in Physics.** Credit arranged. Work is offered in electricity, electronics (including gaseous electronics), light, nuclear physics, solid state physics, sound, spectroscopy, thermodynamics, theoretical physics, and X rays. Pr.: Sufficient training to carry on the line of research undertaken.

PSYCHOLOGY

WILLIAM BEVAN, *Head of Department*

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 skills 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 24 hours of course work, including Psychology 110, 230 (or Stat. 620), 720, 775. Additional courses are determined in consultation with the Director of Undergraduate Studies. Students majoring in the Social Sciences Curriculum should take either Math. 100 or 110 to meet the University Mathematics requirement. Those in the Biological Science Curriculum should take 100 or 115 to meet the mathematics requirement, and A. H. 405; Chem. 110 and 120; Bot. 190; Geog. 205; Zool. 200; Bact. 220; and Phys. 120.

The Graduate curriculum leads to the M. S. and Ph. D. degrees. For most students the Master's program requires two years beyond the baccalaureate level; the doctorate, four years. It is expected that entering students will have had background work which is essentially the equiv-

alent of our undergraduate major. Deficiencies can be made up after enrollment. Research and supervised practicum experience are stressed throughout the program. A detailed description of the program may be obtained by consulting the Graduate School catalog or writing the Director of Graduate Studies.

The following courses will be offered in the fall semester, 1960-61 (for course descriptions see General Catalog 1958-1959 and 1959-1960):

- 110. General Psychology.** (3)
- 230. Quantitative Methods in Psychology.** (3)
- 235. Introduction to Student Personnel.** (2)
- 399. Honors Seminar in Psychology.** (1)
- 410. Learning.** (3)
- 415. Psychology of Childhood and Adolescence.** (3)
- 425. Psychology of Exceptional Children.** (3)
- 465. Psychology of Art.** (3)
- 515. Personnel Psychology.** (3)
- 525. Industrial Psychology.** (2)
- 650. Group Dynamics.** (3)
- 715. Physiological Psychology.** (3)
- 720. Psychology of Personality.** (3)
- 741. Vocational Psychology.** (3)
- 781. Psychological Literature.** (1)
- 799. Problems in Psychology.** Credit arranged.
- 800. Advanced Measurement.** (3)
- 810. Learning Theory.** (3)
- 820. Personality Theory.** (3)
- 825. Clinical Testing I.** (3)
- 844. Introduction to Counseling.** (3)
- 850. Seminar in Personnel and Industrial Psychology.** Credit arranged.
- 860. Practicum I.** Credit arranged.
- 865. Internship in Counseling Psychology.** Credit arranged.
- 885. Pro-seminar in Psychology.** Credit arranged.
- 999. Research in Psychology.** Credit arranged.

The following courses will be offered beginning with the second semester, 1960-1961:

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

FOR UNDERGRADUATE 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) I. Laboratory investigation of the sensory and perceptual processes. Two hours of recitation and four hours of laboratory work a week. Pr.: Psych. 110.

- 410. Experimental Psychology II.** (4) II. Laboratory investigation of learning and motivation. Two hours of recitation and four hours of laboratory work a week. Pr.: Psych. 110.
- 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.: Junior 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.
- 525. Industrial Psychology and Human Engineering.** (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.: Sophomore standing; Psych. 110 or consent of instructor.
- 531. Occupational Information.** (3) II, S. Use of information concerning job requirements and opportunities in counseling, guidance, and personnel work. 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 of recitation and two hours of laboratory work 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-numbered years.
- 714. Physiological Psychology I.** (3) I, S. 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. 465 or consent of instructor. Offered in odd-numbered years.

- 715. Physiological Psychology II.** (3) II. Consideration of the physiological correlates of learning and intelligence, motivation, emotion, and behavior disorders. Pr.: Psych. 714. Offered in odd-numbered years.
- 716. Comparative Psychology.** (4) I. A study of similarities and differences in behavior at different phylogenetic levels as an aid to the clarification of behavioral principles. Three hours of recitation and two hours of laboratory work a week. Pr.: Consent of instructor. Offered in even-numbered 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, 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.: Stat. 610 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 of recitation and four hours of laboratory work a week. Pr.: Psych. 409 or consent of instructor.
- 810. Advanced Experimental Psychology II.** (4) II. Experimental study of learning and motivation, with emphasis on recent developments in the field. Two hours of recitation and four hours of laboratory work a week. Pr.: Psych. 410 or consent of instructor.
- 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-numbered 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-numbered 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-numbered 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-numbered 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, education, or child development. Offered in even-numbered years.
- 844. Counseling Psychology.** (3) I, S. Survey of the problems and methods of the counseling psychologist. Pr.: Nine hours of psychology, education, or child development.
- 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 even-numbered 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 of recitation and two hours of practical work a week. Pr.: Psych. 525 and consent of instructor. Offered in even-numbered years.
- 847. Performance Theory.** (3) I. Analysis of complex operational systems, both military and civilian, with particular attention to the role of the human component. Pr.: Psych. 805, 809, 810, or consent of instructor. Offered in odd-numbered years.
- 850. Seminar in Personnel and Industrial Psychology.** Credit arranged. II, 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.: 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-numbered years.
- 854. Seminar in Experimental Psychology** (including physiological and comparative psychology). (3) 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-numbered years.
- 856. Seminar in Measurement.** (2) 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-numbered 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*

The Department of Speech offers work in the following general areas of study: general speech and speech education, theater and interpreta-

tion, rhetoric and public address, speech therapy, and radio and television.

A major may be selected, with emphasis on any of these areas or a combination of areas. Work for the major should be planned in conference with a member of the speech staff assigned to the student as an adviser by the head of the department.

Special programs are available in each of the areas listed above, and the requirements for these programs may be secured from the departmental office.

Demonstration of proficiency in oral communication is required of all majors prior to the completion of their work.

For a minor in any field in the department: 15 hours selected in consultation with the department. With the approval of his adviser, a non-major may enroll in any speech course without the prerequisite course background.

COURSES IN GENERAL SPEECH AND SPEECH EDUCATION

FOR UNDERGRADUATE CREDIT

- 080. Speech Seminar.** (0) I, II. Special topics and lectures for speech majors. Required of all majors each semester.
- 105. Oral Communication I.** (2) I, II, S. Selection and outlining of material, with special emphasis on organization, clearness, interest, and oral presentation. Coordinated with Engl. 100.
- 106. Oral Communication Ia.** (3) I, II. A substitute for Spch. 105, with greater attention to preparation and delivery. Credit not granted for both Spch. 105 and 106.
- 120. Speech and Drama Participation.** (1 or 2) I, II, S. Pr.: Consent of director of the activity.
- 135. Voice and Diction.** (2) I, II, S of even years. Improvement in use of voice and diction by study and drill with the speech mechanism, tone, quality, range, rate, time, accent, stress, diction, articulation, and pronunciation.
- 155. Oral Reading.** (2) I, II, S of odd years. Attainment of some proficiency in the art of reading aloud.
- 176. Argumentation and Debate.** (3) I. Basic theories of argumentation, with emphasis on their application in debate. Pr.: Spch. 105 or 106.
- 200. Oral Communication II.** (2) I, II, S of odd years. Cont. of Spch. 105 and 106, with special attention to persuasive speaking and illustrative material. Pr.: Spch. 105 or 106.
- 205. Parliamentary Law.** (1) I, II, S. Study and practical application of the rules of parliamentary procedure.
- 210. Elements of Phonetics.** (2) I, II, S of even years. Sounds which make up human speech, and consideration of how these sounds vary physically, physiologically and phonetically. The student will become familiar with the international phonetic alphabet and transcribe from spontaneous and tape-recorded speech.
- 300. Business and Professional Speaking.** (2) I, II, some S. Effective and oral reading for presentation of technical and other material to lay audiences and technical societies. Pr.: Spch. 105 or 106.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 436. Group Discussion Methods.** (3) I, S of even years. Principles and techniques of discussion for committees, conferences, public discussion; human relations in education and in business and professional life. Pr.: Junior standing.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 608. Persuasion.** (3) I, some S. Principles and practice in methods of oral persuasion. Pr.: Junior standing.

- 618. Discussion and Conference Leadership.** (3) II, some S. Principles and functions of leadership and planning in discussion and conference activities. Pr.: Spch. 436 or consent of instructor.
- 653. Directing Speech Activities.** (3) II, some S. The organization and operation of high school or junior college forensic and dramatic activities. For teachers who expect to direct dramatic productions or to coach debate, oratory, extempore speaking, and discussion activities. Pr.: Junior standing.
- 655. History of American Public Address.** (3) I of odd years. Study of American speakers, from the time of Jonathan Edwards to the present, including their training, speeches, and effectiveness. Pr.: Consent of instructor.
- 665. History of Rhetorical Theory and Criticism.** (3) I of even years. History of the development of rhetorical theory and criticism from early Greek to modern times. Pr.: Spch. 105 or 106 and junior standing.
- 680. Teaching of Speech.** (3) II of odd years, S. 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. I, II, S. 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) I, S. 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. I, II, S. Open to students in any of the areas of speech. Pr.: Consent of instructor.

COURSES IN THEATER AND INTERPRETATION

FOR UNDERGRADUATE CREDIT

- 245. Acting and Rehearsal.** (2) I, II, S. Fundamentals of acting. One hour rec. and three hours lab. a week.
- 255. Elementary Stagecraft.** (2) I, II, some S. Construction, function, and operation of scenery. One hour rec. and three hours lab. a week.
- 350. Techniques of Makeup.** (2) I of even years. Techniques of makeup for stage, movies, and television.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 472. Storytelling.** (2) I, II. Oral interpretation of literature for children, with special emphasis on aspects of delivery. Pr.: Spch. 105 or 106.
- 526. Oral Interpretation of Literature.** (3) I of even years. Application of principles of oral reading to interpretation of prose, poetry, and drama. Pr.: Spch. 155 for majors.
- 535. Dramatic Production.** (2) I, S of odd years. Theory of and practice in fundamentals of acting and directing. One hour rec. and three hours lab. a week. Pr.: Spch. 245 or 255 for majors.
- 555. Advanced Acting.** (2) II. Characterization, interpretation, voice, pantomime, and ensemble. One hour rec. and three hours lab. a week. Pr.: Spch. 245 for majors.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 605. Development of the Theater I.** (3) I of odd years, some S. History of the theater from early times to the end of the nineteenth century. Pr.: Junior standing.
- 610. Stage Costuming.** (3) II of even years. Studies in stage costuming: history, characterization, fabrics, construction. A lecture-laboratory course including student planning and construction of costumes for Kansas State Players productions. Pr.: Junior standing.

- 615. Development of the Theater II.** (3) II of even years, some S. History of the theater in America. Pr.: Junior standing.
- 625. Oral Interpretation of Shakespearean Plays.** (2) II of odd years. 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) II of odd years. 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) II of odd years. Application and principles of design to stage settings; scenic design for plays, utilizing sketches, diagrams, plates, and models; work in production of Kansas State Players. Pr.: Spch. 255 for majors.
- 667. Stage Lighting.** (2) I of even years, some S. History, problems of application, design of lighting for various types of plays, and styles of production. One hour rec. and three hours lab. a week. Pr.: Junior standing.
- 683. Advanced Stagecraft.** (2) II of even years. Advanced technical problems, including stage makeup, history of stage costumes, stage properties, and architectural requirements of the theater. Pr.: Spch. 255 for majors.

COURSES IN SPEECH THERAPY

FOR UNDERGRADUATE CREDIT

- 090. Remedial Instruction in Speech.** (0) I, II, S. Remedial instruction in individual problems of voice and diction. Open to students upon recommendation of any faculty member.
- 270. Anatomy and Physiology of Speech.** (3) II, some S. Anatomy and physiology of the mechanisms of speech: the larynx, the chest and cardiac areas, the nose and throat, and the mouth.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 620. Introduction to Audiology.** (3) I of even years. 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.: Junior standing.
- 630. Speech Correction for the Classroom Teacher.** (3) I, S. Types and etiology of speech problems, and methods which teachers and administrators can employ; a survey of current therapeutic methods. Pr.: Spch. 135 for majors.
- 635. Introduction to Speech Pathology.** (3) I, some S. Types of speech problems and consideration of etiology in relation to these types. Pr.: Spch. 210 for majors.
- 645. Speech Therapy I.** (3) II, some S. Methods and materials employed in treatment of organic and functional problems of voice, articulation, hearing, and asyrrhythmic problems by individual and group techniques. Pr.: Spch. 210 for majors.
- 668. Teaching Lip Reading.** (3) II, some S. Methods of communication among the deaf; problems in instruction of deaf and hard of hearing. Pr.: Junior standing.
- 760. Clinical Practice.** (3) I, II. Supervised practice in clinical teaching, application of methods of diagnosis, and restraining of individuals having disorders in speech; preparation and reporting of case histories, lesson plans, and progress reports. Pr.: Consent of instructor.

COURSES IN RADIO AND TELEVISION

FOR UNDERGRADUATE CREDIT

- 132. KSDB-FM Participation.** (1) I, II, S. Minimum of three hours a week working in one or more of the departments of the station.
- 140. Radio Talk.** (2) I, II, some S. Training in writing informative and persuasive material; study of talk, interview, and discussion programs; practice in presentation of these programs. Four hours rec. and lab. a week. For non-majors.
- 150. Radio Speech I.** (2) I, II, some S. Training in voice, diction, pronunciation, and announcing for broadcasting. One hour rec. and three hours lab. a week. Required of majors.
- 160. Survey of Broadcasting.** (2) I, II. Survey of the radio industry; social importance of broadcasting. Required of majors.
- 250. Station Production and Announcing.** (2) I, II. Study of the problems of and practical experience as announcers, control operators, and other positions in radio stations. Required of majors. Pr.: Spch. 150 for majors.
- 295. Radio Continuity.** (3) I, II, some S. Preparation of announcements and introductions to musical shows, talks, radio programs, and news rewriting. Required of men majors. Pr.: Spch. 160 for majors.
- 325. Station Traffic, Music, and Continuity.** (2) II of even years. The study of and practical experience in the problems and operation of the traffic, music, and continuity departments. Pr.: Spch. 295 for majors.
- 326. Introduction to Television.** (2) I, II. Growth and expansion of TV; its codes and control; its relation to other media; economic and social implications; and an introduction to TV equipment. Required of majors. Pr.: Spch. 160 for majors.
- 345. Sports Broadcasting.** (2) I, II. 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. Four hours rec. and lab. a week. Pr.: Spch. 150 for majors.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 460. Radio and Television Production I.** (3) I. Production and direction of individual programs for broadcast, with emphasis on radio. Two hours rec. and four hours lab. a week. Pr.: Spch. 295 for majors.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 660. Radio and Television Production II.** (3) II. Cont. of Spch. 460, with emphasis on television. Pr.: Spch. 326 for majors, and consent of instructor for non-majors.
- 670. Radio and Television Programming.** (3) I. Planning and development of radio and television programs and schedules. Pr.: Spch. 295 and 326 for majors.
- 672. Television Techniques.** (3) I, II, S of even years. Use of visual and dramatic principles in television. Designed to aid non-majors. Five hours rec. and lab. a week. Pr.: Spch. 326 for majors.
- 675. Radio and Television Advertising.** (3) II. Principles and practices in broadcast advertising. Pr.: Journ. 320 for students in Technical Journalism, Spch. 295 for radio-TV majors.
- 685. Radio-Television Writing I.** (3) I, some S. Preparation of dramatized programs. Pr.: Spch. 295 for majors.
- 695. Radio-Television Writing II.** (3) II of odd years. Cont. of Spch. 685. Pr.: Spch. 685 or consent of instructor.
- 705. Radio Speech II.** (2) II of even years. Advanced commercial announcing; development of individual style; supervised experience in

various techniques of delivery. Recommended to radio-TV majors as a senior level course. For radio-TV majors and minors only. Pr.: Spch. 150 and junior standing.

726. Radio-Television Station Management. (3) II of odd years. Radio-television station management problems and methods: program, news, promotion, sales, engineering, continuity, traffic, accounting, and legal requirements. Pr.: Junior standing.

745. Broadcasting of Women's Programs. (3) II. Writing, production, and criticism of radio and television programs presented by women, and those prepared for an audience of women and/or children. Two hours rec. and four hours lab. a week. Required of women majors. Pr.: Spch. 295 for majors.

750. Radio-Television Audience. (3) I of odd years, some S. Listening and viewing habits, preferences, and attitudes. Analysis of methods of gaining information about the audience. Pr.: Junior standing.

STATISTICS

HOLLY C. FRYER, *Head of Department*

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, or a supervisor.

A person wishing to major in statistics may seek a bachelor of arts degree by satisfying the requirements of the curriculum in Humanities (p. 95) and completing Math. 222 or 232, 421 and Stat. 320, 610, and six additional hours in Statistics; or the student may seek a bachelor of science degree by satisfying the requirements of the Curriculum in Physical Science (p. 97) and completing the aforementioned courses in mathematics and statistics. The student should consult someone in the Department of Statistics about this choice before enrolling.

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 bi-variate populations. Pr.: Math. 100 or 110.

FOR UNDERGRADUATE 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.: Math. 100.

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 simple experimental designs; linear regression and correlation. Pr.: Math. 222 or 232.

611. Theory of Statistics II. (3) II. Moment generating functions; sampling distributions; estimation; testing hypotheses; multiple linear

- regression and correlation; elementary decision theory; introduction to non-parametric tests. 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.
- 715. Non-parametric Statistics.** (2) 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.
- 799. Topics in Statistics.** Credit arranged. I, II, S. Pr.: Consent of instructor.

FOR GRADUATE CREDIT

- 801. Advanced Theory of Statistics I.** (3) I. Introduction to stochastic processes; the general decision problem; unbiasedness; measure-theory definition of probability; uniformly most powerful tests. Pr.: Stat. 611.
- 802. Advanced Theory of Statistics II.** (3) II. Unbiasedness with normal distributions; invariance; linear hypotheses; the minimax principle. Pr.: Stat. 801.
- 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
BENJAMIN W. LAFENE, *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*

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 86) and the Physical Science Curriculum (page 97) lead to the bachelor of science degree; the Social Science Curriculum (page 98) 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, 320, 330, 600, or 610, and journalism electives (13). (See pages 86, 97, 98.)

Students interested in Agricultural Journalism should note requirements on page 55; those interested in Home Economics and Journalism should note requirements on page 226.

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 reportorial work on the *Kansas State Collegian* a week. Pr.: Journ. 306.
- 320. Principles of Advertising.** (3) I, II. Study of goods to be advertised, analysis of the market, psychology of advertising, preparation of advertising copy. Pr.: Junior standing.
- 326. Advertising Copy and Layout.** (3) II. The writing of effective copy, testing and 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, Journ. 305 and 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.
- 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.
- 640. Industrial Editing.** (3) II. A study of the publications that represent business, industry, and other institutions, with especial reference to their public relations function; the development of skills in interpretative writing, editing, pictorial journalism, layout, typography, and production techniques. One hour lec. and six hours lab. a week. Pr.: Journ. 330, adequate background in business and journalism, and consent of instructor.
- 645. Readings in Journalism.** (2) I, II. Investigation of the literature of journalism. Pr.: Junior standing and consent of instructor.
- 651. Workshop in School Publications.** (3) S of odd years. Supervision of high school yearbooks and newspapers. The workshops are offered consecutively, and either or both may be taken. 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*

The requirements in the Curriculum in Biological Science for a major in zoology (VI, p. 87) are at least 19 credit hours chosen from the 400 to 799 group.

FOR UNDERGRADUATE CREDIT

200. General Zoology. (5) I, II, S. Three hours rec. and six hours lab. a week.

NOTE: In September, 1961, Zool. 200 will be Zool. 210, four credit hours, with two hours of rec. and six hours of 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. 200.

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. 200.

251. Hematology. (3) 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.

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. 200.

410. Embryology. (4) I, II, S. Developmental anatomy and physiology of reproduction of domestic birds and mammals. Three hours rec. and three hours lab. a week. Pr.: Zool. 200.

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. 200 or equiv.

430. Wildlife Conservation. (3) I. Methods and techniques in the management and propagation of wildlife. Pr.: Zool. 200 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. 200 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. 200 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. 200.

626. Human Parasitology Recitation. (3) II. Pr.: Zool. 200 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. 200. (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. 200.
- 645. Heredity and Eugenics.** (2) I. Human inheritance and the interactions of nature and heredity. Pr.: Zool. 200 or equiv.
- 656. Zoological Technic.** (1 or 2) I, II, S. Methods and processes in preparation of microscopical slides; principles of photomicrography. Pr.: Zool. 200.
- 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. 200 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. 200.
- 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. 200.
- 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. 200 and Ent. 110 or 210, 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. 200 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 Engineering and Architecture

MERRILL AUGUSTUS DURLAND, *Dean*

WILLIAM HONSTEAD, *Associate Dean*

KENNETH KING GOWDY *Assistant to Dean*

The School of Engineering and Architecture offers four-year curriculums in Agricultural Engineering, Architectural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, and Nuclear Engineering, each leading to the degree Bachelor of Science in the particular branch of the profession selected, and, in addition, offers a five-year Curriculum in Architecture leading to the degree Bachelor of Architecture.

The curriculums as tabulated give fundamental preparation for entering upon work in the several branches of the professions, with some opportunity for specialization through options and electives. To a limited extent substitutions may be made for certain of the courses listed as required when there appears to be a good reason for them, but each substitution must have the approval of the head of the department in which the curriculum is administered, and the dean of the school. In no case will the substitution of an additional amount of technical work for any of the cultural work be permitted.

Curriculum in Agricultural Engineering (Page 178)

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 other engineering curriculums, as well as engineering courses in each of the areas in the field of agricultural engineering.

Curriculum in Architectural Engineering (Page 179)

The Curriculum in Architectural Engineering emphasizes the structural and mechanical phases of architecture. The field of the architectural engineer comprises the superintending of building construction, general contracting, structural design, estimating construction costs, and specification writing.

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

Curriculum in Architecture (Page 180)

The Curriculum in Architecture, while stressing architectural design, includes also training in building construction, properties and uses of building materials, professional practice, and other phases important to the architectural profession. The aim is to train students for efficient service as draftsmen and designers in an architectural organization and provide them with the necessary foundation for future independent practice.

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

Curriculum in Chemical Engineering (Page 181)

The Curriculum in Chemical Engineering prepares the student for engineering work in any of the process industries. Research, development, design, construction, operation, and technical sales are fields of activity for which graduates in this curriculum are employed. The process industries are those in which a raw material undergoes either a physical or chemical change. Examples are petroleum, rubber, paint and varnish, detergents and soap, plastics, pharmaceuticals, food, pulp and paper, and chemicals.

Curriculum in Civil Engineering (Page 182)

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

The last two years are devoted largely to technical work. Provision is made for class and laboratory work in mechanical and electrical engineering. Because of the growing importance of municipal problems, such as paving, sewerage, and water supply, the curriculum includes required courses in these subjects.

Curriculum in Electrical Engineering (Page 183)

The object of the Curriculum in Electrical Engineering is to train the student for a future in electrical power or in communication and electronics. 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.

Special laboratories are provided for research in theoretical and applied electronics, computers, and other electrical engineering areas.

Curriculum in Industrial Engineering (Page 184)

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 help to keep the offerings current.

Curriculum in Mechanical Engineering (Page 185)

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 in 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. To permit some degree of specialization, options are provided in the senior year in aeronautical engineering, petroleum production, management, and design, in addition to the variation afforded by the selection of technical electives.

Curriculum in Nuclear Engineering (Page 186)

The Curriculum in Nuclear Engineering is designed to prepare students for professional positions in the nuclear industry. The student may elect an option with special emphasis on either the mechanical aspects 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, Radioactive Tracer Techniques, 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, and radiation safety. This curriculum is of particular rigor and is recommended only for the able, well-motivated student.

Engineering and Architecture in the Summer School

The School offers summer courses in freehand drawing, water-color and oil painting, and industrial arts for secondary school teachers, as well as many required courses in the engineering curriculums. This permits a new student, who wishes to enroll in an Engineering or Architectural Curriculum, to begin in the summer session.

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			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. 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. Ia	1	I. E.	335	Mfg. Processes I	2
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	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. IIa	1			Air or Mil. Sci. IIb	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
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				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Arch.	207	Arch. Graphics I	2	Arch.	208	Arch. Graphics II	2
Math.	220	Anal. Geom. & Calc. I	4	Math.	221	Anal. Geom. & Calc. II ..	4
Arch.	202	Basic Drawing	2	Arch.	216	Intro. to Arch.	1
		Air or Mil. Sci. Ia	1	Econ.	110	Economics I	3
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	Physical Education	0
				G. E.	117	Arch. 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
C. E.	220	Surveying I	2	Arch.	235	Elem. Arch. Design	4
Arch.	211	Sketching	2	Ap. M.	305	Statics	3
Spch.	105	Oral Comm. I	2			Air or Mil. Sci. IIb	1
		Soc. Science Elective*	2	Ph. Ed.	010	Physical Education	0
		Air or Mil. Sci. IIa	1	G. E.	117	Arch. Assembly	0
Ph. Ed.	010	Physical Education	0				
G. E.	117	Arch. Assembly	0				
Total			18	Total			17

JUNIOR

Arch.	434	Building Equipment I	3	Arch.	436	Building Equipment II	3
Arch.	235	Elem. Arch. Design	4	Arch.	300	Bldg. Matls. & Constr.	3
Arch.	200	Appreciation of Arch.	3	Arch.	310	Work. Drawings	3
Ap. M.	415	Mechanics of Materials	3	Arch.	430	Int. Arch. Design	5
Ap. M.	412	Dynamics	3	C. E.	421	Stress Analysis I	3
E. E.	406	Illumination A	2	Ap. M.	418	Mech. of Matls. Lab.	1
Engl.	090	English Proficiency	0	G. E.	117	Arch. Assembly	0
G. E.	117	Arch. Assembly	0				
Total			18	Total			18

SENIOR

Gn. St.	150	Biology I	4	Gn. St.	160	Biology II	4
C. E.	424	Stress Analysis I Lab.	2	C. E.	470	Design Framed Struct.	3
C. E.	428	Stress Analysis II	3	C. E.	478	Reinf. Conc. Design	2
Ap. M.	450	Soil Mechanics I	2	C. E.	480	Reinf. Conc. Des. Lab.	2
C. E.	460	Foundations	2	Arch.	535	Professional Practice	3
M. E.	360	Air Conditioning A	3			Soc. Sci. or Hum. Elec.* ..	4
		Soc. Science Elective*	3	G. E.	117	Arch. Assembly	0
Arch.	390	Inspection Trip	0				
G. E.	117	Arch. Assembly	0				
Total			19	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 Architecture
Bachelor of Architecture

FIRST YEAR

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. II	3
Arch.	270	History of Arch. I	2	Arch.	274	History of Arch. II	2
Arch.	202	Basic Drawing	2	Arch.	202	Basic Drawing	2
Arch.	207	Arch. Graphics I	2	Arch.	208	Arch. Graphics II	2
Math.	220	Anal. Geom. & Calc. I	4	Arch.	222	Water Color Painting	2
Spch.	105	Oral Comm. I	2	Econ.	110	Economics I	3
		Air or Mil. Sci. Ia	1	Arch.	216	Introduction to Arch.	1
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	Physical Education	0
				G. E.	117	Arch. Assembly	0
Total			16	Total			16

SECOND YEAR

Phys.	210	General Physics I	4	Phys.	211	General Physics II	4
Arch.	235	Elem. Arch. Design	4	Arch.	235	Elem. Arch. Design	4
Arch.	278	History of Arch. III	2	Arch.	280	History of Arch. IV	2
Arch.	300	Bldg. Matis. & Constr.	3	Ap. M.	205	Applied Mechanics A	3
Arch.	211	Sketching	2			Soc. Science Elective*	2
		Air or Mil. Sci. IIa	1			Air or Mil. Sci. IIb	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
G. E.	117	Arch. Assembly	0	Arch.	117	Arch. Assembly	0
Total			16	Total			16

THIRD YEAR

Arch.	430	Int. Arch. Design	5	Arch.	430	Int. Arch. Design	5
M. E.	360	Air Conditioning A	3	Arch.	426	Theory of Struct. I	4
Ap. M.	220	Strength of Materials A ..	3	E. E.	406	Illumination A	2
Ap. M.	224	Strength of Matis. A Lab. 1	1	Arch.	224	Figure & Portrait Draw. 2	2
Arch.	310	Work. Drawings	3			Soc. Science Elective*	3
Engl.	090	English Proficiency	0	G. E.	117	Arch. Assembly	0
G. E.	117	Arch. Assembly	0				
Total			15	Total			16

FOURTH YEAR

Gn. St.	150	Biology I	4	Gn. St.	160	Biology II	4
Arch.	427	Theory of Struct. II	5	Arch.	428	Theory of Struct. III	4
Arch.	430	Int. Arch. Design	5	Arch.	430	Int. Arch. Design	5
Arch.	434	Building Equipment I	3	Arch.	436	Building Equipment II	3
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	Architectural Design	5	Arch.	525	Architectural Design	5
Arch.	535	Professional Practice	3			Elective**	7
		Soc. Sci. or Hum. Elec.*. 6	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	Written Comm. I	3	Engl.	120	Written Comm. 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. Ia	1	Ch. E.	201	Ch. E. Orientation	1
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	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. IIb	1
		Air or Mil. Sci. IIa	1	Ph. Ed.	010	Physical Education	0
Ph. Ed.	010	Physical Education	0	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.	440	Unit Process Lab. or	
Ch. E.	431	Unit Operations II Lab. ..	2	Ch. E.	480	Problems in Ch. E.	2
Ch. E.	496	Ch. E. Thermo. II	3	Ch. E.	502	Ind. Reaction Rates	3
Ch. E.	510	Ch. E. Design I	3	Ch. E.	515	Ch. E. Design II	4
Ap. M.	415	Mechanics of Materials ..	3	E. E.	423	Electronics & Controls	3
E. E.	419	Elec. Circuits & Mach.	4			Soc. Sci. or Hum. Elec.* ..	3
G. E.	115	Engg. Assembly	0			Technical Elective**	3
				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			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. 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. Ia	1	C. E.	220	Surveying I	2
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	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. IIa	1			Air or Mil. Sci. IIb	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
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	Ap. M.	450	Soil Mechanics I	2
Aj. 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				SECOND SEMESTER			
		<i>Course</i>	<i>Sem. Hrs.</i>			<i>Course</i>	<i>Sem. Hrs.</i>
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I ..	4	Math.	221	Anal. Geom. & Calc. II ..	4
M. E.	211	Engg. Graphics I	2			Humanities Elective*	6
Spch.	105	Oral. Comm. I	2			Air or Mil. Sci. Ib	1
		Air or Mil. Sci. Ia	1	Ph. Ed.	010	Physical Education	6
Ph. Ed.	010	Physical Education	0	G. E.	115	Engg. Assembly	0
G. E.	110	Engg. Lectures	0				
Total			17	Total			17

SOPHOMORE

Phys.	310	Engg. Physics I	5	Phys.	311	Engg. Physics II	5
Math.	222	Anal. Geom. & Calc. III ..	4	Math.	240	Series & Diff. Equa.	4
I. E.	335	Mfg. Processes I	2	E. E.	395	Basic Elec. Engg.	4
Econ.	110	Economics I	3	I. E.	339	Metals & Alloys	2
		Soc. Sci. or Hum. Elec.* ..	3			Soc. Science Elective* ..	2
		Air or Mil. Sci. IIa	1			Air or Mil. Sci. IIb	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

E. E.	460	Electronics I	2	E. E.	464	Electronics II	4
E. E.	426	A-C Circuits	5	E. E.	468	Electronics II Lab.	2
E. E.	411	D-C Machinery	3	Ap. M.	412	Dynamics	3
E. E.	414	D-C Machinery Lab.	1	E. E.	430	A-C Machinery I	3
Ap. M.	305	Statics	3	E. E.	490	Elec. Measurements	2
		Soc. Science Elective*	4	E. E.	494	Elec. Measurements Lab. ..	1
Engl.	090	English Proficiency	0	E. E.	450	Circuit Analysis	3
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

SENIOR

E. E.	439	A-C Machinery II	2	M. E.	531	Mech. Engg. Lab. E	1
E. E.	437	A-C Laboratory	1	E. E.	576	Elec. Engg. Summary	2
Ap. M.	415	Mechanics of Materials ..	3	E. E.	442	A-C Machinery Lab.	1
M. E.	411	Engg. Thermodynamics I ..	4	E. E.	670	Servomechanisms	3
E. E.	539	Networks	3	Phys.	560	Atomic Physics	3
E. E.	541	Networks Lab.	1	G. E.	115	Engg. Assembly	0
E. E.	550	Electromag. Waves	3			OPTION	
E. E.	554	Electromag. Waves Lab. ..	1	M. E.	511	Engg. Thermodynamics II ..	2
G. E.	115	Engg. Assembly	0			Technical Elective**	6
						OR	
				E. E.	605	Electronics III	4
				E. E.	606	Electronics III Lab.	1
						Technical Elective**	3
Total			18	Total			18

Number of hours required for graduation, 142.

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

** To be chosen with the advice and approval of the head of the department and the dean.

Electrical Engineering and Business Administration

Students may secure the two degrees, B. S. in Electrical Engineering and B. S. in Business Administration, by completing the courses listed in the Electrical Engineering Curriculum and the courses listed below.*

Econ.	120	Economics II	3	B. A.	440	Marketing	3
B. A.	170	Prin. of Accounting	3	B. A.	431	Personnel Administration ..	3
B. A.	301	Cost Accounting	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 Electrical Engineering. A minimum of 30 additional semester hours of credit is required for the second bachelor's degree.

Curriculum in Industrial Engineering
B. S. in Industrial Engineering

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. II	3
Chem.	210	Chemistry I	5	Chem.	230	Chemistry II	3
Math.	220	Anal. Geom. & Calc. I ..	4	Math.	221	Anal. Geom. & Calc. II ..	4
		Humanities Elective*	3	M. E.	211	Engg. Graphics I	2
		Air or Mil. Sci. Ia	1	Spch.	105	Oral Comm. I	2
Ph. Ed.	010	Physical Education	0			Humanities Elective*	3
G. E.	110	Engg. Lectures	0			Air or Mil. Sci. Ib	1
				Ph. Ed.	010	Physical Education	0
				G. E.	115	Engg. Assembly	0
Total			16	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
M. E.	216	Engg. Graphics II	2	I. E.	335	Mfg. Processes I	2
B. A.	170	Prin. of Accounting	3	Ap. M.	305	Statics	3
		Soc. Sci. or Hum. Elec.* ..	3	Econ.	110	Economics I	3
		Air or Mil. Sci. IIa	1			Air or Mil. Sci. IIb	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

JUNIOR

I. E.	436	Indus. Management	3	I. E.	586	Ind. Engg. Analysis	3
I. E.	446	Work Study	3	I. E.	479	Physical Metallurgy	3
I. E.	435	Mfg. Processes II	4	I. E.	465	Tool Engineering	2
I. E.	328	Safety Engineering	2	M. E.	411	Engg. Thermodynam. I ..	4
Ap. M.	412	Dynamics	3	Ap. M.	415	Mechanics of Materials ..	3
Stat.	610	Theory of Statistics I	3	Stat.	611	Theory of Statistics II ..	3
Engl.	090	English Proficiency	0	I. E.	398	Ind. Plant Studies	0
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			18	Total			18

SENIOR

I. E.	596	Work Flow Design	3	I. E.	636	Ind. Engg. Design	3
I. E.	507	Prod. Cost Estimating	2	B. A.	431	Personnel Admin.	3
E. E.	419	Elec. Circuits & Mach.	4	E. E.	423	Electronics & Controls ..	3
Ap. M.	471	Fluid Mechanics	3	E. E.	424	Electron. & Con. Lab.	1
M. E.	560	Engg. Economics	3			Technical Elective**	5
		Soc. Science Elective*	3			Soc. Science Elective*	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.
** 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	Written Comm. I	3	Engl.	120	Written Comm. 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
Spech.	105	Oral Comm. I	2	I. E.	335	Mfg. Processes I	2
		Air or Mil. Sci. Ia	1			Humanities Elective*	3
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	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.	221	Engg. Graphics III	2	I. E.	339	Metals & Alloys	2
		Soc. Sci. or Hum. Elec.* ..	3			Soc. Science Elective*	3
		Air or Mil. Sci. IIa	1			Air or Mil. Sci. IIb	1
Ph. Ed.	010	Physical Education	0	Ph. Ed.	010	Physical Education	0
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 ..	
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	
		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
				G. E.	115	Engg. Assembly	0
Total			17 or 18	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	Airc. & Missile Prop.	3
Total			7	Total			7

Design Option

Ap. M.	601	Adv. Mechanics of Matls. ..	3	M. E.	583	Mech. Engg. Lab. II	2
		Technical Elective**	3	M. E.	651	Mech. Engg. Design	3
						Technical Elective**	3
Total			6	Total			8

Petroleum Option

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

Management Option

Stat.	610	Theory of Statistics I	3	M. E.	583	Mech. Engg. Lab. II	2
I. E.	436	Industrial Management ..	3	B. A.	431	Personnel Admin.	3
						Technical Elective**	3
Total			6	Total			8

** To be chosen with the advice and approval of the head of the department and the dean.

Curriculum in Nuclear Engineering
B. S. in Nuclear Engineering

FRESHMAN

FIRST SEMESTER				SECOND SEMESTER			
	Course		Sem. Hrs.		Course		Sem. Hrs.
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. 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. Ia	1			Humanities Elective*	3
Ph. Ed.	010	Physical Education	0			Air or Mil. Sci. Ib	1
G. E.	110	Engg. Lectures	0	Ph. Ed.	010	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	Nuc. Reactor Matls. I	2	Ch. E.	211	Indust. Stoichiometry ...	4
		Soc. Science Elective*	3	Ap. M.	305	Statics	3
		Option	4 or 3			Air or Mil. Sci. IIb	1
		Air or Mil. Sci. IIa	1	Ph. Ed.	010	Physical Education	0
Ph. Ed.	010	Physical Education	0	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

Chem.	585	Physical Chem. I	3	Chem.	595	Physical Chem. II	3
Ap. M.	412	Dynamics	3	Phys.	535	Tracer Techniques	3
Phys.	680	Modern Physics Lab.	1	N. E.	450	Elem. of Nuclear Engg. ..	3
		Option	10	E. E.	419	Elec. Circuits & Mach. ..	4
Engl.	090	English Proficiency	0			Option	5
G. E.	115	Engg. Assembly	0	G. E.	115	Engg. Assembly	0
Total			17	Total			18

SENIOR

N. E.	670	Nuc. Reactor Tech. I	3	N. E.	690	Nuc. Reactor Tech. II	4
E. E.	423	Electronics & Controls ...	3	N. E.	605	Nuc. Reactor Matls. II ..	3
E. E.	424	Electronics & Con. Lab. ..	1	Phys.	675	Nuclear Physics	3
		Technical Elective**	3			Soc. Sci. or Hum. Elec.* ..	3
		Option	7 or 6			Option	3 or 5
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.

* Social Science and Humanities electives must be selected from the approved list and need not to be taken in the order listed in the curriculum.
** To be chosen with the advice and approval of the head of the department and the dean.

Option I
SOPHOMORE

Chem. 300 Quant. Analysis 4

JUNIOR

Ch. E. 420	Unit Operations I	3	Ch. E. 428	Unit Operations II	3
Chem. 586	Physical 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			
Total		10	Total		5

SENIOR

Ch. E. 431	Unit Operations II Lab. ..	1	Soc. Science Elective*	3
Ch. E. 496	Ch. E. Thermo. II	3		
	Humanities Elective*	3		
Total		7	Total	3

Option II
SOPHOMORE

Humanities Elective* 3

JUNIOR

M. E. 411	Engg. Thermodynam. I	4	M. E. 511	Engg. Thermodynam. II ..	2
	Soc. Science Elective*	3	Ap. M. 471	Fluid Mechanics	3
	Technical Elective**	3			
Total		10	Total		5

SENIOR

M. E. 575	Thermo. Systems Anal. ..	3	M. E. 533	Mech. Engg. Lab. I	2
M. E. 521	Heat Transfer	3		Math. Elective**	3
Total		6	Total		5

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

Social Science Electives

B. A.	110	Personal Finance	2	Govt.	765	Constitutional Law	3
B. A.	400	Administration	3	Govt.	780	Soviet Systems	3
Econ.	120	Economics II	3	Hist.	145	Contemporary World History	2
Econ.	430	Money and Banking	3	Hist.	165	United States Before 1865	3
Econ.	610	Public Finance	3	Hist.	170	United States Since 1865	3
Econ.	635	Economic Systems	2	Hist.	176	American Economic History	3
Econ.	680	International Trade	3	Hist.	605	Early Americas	3
Econ.	685	Business Cycles	2	Hist.	630	Civil War, Reconstruc- tion, and the New South	3
Geog.	115	World Regional Geography	3	Hist.	635	Frontier America	3
Geog.	645	Political Geography	3	Hist.	645	Contemporary United States	3
Gn. St.	131	Introductory Social Science I	4	Hist.	655	Representative Americans ..	2
Gn. St.	132	Introductory Social Science II	4	Hist.	670	American Social History ..	3
Govt.	120	Modern Democracy	3	Hist.	690	Latin-American Nations ..	3
Govt.	150	Constitutional Democ- racy in America I	3	Hist.	720	French Revolution and Napoleonic Period	3
Govt.	155	Constitutional Democ- racy in America II	3	Hist.	724	Europe 1815-1914	3
Govt.	175	Effective Citizenship	2	Hist.	728	Europe Since 1914	3
Govt.	220	American Government I	3	Hist.	734	Modern England	3
Govt.	225	American Government II ..	2	Hist.	738	Modern Germany	3
Govt.	420	Public Policy Toward Business	3	Hist.	744	Russia and the Soviet Union	3
Govt.	450	City Government	2	Psych.	110	General Psychology	3
Govt.	580	International Relations	3	Psych.	225	General Applied Psychology ..	2
Govt.	600	American Political Ideas	3	Psych.	435	Social Psychology	3
Govt.	620	State and Local Politics and Administration	2	Soc.	200	Introduction to Anthropology	3
Govt.	630	Federal Politics and Administration	2	Soc.	220	Introduction to Sociology ..	3
Govt.	645	International Law and Organization	3	Soc.	645	Sociology of the Family	3
Govt.	720	Government of Britain and the Commonwealth	3	Soc.	655	Cultural Anthropology	3
Govt.	725	Government of Conti- nental Europe	3	Soc.	657	Social Systems	3
Govt.	740	Political Parties and Pressure Groups	3	Soc.	700	Development of Social Thought	3
				Spch.	205	Parliamentary Law	1

Humanities Electives

Arch.	200	Appreciation of Architecture	3	Hist.	760	Far East	3
Arch.	285	History of Painting and Sculpture	3	Hist.	765	India and Southeast Asia ..	3
Engl.	230	Introduction to Fiction	2	Hist.	770	History of Religions	3
Engl.	240	Introduction to Drama	2	Music	250	Modern Language	6
Engl.	250	English Literature I	3	Music	650	Appreciation of Music	2
Engl.	255	English Literature II	3	Phil.	150	Music in History	3
Engl.	270	American Literature I	3	Phil.	165	Elementary Logic	3
Engl.	275	American Literature II	3	Phil.	175	Introduction to Philosophy ..	3
Engl.	370	Books and Men I	3	Phil.	610	Introduction to Religion ..	3
Engl.	375	Books and Men II	3	Phil.	620	Early Western Philosophy ..	3
Engl.	650	Shakespearean Drama	3	Phil.	620	Modern Western Philosophy	3
Gn. St.	141	Introduction to Humanities I	4	Phil.	640	History of Science I	3
Gn. St.	142	Introduction to Humanities II	4	Phil.	650	History of Science II	3
Hist.	115	Civilization I	3	Phil.	660	Philosophy of Religion	3
Hist.	130	Civilization II	3	Phil.	680	Philosophy of Science	3
Hist.	660	American Intellectual History	3	Phil.	690	American Philosophy	3
Hist.	700	History and Culture of Greece	3	Phil.	700	Social Philosophies	3
Hist.	703	History and Culture of Rome	3	Phil.	705	Ethics	2
Hist.	705	Medieval Europe	3	Phil.	710	Political Philosophy	2
Hist.	710	Medieval and Tudor England	3	Phil.	720	Aesthetics	3
Hist.	715	Renaissance and Enlightenment	3	Phil.	730	Contemporary World- Views	3
				Phil.	740	Philosophical Ideas in Literature	3
				Phil.	750	Oriental Philosophy	2
				Phil.	760	Symbolic Logic	3

AGRICULTURAL ENGINEERINGGEORGE H. LARSON, *Head of Department*

For Curriculum in Agricultural Engineering see page 178

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. For agricultural students.
- 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. For agricultural students. 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. For agricultural students.
- 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. For agricultural students. Pr.: Math. 100, 150, Phys. 210.
- 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.

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. For agricultural students. Pr.: Ag. E. 210, 220.
- 408. 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.
- 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. For agricultural students. 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. For agricultural students. Pr.: Junior standing.
- 421. 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. For agricultural students. Pr.: Agron. 270.
- 425. 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. For agricultural students. Pr.: Agron. 270.

- 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.
- 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.
- 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.
- 490. 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. For agricultural students. Pr.: Junior standing.
- 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.

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.

APPLIED MECHANICS

MILTON E. RAVILLE, *Head of Department*

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 231.

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 231.
- 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 231.
- 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.
- 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.
- 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.
- 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.: Ap. M. 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.: Ap. M. 450.
- 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 to 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. (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*

For Curriculum in Architectural Engineering see page 179

For Curriculum in Architecture see page 180

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.

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. Continuation 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, Phys. 210 or equiv.
- 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.
- 426. Theory of Structures I.** (4) I, II. Mathematical and graphical solutions of stresses in framed structures under static loading; practical problems in the design of wood, steel, and masonry construction; occasional inspection trips to buildings under construction. Two hours rec. and six hours lab. a week. Pr.: Ap. M. 220, 224.
- 427. Theory of Structures II.** (5) I, II, S. Continuation of Arch. 426. Three hours rec. and six hours lab. a week. Pr.: Arch. 426.
- 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. 220, 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.

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.
- 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. 202 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 regional and state 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

, Head of Department

For Curriculum in Chemical Engineering see page 181

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.

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.
- 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.
- 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.
- 440. Unit Process Laboratory.** (2) II. Investigation of important unit processes. Six hours lab. a week. Pr. or conc.: Ch. E. 428, 510.
- 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.
- 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.
- 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.** (3) II. 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. Satisfactory results may be used for the master's thesis. Pr.: Approval of department head.

- 815. Advanced Chemical Engineering Thermodynamics.** (3) I. Advanced topics; practical methods of computing thermodynamic functions from molecular structure and statistical and quantum mechanics. Three hours rec. a week. Pr.: Ch. E. 496.
- 821. Advanced Industrial Reaction Rates and Catalysis.** (3) II. 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. Advanced study of distillation. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 830. Drying.** (3) II. 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) II. 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. Theory of evaporation and design of evaporators. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 845. Absorption and Extraction.** (3) II. Advanced study of absorption and extraction. Three hours rec. a week. Pr.: Ch. E. 435, 496.
- 860. Fluid Dynamics for Chemical Engineers.** (3) I. 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.** (3) I. 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.
- 870. Transfer Theory for Chemical Engineers.** (3) II. 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.

CIVIL ENGINEERING

REED F. MORSE, *Head of Department*

For Curriculum in Civil Engineering see page 182

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.

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.
- 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.: Ap. M. 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.
- 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.
- 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.
- 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. A 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.
- 730. Astronomy and Geodesy.** (3) I. The elements of astronomy; precise methods of surveying and leveling. Two hours rec. and three hours lab. a week. Pr.: C. E. 611, Math. 222 or 231.
- 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*

For Curriculum in Electrical Engineering see page 183

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 231.
- 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 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 231.
- 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. 426.

- 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, Math. 240 or equiv.
- 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.
- 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 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. 468.
- 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

- 810. Research in Electrical Engineering.** Credit arranged. I, II, S. Special investigations adapted to the needs of individual students. The labora-

tory 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) I. 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 231.
- 821. Noise Theory.** (3) II, alt. years. 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 Waves.** (3) I. Mathematical development of electromagnetic wave theory. Three hours rec. a week. Pr.: E. E. 554.
- 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

MERRILL A. DURLAND, *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 the field. One hour of lecture a month. Dean Durland, other members of the engineering faculty, and visiting practicing engineers.
- 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. Maximum, 4 credit hours. Editorial and business staff work on the Kansas State Engineer. Pr.: Junior classification and consent of dean.

INDUSTRIAL ENGINEERINGIRVIN L. REIS, *Head of Department*

For Curriculum in Industrial Engineering see page 184

COURSES IN INDUSTRIAL ENGINEERING

FOR UNDERGRADUATE CREDIT

- 328. Safety Engineering.** (2) I, II. Engineering principles of accident prevention for industrial plants and materials; treatment of special hazards; maintenance; human factors; safety standards. Two hours rec. a week.
- 335. Manufacturing Processes I.** (2) I, II. An introductory course in machine shop, foundry, welding, and other manufacturing processes, emphasizing process capability and suitability. One hour rec. and three 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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 407. Industrial Measurements.** (2) I. Types of industrial measurements; equipment and techniques for measuring size, weight, time, and other characteristics. One hour rec. and three hours lab. a week. Pr.: I. E. 335.
- 435. Manufacturing Processes II.** (4) I, II. Technical aspects of engineered manufacturing; materials and process selection, their influence on production design. Three hours rec. and three hours lab. a week. Pr.: I. E. 335.
- 436. Industrial Management.** (3) I, II. 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.
- 446. Work Study.** (3) I, II. Time study, work planning; micro-motion; memo-motion; work sampling; human elements; standards; modern techniques. Two hours rec. and three hours lab. a week. Pr.: I. E. 436, Stat. 610; Pr. or conc.: I. E. 335.
- 465. Tool Engineering.** (2) II. Design of jigs, fixtures, dies, and other tooling for effective production. Two hours rec. a week. Pr.: Ap. M. 415; Pr. or conc.: I. E. 435.
- 469. General Metallurgy Laboratory.** (1) II. Examination of microscopy, X-ray techniques, and physical testing of metals; effect of various fabrication and processing methods. Three hours lab. a week. Pr.: I. E. 339, 479, or N. E. 205.
- 479. Physical Metallurgy.** (3) I, II. Structures, properties, and uses of metals and alloys; allotropic, crystalline, and solubility changes; properties related to processes; applicable solid-state physics. Three hours rec. a week. Pr.: Chem. 230, Phys. 311.
- 507. Production Cost Estimating.** (2) I. Manufacturing cost estimation; establishment of cost standards; cost control at the supervisory level. Two hours rec. a week. Pr.: I. E. 436, 446.
- 576. Production Control.** (2) II. Organization for production control; control planning; control systems; work routing, scheduling, and dispatching; materials control; related topics. Two hours rec. a week. Pr.: I. E. 435, 436.
- 586. Industrial Engineering Analysis.** (3) I, II. Application of modern mathematics and other quantitative techniques to the analysis of in-

ustrial engineering and production management problems. Three hours rec. a week. Pr.: I. E. 436, Stat. 610.

596. Work Flow Design. (3) I. Analysis and design of production flow; handling and transfer equipment; plant layout and planning; quantitative location techniques. Two hours rec. and three hours lab. a week. Pr.: I. E. 446; Pr. or conc.: I. E. 586.

636. Industrial Engineering Design. (3) I, II. Comprehensive design problem for an industrial enterprise; application of undergraduate industrial engineering sequence. Two hours rec. and three hours lab. a week. Pr.: I. E. 586, 596.

646. Standard Data Systems. (3) II. 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. 446.

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. 479 or approval of instructor.

716. Problems in Industrial Engineering. Credit arranged. I, II, S. Pr.: Senior standing in industrial engineering, approval of instructor and department head.

749. Advanced Metallurgy. Credit arranged. I. Studies in specialized phases and current concepts of metallurgy. Pr.: I. E. 479 or approval of instructor and 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 per 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. 586, 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.

COURSES IN 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, S. 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 ENGINEERINGRALPH G. NEVINS, *Head of Department*

For Curriculum in Mechanical Engineering see page 185

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.
- 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 231.

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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

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 231, 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. Four hours rec. and three 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; principally for mechanical engineering students. 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. Fundamentals of instrumentation; applications of thermodynamic principles. Six hours lab. a week. Pr.: M. E. 511; Pr. or conc.: M. E. 575.

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.: Ap. M. 412, 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, junior standing.

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. Analysis of thermodynamic systems used for power generation; economic principles used in design; principles of combustion. 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.
- 620. Internal Combustion Engines.** (3) II. Analysis of practical 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.
- 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.
- 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 or various forms of energy; the concept of flux of mass, energy, available energy, and entropy; and one-dimensional, high-speed gas flow. 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.
- 721. Advanced Heat Transfer.** (3) II. Advanced analytical solutions for boundary value problems in conduction; energy and momentum equation in convective heat transfer; laminar and turbulent boundary layer equations; steady and non-steady problems; theories of thermal radiation. Three hours rec. a week. Pr.: M. E. 521.
- 725. Combustion.** (3) I. Dynamics and thermodynamics of combustion processes; solid, liquid, and gaseous fuels. Three hours rec. a week. Pr.: M. E. 721.

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.

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. 721.

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

W. R. KIMEL, *Head of Department*

For Curriculum in Nuclear Engineering see page 186

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.

FOR UNDERGRADUATE AND GRADUATE CREDIT

- 410. Introduction to Nuclear Engineering.** (3) I, II. A course to acquaint non-nuclear engineers with introductory aspects of nuclear engineering. A study of nuclear reactions, radiation safety, 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 290.
- 450. Elements of Nuclear Engineering.** (3) II. 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. 535, 560, Math. 240 or 600.
- 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 approval of department head.
- 610. Industrial Isotopes Symposium.** (2) I. The application of isotopes to industrial problems such as beta thickness gauging, soil moisture and density gauging, liquid level gauging and leak detection. One hour rec. and three hours lab. a week. Pr.: Phys. 535.
- 615. Industrial Isotopes Laboratory.** (2) II. Course to provide students further experience in use of radioactive isotopes in industrial applications. Experiments include such applications as wear rate determinations, volume determinations, polymerization, mixing, sterilizing and well logging. Six hours lab. a week. Pr.: N. E. 610.
- 620. Problems in Nuclear Engineering.** Credit arranged. I, II, S. Specific studies in current and advanced problems in various phases of nuclear engineering. Pr.: Approval of department head.
- 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.: N. E. 670.
- 710. Nuclear Fuel Processing.** (3) II. 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. 670, 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 department head.
- 820. Control of Nuclear Reactors.** (3) II. Servomechanisms and feedback loops, reactor kinetics, measurement of power level and period. Temperature effects. Three hours rec. a week. Pr.: N. E. 670.
- 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. Diffusion and slowing down of neutrons, multi-group theory, transport theory, age calculations, lattice calculations, criticality conditions, reactor kinetics, per-

turbation theory, and applications of computers to reactor physics calculations. Pr.: N. E. 690.

850. Nuclear Engineering Laboratory. (1) II. Simulated reactor start-up, control, operation, and shut-down problems. Three hours lab. a week. Pr.: N. E. 820.

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.

The Engineering Experiment Station

MERRILL A. DURLAND, *Director*

LELAND S. HOBSON, *Associate Director*

The Engineering Experiment Station was established March 24, 1910, by the Board of Regents for the purpose of carrying on tests and research work 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 another section of this catalog.

The research work carried on in the Engineering Experiment Station has three important objectives. First, the research carried on in the Engineering Experiment Station 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, they 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 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 which are for specific industrial concerns are financed by those concerns. Other 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.

A number of very interesting research projects are now being carried on in the different departments of the Engineering Experiment Station. Projects supported by the federal government include a U. S. Air Force project on "Research in Satellite Tracking"; a National Science Foundation project on "Vibrational Characteristics of Sandwich Material"; an Office of Ordnance Research project on "Study of Heat Transfer Between a Flat Plate and a Pulsating Impinging Jet"; a National Institute of Health project on "The Effect of Floor Temperature on Comfort"; a National Science Foundation project on "Design and Development of Transparent Overlay for Teaching Basic Principles of Engineering Graphics"; and a Small Business Administration project on "Management Strategy in Establishment Sizes Operated by Both Independent and Centrally-controlled Companies." Projects supported by engineering associations and private industry include an American Society of Heating and Air Conditioning Engineers project on "Heat Transfer Through Air-Conditioning Ducts"; and an American Society of Refrigerating Engineers project on "Heat Transfer of Condensing Freon in Horizontal and Inclined Tubes." Other projects include one on "Prestressed Concrete Durability"; "Analysis of Trussed-Tee Reinforced Concrete Slab Construction"; "In-

vestigation of the Mechanism of Turbulent Heat Transfer Inside Tubes"; "Research in Asphalt"; "Effects of Sonic Vibrations on Chemical Change"; and "A Study of Soil Stabilization." Some of the other research projects carried on in the departments of the Engineering Experiment Station of special importance to students include "Electronic Analogue Computer"; "The Use of Light-weight Aggregates"; "Industrial Building Design"; "The Study of Sound Using an Anechoic Chamber"; "Downward Projection of Heated Air"; "Radioactive Salts in Studying the Migration of Soluble Salts in Concrete"; "Engineering Design of Subcritical Nuclear Reactors"; "Slowing Down Density and Diffusion of Neutrons in Moderators"; "Investigation of Residential Kitchen Exhaust Systems"; "Design Study of Kansas Homes"; and "Terrestrial Photogrammetric Procedure Using Standard Cameras."

A complete list of the Engineering Experiment Station research projects and a brief description of each is published in a bulletin entitled "Research Activities, 1959, Kansas Engineering Experiment Station." A copy of this or any other 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

M. A. DURLAND, *Director*

LELAND S. HOBSON, *Associate Director*

The Division of Engineering and Industrial Services was established by the Board of Regents September 30, 1958, in order to coordinate and develop engineering and industrial services previously 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 the community industrial survey program, city and regional planning assistance, special meetings and conferences and industrial assistance and advisement. During the past year, 11 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 in analyzing and evaluating industrial opportunities and problems. Small industries which are unable to maintain personnel experienced in the many areas of modern technology seek the experience of this Division for counsel and advice. This assistance to the home industries of Kansas is materially aiding the industrial development of the state.

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 nearly 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.

COMMUNITY PLANNING AND DEVELOPMENT

PROFESSOR M. R. HODGELL

City and regional planning studies have an important relationship to any successful program of industrial development and must also be the foundation for any worthwhile program for community development. Assistance to Kansas communities in this broader field has, therefore, developed alongside the industrial survey program and is now conducted under the Division of Engineering and Industrial Services.

Probably no other field of public endeavor has excited so much interest nationally, and the communities in Kansas are rapidly becoming aware of their needs and possibilities in this basic field. Initial activities of the University in the planning area have concentrated on the publication of basic data and procedural outlines relating to planning, zoning, and urban redevelopment, with emphasis on the need for local community action and citizen participation. In addition, professional personnel frequently are called upon by civic groups and city and county governing bodies to discuss the application of such information to local situations.

On occasion, students in the graduate program in City and Regional Planning may be assigned problems in specific cities as a device for more realistic training and, incidentally, to give the community itself a fresh outlook and additional data. Although a limited amount of professional consulting work is undertaken by members of the staff and by graduate students under staff direction, primary emphasis is given to encouragement of improved planning abilities among members of private consulting firms.

The School of Home Economics

DORETTA SCHLAPHOFF HOFFMAN, *Dean*

RUTH HOEFLIN, *Associate Dean*

MARGARET E. RAFFINGTON, *Assistant to the Dean*

Two major objectives are basic to the program for each student in home economics. The first objective is to contribute to general education through a combination of required courses. The goal of these courses is to help the student become a well-informed person trained for responsible citizenship, with a sound philosophy of personal and family living, and an appreciation of the aesthetic in daily living. The second major objective is to provide a sound background for homemaking and for entering one of the many professions open to home economists.

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

It is possible, therefore, with the guidance of a faculty adviser to plan a program that will prepare the student for homemaking and 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 requirements of these curriculums for the first year are much the same, so the student has time to study possibilities in all areas in home economics before choosing the one best suited to her 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 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.

Adequate 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	Written Comm. I	3	Gn. St.	112	Man's Phys. World II	4
Art	100	El. Des. I	2	Engl.	120	Written Comm. II	3
F. C. Dev.	250	Human Relations	2	Psych.	110	Gen. Psychology	3
C. & T.	130	Selection 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.	130	Selection of Clothing	2	C. & T.	210	Pattern Study	3
F. & N.	130	Applied Nutrition	2			Elective or option	7
		Elective or option	6	Ph. Ed.		Physical Education	0
Ph. Ed.		Physical Education	0				
Total				16	Total		
					16		

JUNIOR

Gn. St.	131	Intro. Soc. Sci. I*	4	Gn. St.	132	Intro. 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				Elective—Humanities or	
		Social Science	3			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
		Elec. 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 Teaching Home Economics in High School—Vocational Plan
(H. E. Educ.)

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.

Course			Sem. Hrs.	Course			Sem. Hrs.
Educ.	202	Educ. Psychology I	3	C. & T.	210	Pattern Study and	
Educ.	400	Educ. Psychology II	3			Garment Construction	3
Educ.	201	Prin. of Sec. Educ.	3	C. & T.	310	Tailoring	3
Educ.	550	Methods of Tchg. H. E. ..	3	F. C. Dev.	320	The Preschool Child	3
Educ.	552	Tchg. Partic. in H. E.	5	F. C. Dev.	350	Family Relationships	2
Educ.	750	Voc. H. E. Curriculum ..	3	F. Ec.	665	Home Management	2
				F. Ec.	565	Home Management Lab. .	2
				F. & N.	240	Foods II	3
				Ins. M.	440	School Food Service	3
				Phys.	115	Household Physics	4
Option Requirements			45				
Electives			3				
Curriculum Requirements			76				
(Take Chem. 110 and 190, 191; F. C. Dev. 450; C. & T. 260; take F. & N. 400 in place							
of F. & N. 130.)							
(Omit: F. C. Dev. 250 and electives in humanities or social science, 6 hours.)							
Total			124				

Option in Teaching Home Economics in High School—Non-vocational
Plan (H. E. Educ.)

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	F. C. Dev.	320	The Preschool Child	3
Educ.	400	Educ. Psychology II	3	F. C. Dev.	660	The Family	3
Educ.	201	Prin. of Sec. Educ.	3	F. Ec.	665	Home Management	2
Educ.	550	Methods of Tchg. H. E. ..	3			Elective in H. E.	9
Educ.	552	Tchg. Partic. in H. E.	5				
Educ.	750	Voc. H. E. Curriculum.. 3 or					
		other suitable course					
		in education	3				
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.

Course			Sem. Hrs.	Course			Sem. Hrs.
Educ.	550	Methods of Tchg. H. E. ..	3	F. Ec.	340	Household Equipment	2
Educ.	605	Exten. Organ. & Policies ..	3	F. Ec.	665	Home Management	2
Educ.	752	Exten. Meth. for H. E.	3	F. Ec.	565	Home Management Lab. ..	2
Art	345	Home Furnishings	2	F. Ec.	600	Families in Amer. Econ.	3
C. & T.	210	Pat. Study & Garment		F. & N.	240	Foods II	3
		Construction	3				
F. C. Dev.	320	The Preschool Child	3				
F. C. Dev.	350	Family Relationships	2				
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.	260	Textiles	3
Art	390	Drawing II	2	C. & T.	610	Flat Pattern Designing ..	3
Art	620	Costume Design III	3	C. & T.	615	Designing by Draping	3
Art	740	Historic Fabric Design ..	3	C. & T.	730	History of Costume	3
Option Requirements							30—30
Electives, 6 hours of which must be in humanities or social science							26—23
Curriculum Requirements							68—71
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.

Course			Sem. Hrs.	Course			Sem. Hrs.
B. A.	170	Principles of Acctg.	3	Psych.	515	Personnel Psychology	3
B. A.	400	Administration	3	Art	395	Window Display	3
B. A.	440	Marketing	3	C. & T.	630	Clothing Economics	3
B. A.	540	Retailing	3	C. & T.	650	Intermediate Textiles	3
Engl.	205	Business Letter Writing	3	C. & T.	730	History of Costume	3
Psych.	505	Psych. of Adv. & Selling	3				
Option Requirements							33—33
Electives, 6 hours of which must be in humanities or social science							20—17
Curriculum Requirements							71—74
(Take Ec. So. 110, 220, and other substitutions in place of Gn. St. 131 and 132.)							
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. Opportunities for those completing this option are found in the laboratories of colleges and universities, commercial firms, or government agencies.

Course			Sem. Hrs.	Course			Sem. Hrs.
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				
Phys.	211	General Physics I	4				
Option Requirements							28—28
Electives, 6 hours of which must be in humanities or social science							23—22
Curriculum Requirements							73—74
(Take Chem. 110 or 210. Take Chem. 350, 351 in place of Chem. 190, 191.)							
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.

Course			Sem. Hrs.	Course			Sem. Hrs.
Psych.	415	Psych. of Child. and Adolescence	3	F. C. Dev.	615	Nursery School Procedure	3
F. C. Dev.	320	The Preschool Child	3	F. C. Dev.	625	Play Activities & Matls.	3
F. C. Dev.	350	Family Relationships	2	F. C. Dev.	630	Devel. & Guid. of Youth	3
F. C. Dev.	605	Child Development	3	F. C. Dev.	660	The Family	3
F. C. Dev.	610	Lit. & Music for the Young Child	3	F. Ec.	665	Home Management	2
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.

	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>
Ec. So.	615 Social Problems	3	F. C. Dev.	605 Child Development	3
Psych.	415 Psych. of Child. and Adolescence	3	F. C. Dev.	630 Devel. & Guid. of Youth ..	3
Psych.	435 Social Psychology	3	F. C. Dev.	660 The Family	3
F. C. Dev.	320 The Preschool Child	3	F. Ec.	600 Families in Amer. Econ.	3
F. C. Dev.	350 Family Relationships	2	F. Ec.	665 Home Management	2
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 Homemaking (F. Ec.)

This option provides students additional experiences in home-oriented courses which will prove valuable to them as homemakers. It provides sufficient electives that the student can prepare for employment after graduation and until family responsibilities demand her full time. The electives may also be used to pursue non-vocational subjects of general educational interest.

	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>
Art	345 Home Furnishings	2	F. Ec.	600 Families in Amer. Econ.	3
F. C. Dev.	320 The Preschool Child	3	F. Ec.	605 Consumers and the Mkt.	3
F. C. Dev.	350 Family Relationships	2	F. Ec.	665 Home Management	2
F. Ec.	340 Household Equipment	2	F. Ec.	565 Home Management Lab.	2
Option Requirements					19
Electives, 6 hours of which must be in humanities or social science					32
Curriculum Requirements					73
(Substitute Ec. So. 110 and approved courses for Gn. St. 131 and 132. Take Gn. St. 111 and 112, F. C. Dev. 450.)					
Total					124

Option in Family Economics and Finance (F. Ec.)

This option is intended to prepare students for work as family financial consultants and as consumer education specialists in adult education, with commercial companies, or in social welfare. Also, this option is intended to provide basic training for further study of family living in today's economy; that is, for those students preparing for college teaching, research, or work in areas of government related to family living.

	<i>Course</i>	<i>Sem. Hrs.</i>		<i>Course</i>	<i>Sem. Hrs.</i>
B. A.	170 Principles of Acctg.	3	Stat.	320 Elements of Statistics	3
Ec. So.	120 Economics II	3	F. C. Dev.	320 The Preschool Child	3
Ec. So.	430 Money and Banking	3	F. Ec.	600 Families in Amer. Econ.	3
Psych.	435 Social Psychology	3 or	F. Ec.	605 Consumers and the Mkt.	3
Ec. So.	655 Cultural Anthropology	3	F. Ec.	665 Home Management	2
Math.	110 General Algebra	5	F. Ec.	565 Home Management Lab.	2
Math.	200 Math. of Finance	3 or	F. Ec.	705 Finan. Prob. of Families ..	2
Option Requirements					35
Electives, 6 hours of which must be in humanities or social science					17
Curriculum Requirements					72
(Substitute Ec. So. 110 and approved courses for Gn. St. 131 and 132. Take Gn. St. 111 and 112, F. C. Dev. 350.)					
Total					124

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-

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	Written Comm. I	3	Engl.	120	Written Comm. II	3
Gn. H. E.	110	Intro. to H. E.	1	C. & T.	130	Selection of Clothing	2
		Elective*	7			Elective*	6
Ph. Ed.		Physical Education	0	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.	130	Applied Nutrition	2
Art	100	Elementary Design I	2			Elective*	9
		Elective*	7	Ph. Ed.		Physical Education	0
Ph. Ed.		Physical Education	0	Total		.....	15
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	Total		.....	16

SENIOR

Gn. St.	121	Biology I	4	Gn. St.	122	Biology II	4
		Elective*	12			Elective*	12
Gn. H. E.	030	H. E. Lect.	0	Total		.....	16
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			
		Course	Sem. Hrs.			Course	Sem. Hrs.
Chem.	110	General Chemistry	5	Chem.	190	El. Org. Chem.	3
Engl.	100	Written Comm. I	3	Chem.	191	El. Org. Chem. Lab.	2
F. C. Dev.	250	Human Relations	2	Engl.	120	Written Comm. 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.	130	Selection of Clothing	2
				F. & N.	130	Applied 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	5	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	Ph. Ed.		Physical Education	0
Ph. Ed.		Physical Education	0				
Total			16	Total			15

JUNIOR

Ec. So.	220	Intro. to Sociology	3	B. A.	170	Principles of Acctg.	3
Phys.	115	Household Physics	4	Chem.	420	Gen. Biochemistry	5
Ins. M.	600	Food Prod. Mgmt.	3	F. & N.	250	Dietetics	3
Ins. M.	620	Inst. Food Purch.	3	Ins. M.	630	Inst. Equipment	3
		Elective	2			Elective	1
Gn. H. E.	030	H. E. Lect.	0				
Engl.	090	English Proficiency	0				
Total			15	Total			15

SENIOR

Bact.	220	Gen. Microbiology	4	F. C. Dev.	320	The Preschool Child	3
Educ.	551	Meth. of Tchg. for		F. & N.	710	Diet. for Abn. Cond.	2
		Diet. Students	3	Ins. M.	640	Org. and Mgmt. of	
F. & N.	705	Human Nutrition	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>
Gn. St.	111	Man's Phys. World I	4	Gn. St.	112	Man's Phys. World II	4
Engl.	100	Written Comm. I	3	Engl.	120	Written Comm. II	3
Psych.	110	Gen. Psychology	3	Spch.	105	Oral Comm. I	2
Ec. So.	220	Intro. to Sociology	3	F. & N.	110	Foods I	5
A. H.	280	Meat Sel. & Util. H. E.	2	Ph. Ed.		Physical Education	0
Ph. Ed.		Physical Education	0			Air or Military Science	1
		Air or Military Science	1				
Total			16	Total			15

SOPHOMORE

Ec. So.	220	Economics I	3	Gn. St.	122	Biology II	4
Gn. St.	121	Biology I	4	Gn. St.	142	Intro. to Hman. II	4
Gn. St.	141	Intro. to Human. I	4	Art	100	Elementary Design I	2
F. & N.	240	Foods II	3	F. & N.	130	Applied Nutrition	2
Ph. Ed.		Physical Education	0	Ins. M.	200	Quan. Food Prep.	2
		Air or Military Science	1	Ph. Ed.		Physical Education	0
						Air or Military Science	1
Total			15	Total			15

JUNIOR

B. A.	170	Principles of Acctg.	3	B. A.	300	Managerial Acctg.	3
C. & T.	260	Textiles	3	B. A.	430	Personnel Admin.	3
Ins. M.	240	Restaurant Mgmt.	2	Ins. M.	630	Inst. Equipment	3
Ins. M.	600	Food Prod. Mgmt.	3	Ins. M.	640	Org. and Mgmt. of	
Ins. M.	620	Inst. Food Purch.	3			Food Services	3
		Elective	2	Ins. M.	645	Org. and Mgmt. of	
Engl.	090	English Proficiency	0			Food Services Lab.	2
						Elective	2
Total			16	Total			16

SENIOR

B. A.	325	Business Law I	3	Bact.	200	Public Health Bact.	3
B. A.	400	Administration	3	B. A.	500	Small Bus. Operation	3
Ins. M.	645	Org. & Mgmt. of Food		Psych.	505	Psych. of Adv. and	
		Services Lab.	2			Selling	3
		Elective	8			Elective	6
Total			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			
		Course	Sem. Hrs.			Course	Sem. Hrs.
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	Written Comm. I	3	Gn. St.	112	Man's Phys. World II ...	4
Art	100	Elementary Design I	2	Engl.	120	Written Comm. 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.	130	Selection 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	Intro. Soc. Sci. I*	4	Gn. St.	132	Intro. Soc. Sci. II	4
F. & N.	130	Applied 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
Ph. Ed.		Physical Education	0	Journ.	050	Tech. Journ. Lect.	0
				Ph. Ed.		Physical Education	0
Total			15 or 16	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 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***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.	120	Intro. Org. and Bio.	
Engl.	100	Written Comm. I	3			Chem.	5
F. C. Dev.	250	Human Relations	2	Engl.	120	Written Comm. 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.	130	Selection of Clothing	2
				F. Ec.	200	Family Finance	2
				Ph. Ed.		Physical Education	0
Total			16	Total			17

SUMMER SESSION

Zool.	200	Gen. Zoology	5
Ec. So.	220	Intro. to Sociology	3
Total			8

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.	5
F. & N.	130	Applied Nutrition	2	Ph. Ed.		Physical Education	0
		Elective in H. E.	4	Engl.	090	English Proficiency	0
Ph. Ed.		Physical Education	0				
Total			17	Total			16

JUNIOR AND SENIOR

Summer (in residence at Kansas State University with dual enrollment in the Department of Nursing, University of Kansas School of Medicine, and Kansas State University).

Educ.	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 24 months.* A student qualifies for a Bachelor of Science Degree in Home Economics from Kansas State University on completion of 15 months of professional training in the Department of Nursing. After completion of the entire prescribed program in nursing, the student qualifies for the degree, Bachelor of Science in Nursing, conferred by the University of Kansas School of Medicine.

* Entrance requirements to the Department of Nursing are: 1) University grades that average C or more. 2) Scores that are acceptable to the Department of Nursing on the battery of orientation tests administered when the student first enrolls at Kansas State University.

ART

DOROTHY BARFOOT, *Head of Department*

Concentration in art is designed to provide a background for home-making or other professional work. Depending upon their interests, the undergraduate students may select options in interior decoration, crafts, costume design, or teaching of art. Major work leading to the degree Master of Science is offered in costume design and interior decoration and related phases of the department's work.

FOR UNDERGRADUATE CREDIT

- 100. Elementary Design I.** (2) I, II, S. An introduction to the arts and application of their principles to daily living. 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 sketching in which a variety of media is used. Students work out-of-doors as well as in the studio. Pr.: Art 100.
- 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) I. 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) I. Creative designing for the fashion figure. Sources of fashion inspiration. Nine hours lab. a week. Pr.: Art 190, 220.
- 325. Fashion Life Sketching.** (2) I. The professional fashion approach to the live model; various media; fashion posture, drapery, silhouettes. Pr.: Art 100, 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, II, S. 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. Creative work in oil, water color, and lithograph crayon. The student works both in the studio and outdoors. 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.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

- 425. Costume Illustration.** (2) II, 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. Design, raising, and stretching of holloware 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, holloware 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 and interior decoration. Pr.: Graduate standing.

CLOTHING AND TEXTILES

, Head of Department

The Department of Clothing and Textiles offers work in the following areas of study: clothing selection, clothing construction, textiles, clothing economics, 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. Graduate students preparing to become teachers, extension specialists, textile analysts, and research workers find appropriate courses in this department.

FOR UNDERGRADUATE CREDIT

- 130. Selection 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.

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.** (1) II, S. Discussion of current developments in the field. Pr.: Senior or graduate standing.
- 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.
- 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

RUTH HOEFLIN, *Head of Department*

The Department of Family and Child Development offers opportunities for study of the child and his family, with a nursery school as a laboratory of child development. 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. Many of the courses will be of value to prospective teachers, nurses, dietitians, extension workers, and others, in helping them understand human needs and relationships. For the student interested in professional opportunities such as nursery school teaching, child guidance clinics, family life programs in the public schools, college teaching, child welfare with community agencies, or research in child development and family life, the department offers work toward the degree Master of Science.

The curriculum for students in Home Economics and Nursing is under the supervision of the Department of Family and Child Development.

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 three 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.

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.
- 610. Literature and Music for the Young Child.** (3) II. Creative experience with stories, songs, records, and dramatized play for preschool children. Two hours rec. and three hours lab. a week. 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.
- 625. Play Activities and Materials.** (3) I. Preschool child's use of space and equipment, toys, plastic and graphic materials, with emphasis upon play experiences, which will contribute to the needs of the individual child. Two hours rec. and three hours lab. a week. Pr.: F. C. Dev. 320.
- 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.
- 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.
- 680. Seminar in Family and Child Development.** (2) I, II, S. Interpretation and evaluation of research relating to interaction of family members. Pr.: F. C. Dev. 660.
- 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

- 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*

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. Instruction in the department leading to the degree B. S. in Home Economics is described under the curriculum **Home Economics with Options**: (1) Homemaking, (2) Family Economics and Family Finance, and (3) Housing, Household Equipment, and Home Management.

Graduate study leading to the M. S. degree is provided.

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.

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.** (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. or parallel: Gn. St. 132 and junior standing.
- 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.** (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*

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. Programs of study are set up through the selection of the option in foods demonstrating or the option in foods and nutrition research, and in consultation with an assigned faculty adviser. Programs of graduate study are offered that lead to the M. S. and Ph. D. degrees in foods and nutrition.

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.
- 130. Applied Nutrition.** (2) I, II, S. Relationship of the role of nutrition to the well-being of the individual and to 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. 130, Gn. St. 122 or Zool. 425, Chem. 190, 191 or 350, 351, or Gn. St. 112.

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.
- 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 Gen. 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 705 or consent of head of department.
- 705. Human Nutrition.** (3) I, S. Chemistry of foods and nutrition, emphasizing food nutrients, digestion, and metabolism. Pr.: Chem. 420, Zool. 425, or Gn. St. 122; for home economics majors, F. & N. 250.
- 710. Dietetics for Abnormal Conditions.** (2) II. Planning and preparation of special diets, and food requirements in pathological conditions. Four hours rec. and lab. a week. Pr.: F. & N. 705.
- 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.: Chem. 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 705.

FOR GRADUATE CREDIT

800. Advanced Nutrition. (3) II, S. Current knowledge of metabolic functions of food in the human organism. Pr.: F. & N. 705.

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. 800.

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 705 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*

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.

399. Honors Seminar in Home Economics. (1) I, II. For students in honors program only. Selected topics. May be taken for credit more than once.

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.

COURSES IN HOME ECONOMICS EDUCATION

Courses are given by the Department of Education for the School of Home Economics. The staff is appointed cooperatively by that department and the School of Home Economics.

INSTITUTIONAL MANAGEMENT

GRACE M. SHUGART, *Head of Department*

The Department of Institutional Management provides instruction for students preparing to become dietitians or managers in hospital, college, school, commercial, or industrial food services. This department offers two curriculums, 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. Courses leading to the degree Master of Science are also offered.

FOR UNDERGRADUATE CREDIT

200. Quantity Food Preparation. (2) II, S. Principles of quantity food preparation and service. Six hours lab. a week. Pr.: F. & N. 240.

240. Restaurant Management. (2) II. An introduction to the field of restaurant management including the development of the industry and a survey of its opportunities and responsibilities. Pr.: Ins. M. 200.

FOR UNDERGRADUATE CREDIT AND FOR GRADUATE CREDIT IN MINOR FIELD ONLY

440. School Food Service. (3) I, II. 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, S. 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. (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. (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) I, II, S. 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.

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

980. Research in Institutional Management. Credit arranged. I, II, S. Pr.: Consent of instructor.

The School of Veterinary Medicine

ELDEN E. LEASURE, *Dean*

VETERINARY ENROLLMENT LIMITED

By authority of the State Board of Regents, enrollment in the Curriculum of 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	\$175.00
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	\$209.00

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 Catalog 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 87.

The two-year Pre-Veterinary Curriculum and this curriculum lead to the two degrees, Bachelor of Science and Doctor of Veterinary Medicine.

FIRST YEAR

FIRST SEMESTER			SECOND SEMESTER		
	Course	Sem. Hrs.		Course	Sem. Hrs.
Bact.	310 Vet. Microbiology	3	Bact.	340 Path. Bact. and	
Anat.	625 Anatomy I	7		Virology	4
Path.	600 Histology I	3	Anat.	635 Anatomy II	6
Chem.	420 G. Bio. Chemistry	5	Path.	602 Histology II	3
Engl.	090 English Proficiency	0	Physi.	635 Comp. Physiol. I	4
Gn. V. M.	140 Vet. Orientation	R			
Total	.....	18	Total	.....	17

SECOND YEAR

Bact.	370 Vet. Immunology	3	Physi.	650 Comp. Physiol. III	3
Physi.	645 Comp. Physiol. II	4	Path.	603 Pathology I	5
A. II.	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.	500	Special Anatomy	Credit to be arranged
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	Credit to be arranged
Anat.	870	Research in Anatomy	Credit to be arranged
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.	710	Special Histology	3 semester hours
Path.	802	Research in Pathology	Credit to be arranged
Path.	805	Pathology of Neoplasms	1 to 6 semester hours
Path.	810	Problems in Pathology	Credit to be arranged
Path.	815	Reproductive Organ Pathology	1 to 4 semester hours
Path.	820	Advanced Clinical Pathology	1 to 4 semester hours
Path.	830	Pathology Seminar	1 semester hour
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	Credit to be arranged
Physi.	824	Physiology of Reproduction	3 semester hours
Surg.	400	Diseases of Wildlife	3 semester hours
Surg.	740	Extra Clinics	1 semester hour
Surg.	801	Research in Surgery	Credit to be arranged
Surg.	810	Research in Medicine	Credit to be arranged
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	Credit to be arranged

ANATOMY

DONALD M. TROTTER, *Head of Department*

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.

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.** Credit arranged. II of odd numbered years and each S. Pr.: Physi. 635 or consent of staff.
- 870. Research in Anatomy.** Credit arranged. I, II, S. For graduate students in the field of anatomy.

PATHOLOGY

M. J. TWIEHAUS, *Head of Department*

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.

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.

FOR GRADUATE CREDIT

- 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.
- 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.
- 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.
- 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
- 802. Research in Pathology.** Credit arranged. 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.** Credit arranged. 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.
- 830. Pathology Seminar.** (1) I, II, S. Pr.: Consult department head.

PHYSIOLOGY

GRAVERS K. L. UNDERBJERG, *Head of Department*

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.

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.

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. Credit arranged. 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.

SURGERY AND MEDICINE

EDWIN J. FRICK, *Head of Department*

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.

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. Credit arranged. 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. Credit arranged. 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. Credit arranged. 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

ARTHUR D. WEBER, *Dean*

HAROLD E. JONES, *Director*

PAUL W. GRIFFITH, *Associate Director*

WILBER E. RINGLER, *Assistant Director*

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 departments within the Division of Extension; namely, the Cooperative Agricultural Extension Service and Continuing Education.

COOPERATIVE AGRICULTURAL EXTENSION SERVICE

The Cooperative 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 newspapers, farm magazines, radio, and television.

EXTENSION STIMULATES COMMUNITY ACTION

Extension workers may assist people to work together as a group for a common goal that is not attainable to the individual, such as: organizing county-wide campaigns to control diseases, pests, and weeds; to conserve soil and moisture in an entire watershed; to study many different kinds of local, state, and national problems. They help conduct fairs and teach good standards of production in agriculture and home economics by serving as judges at county and state fairs.

EXTENSION TAKES PEOPLE TO THE UNIVERSITY

Extension agents acquaint many people with the work of the University by organizing and conducting groups to visit the University and its Branch Experiment Stations and Fields. Many of the state-wide organizations in agriculture, home economics, and 4-H club work are given assistance with their annual 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, Agricultural Stabilization and Conservation Committee, 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:

COUNTY EXTENSION PROGRAM ADMINISTRATION

LAWRENCE COX, *District Agent—Northwest*

ELMER W. BLANKENHAGEN, *District Agent—Southwest*

FRANK A. HAGANS, *District Agent—Central*

OTIS B. GLOVER, *District Agent—Northeast*

RAY M. HOSS, *District Agent—Southeast*

County agent work is an organized activity of Kansas State University to develop and carry out the extension program as stated in national 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 demonstrations in agriculture and home economics and subjects relating thereto to persons not attending or resident in said colleges in the several communities and imparting information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on 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 this Act.”

The 1915 session of the Kansas legislature accepted the provisions of the Smith-Lever Act. The Kansas legislature in 1951 amended the county farm bureau law which had been in effect since 1915, to provide

for county agricultural extension councils with whom the Extension program of Kansas State University is conducted in the counties. The sole purpose of the county extension council is to plan and conduct an extension program in agriculture, home economics, and 4-H Club work among the people of each county.

The Smith-Lever Act and subsequent congressional acts authorize appropriations for the support of extension work. These funds are allocated to the states on the basis of rural or farm population. The Kansas legislature also makes appropriations to Kansas State University for the extension program. The boards of county commissioners also appropriate to this program in accordance with a budget developed annually with the executive board of each county agricultural extension council and the director of extension.

Supervisory work by the members of this department includes the selection and training of persons interested in becoming county extension agents, representing the director of extension by carrying out his responsibilities as imposed by state law, cooperation 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.

HOME ECONOMICS EXTENSION

MARGARET A. KOENIG, *Acting Head of Department*

Extension work in home economics is carried on in counties through organized study groups, public meetings, press, radio, and television. Definite programs are pursued throughout the year by the home demonstration units, 4-H clubs, and special interest groups. Material furnished by the specialists and by home economics agents is used by local leaders in their respective communities.

Home Economics Extension work was made possible in August, 1917, when Congress provided funds for the employment of emergency home demonstration agents. This work was instituted under the auspices of city or county organizations, but after a short time the placing of home demonstration agents was deferred until the counties were properly organized for this specific purpose. Since July 1, 1921, a county desiring the services of a home economics agent or agents must provide a well-equipped office with adequate stenographic help, transportation facilities, and a county appropriation toward the salaries and expenses of the agent or agents.

The program of work for the various groups in the county is based on the local situation in the communities. It is evolved 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, 1960, 103 counties had appropriations for home demonstration work, and in addition 10 counties had appropriations for associate and assistant home economics agents.

BOYS' AND GIRLS' 4-H CLUB WORK

ROGER E. REGNIER, *Head of Department*

4-H Club work is conducted by the University in cooperation with the county agricultural extension councils and the United States Department of Agriculture. Community 4-H clubs are open to all young people between the ages of 10 and 20 years, inclusive. They work under the direction of the county extension agents with the help of local volunteer 4-H Club leaders. 4-H Club members receive valuable help from their county agents and local leaders; subject matter material is prepared by specialists and sent out by the state club leader to give members definite information and suggestions on farm and home practices recommended by the University.

The origin of 4-H Club work is obscure. Shortly after 1900, farmers' institutes, farm leaders, and educators, in various parts of the country, made efforts to bring about a more definite connection between rural life and school life. They assisted boys and girls to conduct, at home, various educational demonstrations or contests centered around improved agricultural practices.

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. Cooperation with the group is promoted, leadership is encouraged, exhibitions and contests are conducted, accurate records and reports are required, and achievements are suitably recognized. Wholesome recreation is promoted, and county and state-wide round-ups, camps, and conferences are arranged.

An educational program for older youth above 4-H Club age is carried on through Young Men and Women in Extension (YMW). These groups meet regularly for discussions and talks on topics of current interest relating to public policy, homemaking, and agriculture. Community service projects and social activities are important features in the programs of work.

AGRICULTURAL SPECIALISTS

WILLIAM G. AMSTEIN, *Head of Department*

This department includes those members of the extension staff who conduct and supervise programs in agricultural 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 husbandry, entomology, farm management, marketing, agricultural planning, farm forestry, soil conservation, landscape gardening, and rodent and predator control. 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*

The function of the Department of Engineering Extension is to carry on an educational program throughout the state dealing with applica-

tion 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.

EXTENSION INFORMATION

LISLE L. LONGSDORF, *Head of Department*

It is the objective of this department to acquaint the people of Kansas with the research findings of this land-grant University, its branch experiment stations, and the United States Department of Agriculture, through the mediums of communication. It also has the responsibility of reporting the progress being made, especially by rural people, in the adoption of recommended scientific methods of farming and homemaking for an improved agricultural industry. All means of communication are utilized in the dissemination of information for the benefit of both rural and town people.

Scientific information, as written in popular version by the departmental staff, is channeled through all practical means of communication, including newspapers, printed publications, circulars and posters, printed annual reports, exhibits, motion pictures, 2 x 2 slides, radio, and TV.

Each week some 400 weekly newspapers of the state, the farm press, and daily newspaper outlets are provided with news stories on research work of the Kansas Agricultural Experiment Station.

County agents are provided a weekly press service and are given special training throughout the year in utilizing to the maximum a balanced information program. The department cooperates with all agents in the 105 organized extension service counties, as well as central office staff workers, in planning and executing information programs that will acquaint people of Kansas with the projects being carried.

Each year nearly three and one-half 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

JACK M. BURKE, *Acting Head of Department*

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-owned radio station, is used exclusively for the dissemination of information from this institution. Engineering data would indicate that there is a potential audience of approximately five million listeners when the station is on the air. Three and one-half hours a day are devoted to the broadcasting 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.

CONTINUING EDUCATION

ROMAN J. VERHAALLEN, *Head of Department*

The Department of Continuing Education provides opportunities for continuing education 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 fields. It offers educational opportunities for professional training in a variety of areas, for fulfilling citizenship responsibilities, and for the development of appreciations and skills appropriate to the layman in the arts. It also provides consultant service in the areas of community development and group program planning.

COMMUNITY SERVICES

The Community Services section of Continuing Education has responsibility for offering a variety of services to Kansas. At the present time the following kinds of services are available to communities, groups, schools, and other organizations:

1. consultation and assistance on community organization and community development problems, and on adult education programs concerned with liberal arts or public affairs.
2. leadership training, including especially designed workshops, institutes, and program planning aids for groups and organizations concerned with community development, adult education programs in the liberal arts or on public affairs, and
3. speakers on many topics from all departments of the University.

Further information about these services may be obtained by writing to Community Services, Department of Continuing Education, Division of Extension.

CONFERENCES AND INSTITUTES

The Conferences and Institutes section of Continuing Education is responsible for the conduct of the Department's conference activity. The office also acts as the conference coordinating office for the entire cam-

pus in an attempt to avoid scheduling conflicts. Although any attempt to define a conference would fail to satisfy all requests, the Department considers a conference to be an educational activity designed to bring together a group of people with mutual problems or interests for a brief period of intensive study.

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) the activity must be of an educational nature; (2) Kansas State University must participate actively and make an adequate contribution to the program; and (3) the activity should be of a continuing nature, i.e., lend itself to being repeated annually. Conference planning is regarded as a three-way effort involving the academic department, the off-campus adult group, and the conference coordinator, all three coming on an equal footing and each bringing to the planning table its own peculiar attributes of expert knowledge, an awareness of the problem's scope and the public's needs, practical knowledge, and a background of conference planning and housekeeping procedures.

Fees. Registration fees for conferences will vary to correspond with the total direct costs 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 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.

To organize extension classes. If any group of people is interested in a particular course, it should contact the Head of the Department of Continuing Education at Kansas State University, Manhattan, for the scheduling of the class. Additional enrollees are sometimes necessary to cover travel costs. Classes are organized on either credit or non-credit basis.

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; these fees are effective July 1, 1960; fees for certificate or 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.

Certificate classes:

1. Certificate 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 Con-

tinuing 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 demonstration. Pr.: Accounting I (CAC 300, Acctg. 300, or equiv.).

CAR 1. Drawing and Appreciation I. (2) One hour lec. on appreciation and two hours lab. instruction.

CAR 2. Drawing and Appreciation II. (2) One hour lec. on appreciation and two hours lab. instruction.

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 5. Painting and Appreciation I. (2) One hour lec. on appreciation and two hours lab. instruction.

CAR 6. Painting and Appreciation II. (2) One hour lec. on appreciation and two hours lab. instruction.

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.

CBA 610a. Microbiology of Human Diseases. (3) Lecture and demonstration. For students who have had adequate practical laboratory experience and/or a basic course in bacteriology or microbiology. A condensed survey of the microbiology of human diseases.

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, De-

partment 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.

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 25c), 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 are advised to 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. Equivalent: 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. No exact equivalent in residence.

HORTICULTURE

- 200. 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 HUSBANDRY

- 100. Farm Poultry Production.** (2) An introductory course in poultry management.

School of Arts and Sciences

BUSINESS ADMINISTRATION

- 320. Business Law I** (Not available 1960). (3) Contracts, agencies, and sales.
- 321. Business Law II** (Not available 1960). (3) Negotiable instruments, partnerships, and corporations.
- 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. Pr.: Ec. So. 220 (Introduction to Sociology), or Ec. So. 180 (Rural Sociology).

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.
- 444. 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).
- 446. 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.

600. Educational Sociology. (3) Development of meaning of American democracy; social problems of the public schools; development of plans for practicing democracy in the public schools. 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 course; fundamentals of composition and rhetoric; analyses of thought, content and style; practice in composition.

120. Written Communications II. (3) Cont. of analyses and practice in composition; types of reasoning; emphasis on an investigative theme. Pr.: Engl. 105 (Written Communications Ia), or Engl. 100 (Written Communications I).

CCE 2a. Written Communications IIa. (1) Brief review of grammar and punctuation, theme writing, and dictionary use. No exact equivalent in residence. Pr.: Engl. 120 (Written Communications II).

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

250. English Literature I. (3) From the early Britons through the end of the 17th century. Pr.: Engl. 120 (Written Communications II).

255. 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).

CEN 375B. Books and Men IIb (Not available 1960-61). (2) Cont. of CEN 375A. 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.

205. Introductory Physical Geography. (3) A study of the geographic factors of our physical environment: map fundamentals, climatic factors, land forms, natural vegetation, soils, and water and mineral resources.

HISTORY, GOVERNMENT AND PHILOSOPHY

115. Civilization I. (3) Ancient civilizations, their rise and fall, and contributions to world civilization; to about 1650.

130. Civilization II. (3) Civilization since 1650; showing the shift from agricultural to industrial and commercial civilization, and to the approaching scientific and atomic age.

165. United States Before 1865. (3) The significant forces, movements, and personalities in the development of American life before 1865.

170. United States Since 1865. (3) The significant forces, movements, and personalities in the development of American life since 1865. International developments.

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; growth of democratic processes. Pr.: Three hours of American history or junior standing.

CHC 1. Community Civics. (2) Study and problems of local, county, and state governments. No exact equivalent in residence.

LIBRARY ECONOMICS

CLE 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.

CLE 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.

CLE 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.

420. 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.

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 equivalent 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 equivalent 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 equivalent. Together, CPE 3 and CPE 4 are equivalent to Ph. Ed. 380.

PHYSICS

- 135. Descriptive Meteorology.** (3) Atmospheric phenomena, meteorological instruments and their understanding from physical concepts. Application of meteorological knowledge to agriculture, engineering, and other aspects of everyday life.

PSYCHOLOGY

- 110. General Psychology.** (3) Human behavior: methods, research, principles. (A basic course for teachers and others interested in social science.)
- 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

- CE 3. Gas Engines and Tractors.** (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 analysis of simple structures, loaded cables, and machine elements; centers of gravity; movements of inertia. Pr.: Phys. 310 (Engineering Physics I), Math. 231 (Calculus II); or conc.: Math. 222 (Analytical Geometry and Calculus III).

ELECTRICAL ENGINEERING

- 395. Basic Electrical Engineering.** (4) Fundamentals of electric, magnetic, and electrostatic circuits. Pr. or conc.: Phys. 311 (Engineering Physics II), Math. 222 (Analytical Geometry and Calculus III) or Math. 231 (Calculus II).

INDUSTRIAL ENGINEERING

- 339. Metals and Alloys.** (2) The manufacture and use of iron, steel, copper, aluminum, and their alloys. Pr. or conc.: 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. 110 (Solid Geometry), or equivalent.

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), M. E. 215 (Descriptive Geometry).

310. Engineering Graphics III. (2) Pictorial and orthographic working drawings and sketches, including details and assemblies using the principles and standards of geometric control; creative and functional design; ASA Standard conventions and specifications; threads and fasteners; sketching of exploded views; charts and diagrams. Pr.: M. E. 215 (Descriptive Geometry) or M. E. 216 (Engineering Graphics II).

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			Unit H. S. credit
PCA	1.	Elementary Agriculture I	$\frac{1}{2}$
PCA	2.	Elementary Agriculture II	$\frac{1}{2}$
COMMERCE			
PCM	7.	Bookkeeping I	$\frac{1}{2}$
PCM	8.	Bookkeeping II	$\frac{1}{2}$
DRAWING			
PCD	3.	Shop Mechanical Drawing I	$\frac{1}{2}$
PCD	4.	Shop Mechanical Drawing II	$\frac{1}{2}$

ENGLISH

		Unit H. S. credit
PCE	1C. Grammar and Composition (first semester, first year)	1½
PCE	2L. Literature (second semester, first year)	1½
PCE	3C. Composition (first semester, second year)	1½
PCE	4L. Literature (second semester, second year)	1½
PCE	5C. Composition (first semester, third year)	1½
PCE	6L. Literature (second semester, third year)	1½
PCE	7C. Composition (first semester, fourth year)	1½
PCE	8L. Literature (second semester, fourth year)	1½

HISTORY AND CIVICS

PCH	5. American History I	1½
PCH	6. American History II	1½
PCH	7. Community Civics	1½
PCH	8. Constitution of United States	1½
PCH	9. World History I (not open to students who have had Ancient History)	1½
PCH	10. World History II	1½

MATHEMATICS

PCM	1. Algebra I	1½
PCM	2. Algebra II	1½
PCM	3. Algebra III	1½
PCM	4. Plane Geometry I	1½
PCM	5. Plane Geometry II	1½
PCM	6. Solid Geometry	1½

SCIENCE

PCS	1a. Physical Geography	1½
PCS	4. Physiology	1½
PCS	5a. General Science I	1½
PCS	5b. General Science II	1½

SOCIAL SCIENCE

PCS	1b. Geography of Nations	1½
PCC	2. Elementary Economics	1½
PCC	3. Elementary Sociology	1½
PCC	4. Elementary Psychology	1½

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 three 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 continuation 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.

TECHNICAL AND SPECIAL SERVICES

The Department of Continuing Education also carries on specialized services, financed cooperatively with other state or private agencies;

these include the Kansas Rural-Urban Art Program and 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

- ROBERT ARTHUR ANDERSON, Assistant Professor; Assistant Director, Office of Admissions and Registrar (1949, 1959). B. S., M. S., Kansas State University.
- WILLIAM FREDERICK BAEHR, Professor, University Library (1943, 1959). B. S. in L. S., M. A., University of Illinois.
- EDWARD L. BARTH, Program Director, K-State Union (1960). A. B., William Jewell College.
- MELVIN BAUGHMAN, Instructor; Administrative Assistant, Office of Admissions and Registrar (1958). B. S., Kansas State University.
- MABEL GERTRUDE BAXTER, Instructor, Emeritus, University Library (1916, 1947).
- DANIEL D. BEATTY, Business Manager; Professor of Business Administration (1956, 1959). A. B., Hope College; M. B. A., University of Michigan.
- ELLYN MARIE BLACK, Instructor, University Library (1957, 1958). B. S., Kansas State Teachers College of Emporia.
- MILDRED CAMP, Assistant Professor, Emeritus, University Library (1927, 1955). A. B., Eureka College; B. L. S., University of Illinois.
- DOROTHY B. CHAMBERLIN, Physician, Student Health Center (1958). B. S., Middlebury College; M. D., Albany Medical College; M. P. H., Harvard School of Public Health.
- DAVID G. DANSKIN, Associate Director, Counseling Center; Associate Professor of Psychology (1959). A. B., San Diego State College; M. A., Ph. D., Ohio State University.
- ELIZABETH HAMILTON DAVIS, Associate Professor, Emeritus, University Library (1920, 1958). A. B., MacMurray College for Women; B. L. S., University of Illinois.
- MARY JANE DENTON, Residence Hall Director; Instructor (1959). B. A., Friends University; M. S., Southern Illinois University.
- GRACE EMILY DERBY, Professor, Emeritus, University Library (1911, 1950). A. B., Western College for Women.
- AUBREY THORNTON EDWARDS, Director of Housing; Associate Professor of Psychology (1945, 1949). B. S., M. S., Kansas State University.
- GEORGE H. FADENRECHT, Assistant Professor, University Library (1953, 1956). B. A., Tabor College; M. A., University of Kansas; M. A. in L. S., University of Michigan.
- KENNEY LEE FORD, Alumni Secretary (1928). B. S., M. S., Kansas State University.
- ELLSWORTH M. GERRITZ, Director of Admissions and Registrar; Professor (1954). B. E., St. Cloud State Teachers College; M. S., Ph. D., University of Minnesota.
- RANDOLPH FORNEY GINGRICH, Professor; Administrative Assistant in charge of the Physical Plant (1923, 1959). B. S., University of Nebraska; M. S., Kansas State University.
- ERNEST JACOB GOERTZEN, Instructor; University Library (1957). A. B., Bethel College; M. S. in L. S., University of Illinois.
- GLADYS F. GRACE, Residence Hall Director; Instructor (1956). B. A., Dakota Wesleyan University; M. A., University of South Dakota.
- DOROTHY MAY HAMER, Assistant Dean of Women, Emeritus (1941, 1946). A. B., University of Illinois; M. A., Columbia University.
- KENNETH M. HEYWOOD, Director of Development (1956). B. S., Kansas State University; M. A., University of Wyoming.
- HAROLD HOWE, Dean of Graduate School; Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1925, 1945). B. S., Kansas State University; M. S., University of Maryland; Ph. D., University of Wisconsin; LL. D., St. Benedict's College.
- DONALD PAUL HOYT, Director; Counseling Center; Associate Professor of Psychology (1954, 1958). B. S., University of Illinois; M. A., Ph. D., University of Minnesota.
- CARROLL EARL KENNEDY, Counselor; Instructor in Psychology (1954). A. B., Wheaton College; M. S., Kansas State University.
- WENDELL ROBERT KERR, Veterans Service Officer; Assistant Professor; Assistant to Housing Director (1947, 1957). B. S., M. S., Kansas State University.
- LOREN V. KOTTNER, Director of the Kansas State Union (1955). B. A., Nebraska Wesleyan University.
- BENJAMIN WILLIAM LAFENE, Director of the Student Health Center; Physician (1946, 1948). B. S., Michigan State University; M. D., Western Reserve University.
- MARGARET N. LAHEY, Associate Dean of Students; Associate Professor (1957). B. S., M. A., University of Minnesota.
- JAMES ALLEN MCCAIN, President (1950). A. B., LL. D., Wofford College; M. A., Duke University; Ed. D., Stanford University.
- JESSIE McDOWELL MACHIR, Registrar, Emeritus (1913, 1914).
- JAMES C. MATHEWS, Instructor, University Library (1958). B. S., Kansas State College of Pittsburg; M. S. in L. S., Kansas State Teachers College of Emporia.
- MAX W. MILBOURN, Assistant to the President; Associate Professor of Journalism (1949, 1957). A. B., University of Wichita.
- CAROL LEE OWSLEY, Instructor, University Library (1942, 1947). B. S., M. S., Kansas State University.

- BERNICE HARRIETT PATON, Assistant Professor, University Library (1947). B. A., University of Oklahoma; B. S., Columbia University; M. A., University of Michigan.
- MARTHA H. PATTERSON, Instructor, University Library (1953). B. A., University of Arkansas; B. S. in L. S., University of Illinois.
- RALPH H. PERRY, Comptroller (1946, 1953). B. S., Kansas State University.
- CHESTER E. PETERS, Director of the Placement Center (1953). B. S., M. S., Kansas State University; Ph. D., University of Wisconsin.
- ALBERT LEROY PUGSLEY, Dean of Academic Administration; Professor of Structural Engineering (1943, 1951). B. S. in C. E., South Dakota State College; M. Arch., Harvard University. LL. D., Kansas Wesleyan University. Professional Engineer. Registered Architect.
- EDITH MARY RIDGEWAY, Assistant Professor, University Library (1943, 1956). A. B., Kansas State Teachers College of Emporia; B. S. in L. S., University of Illinois; M. S., Kansas State University.
- MARY EILLEN ROBERTS, Assistant Professor, University Library (1938, 1943). B. S., Kansas State University; B. S. in L. S., University of Illinois; A. M., University of Michigan.
- CARL ROBERT ROCHAT, Director of News Bureau; Associate Professor of Journalism (1953, 1954). B. S., Kansas State University; M. S., University of Illinois.
- ALICE ANN SCHMIDT, Instructor, University Library (1959). B. A., Kansas State Teachers College of Emporia; M. S. in L. S., Western Reserve University.
- ROBERT J. SIGG, Instructor; Assistant to the Director, Office of Admissions and Registrar (1959). B. S., M. S., Kansas State University.
- VIOLA E. STONE, Residence Hall Director; Instructor (1957, 1959).
- KAY WILSON SUTTLES, Residence Hall Director; Instructor (1958). A. B., Muskingum College; M. A., Syracuse University.
- ROLAND Q. SWAIM, Assistant Director of the Placement Center (1957). B. S., Kansas State Teachers College of Emporia; M. S., Kansas State University.
- THOBURN TAGGART, JR., Instructor, University Library (1958). B. A., University of the South; M. A., George Peabody College for Teachers.
- RICHARD LEE TAYLOR, Instructor, University Library (1956). B. S., Western Illinois State College; M. S., University of Illinois.
- CLARENCE W. THOMAS, JR., Residence Hall Director; Instructor (1955). B. S., M. S., Kansas State University.
- WILLIAM C. TREMMEL, Director of Student Religious Activities; Associate Professor of Philosophy (1956, 1959). A. B., Denver University; Th. M. and Th. D., Iliff School of Theology.
- MELVIN J. VOIGT, Professor; University Librarian (1959). A. B., Chaffey College; A. B. in L. S., A. M. in L. S., University of Michigan.
- ROGER KEITH WALLACE, Consulting Radiologist (1954). B. S., M. S., University of South Dakota; M. D., University of Nebraska.
- FOREST L. WHAN, Professor; Director of Summer School and Institutional Research (1953, 1960). B. S., Kansas State University; M. A., University of Illinois; Ph. D., State University of Iowa.
- HERBERT J. WUNDERLICH, Dean of Students; Professor of Education (1955). B. S., University of Idaho; M. A., Harvard University; Ed. D., Stanford University.

School of Agriculture

- ERWIN ABMEYER, Assistant Professor of Horticulture; Assistant Pomologist, Northeast Kansas Experiment Fields (1934, 1935). B. S., Kansas State University.
- LOUIS CORNELIUS AICHER, Professor of Animal Husbandry, Emeritus (1921, 1957). B. S., Kansas State University.
- KLING LEROY ANDERSON, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1936, 1946). B. S., University of California; M. S., Kansas State University; Ph. D., University of Nebraska.
- LAUREL E. ANDERSON, Associate Professor of Agronomy; Associate Agronomist (Weed Control), Agr. Exp. Sta. (1953, 1958). B. S., M. S., Ph. D., University of Minnesota.
- C. ANCEL ARMSTRONG, Instructor in Dairy Husbandry; Assistant in Dairy Improvement, Agr. Exp. Sta. (1958). B. S., Kansas State University.
- C. HARRY ATKINSON, Associate Professor of Agronomy; Soil Scientist, Soil Conservation Service, U. S. D. A., Agr. Exp. Sta. (1949). B. S., M. S., Pennsylvania State University.
- CLIFF ERRETT AUBEL, Professor of Animal Husbandry; Animal Husbandman, Agr. Exp. Sta. (1915, 1938). B. S., Pennsylvania State University; M. S., Kansas State University; Ph. D., University of Minnesota.
- THOMAS BURT AVERY, Professor; Head of Department of Poultry Husbandry; Poultry Husbandman in charge, Agr. Exp. Sta. (1937, 1954). B. S., M. S., Kansas State University.
- MILBURNE CLINTON AXELTON, Instructor in Agronomy; Assistant Agronomist, Southwest Kansas Experiment Fields (1929, 1951); B. S., Kansas State University.
- EVANS E. BANBURY, Associate Professor; Superintendent in charge, Colby Branch Agr. Exp. Sta. (1946, 1955). B. S., Kansas State University.
- FRANCIS L. BARNETT, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1956, 1959). B. S., McGill University (Canada); M. S., Ph. D., Pennsylvania State University.

- ERLE EDWIN BARTLEY, Professor of Dairy Husbandry; Dairy Nutritionist, Agr. Exp. Sta. (1949, 1958). B. S., Allahabad University (India); M. S., Ph. D., Iowa State University.
- RICHARD BASSETTE, Assistant Professor of Dairy Husbandry; Assistant Dairy Husbandman, Agr. Exp. Sta. (1958). B. S., M. S., Ph. D., University of Maryland.
- WILLIAM MAYFIELD BAXTER, Instructor and Assistant to the Superintendent, Fort Hays Agr. Exp. Sta. (1949, 1952). B. S., Kansas State University.
- GLENN H. BECK, Director of Agricultural Experiment Station and Assistant Director of the School of Agriculture (1936, 1956). B. S., University of Idaho; M. S., Kansas State University; Ph. D., Cornell University.
- FLOYD WAYNE BELL, Professor of Animal Husbandry, Emeritus (1918, 1958). B. S., Cornell University.
- ORVILLE WILLARD BIDWELL, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1950, 1954). A. B., Oberlin College; B. S., Ph. D., Ohio State University.
- ROBERT A. BOHANNON, Associate Professor of Agronomy; Associate Agronomist, Agr. Exp. Sta. (1951, 1958). B. S., Michigan State University; M. S., Kansas State University; Ph. D., University of Illinois.
- FRED W. BOREN, Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agr. Exp. Sta. (1957). B. S., A. & M. College of Texas; M. S., Kansas State University.
- ROGER B. BOREN, Instructor in Entomology; Agr. Exp. Sta.; Assistant State Apiarist (1957). B. S., M. S., Mississippi State College.
- CHARLES FREDERICK BORTFELD, Associate Professor of Agricultural Economics; Associate Economist, Agr. Exp. Sta. (1948). B. S., M. A., University of Nebraska; Ph. D., University of Minnesota.
- SIDNEY A. BOWERS, Soil Scientist, U. S. D. A., Agricultural Research Service (1958). B. S., Brigham Young University; M. S., Kansas State University.
- LOWELL BRANDNER, Associate Professor; Agricultural Editor (1947, 1953). A. B., B. S., Emporia State Teachers College; M. S., Kansas State University; Ph. D., University of Wisconsin.
- JOHN EDWIN BRAUM, Assistant Professor of Agronomy; Assistant Agronomist, East Central Kansas Experiment Fields (1951, 1952). B. S., Kansas State University.
- JOHN R. BRETHOUR, Instructor; Assistant Animal Husbandman, Fort Hays Branch Agr. Exp. Sta. (1957). B. S., Kansas State University; M. S., Oklahoma State University.
- CHRISTIAN C. BURKHARDT, Assistant Professor of Entomology; Assistant Entomologist (1951, 1955). B. S., M. S., Kansas State University.
- LELAND EVERETT CALL, Dean and Director, Emeritus (1907, 1946). B. S., M. S., Ohio State University.
- RONALD WAYNE CAMPBELL, Associate Professor of Horticulture; Associate Pomologist, Agr. Exp. Sta. (1946, 1949). B. S., M. S., Kansas State University; Ph. D., Michigan State University.
- WILLIAM JOHN CARPENTER, Associate Professor of Horticulture; Associate Floriculturist, Agr. Exp. Sta. (1953, 1958). B. S., University of Maryland; M. S., Ph. D., Michigan State University.
- ALFRED J. CASADY, Instructor in Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1949, 1955). B. S., M. S., Kansas State University.
- WILLIAM STEVEN CHEPIL, Professor of Agronomy; Agronomist, U. S. D. A. (1948). B. S., M. S., University of Saskatchewan (Canada); Ph. D., University of Minnesota.
- ALFRED LESTER CLAPP, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1915, 1939). B. S., M. S., Kansas State University.
- THOMAS JOSEPH CLAYDON, Associate Professor of Dairy Husbandry; Associate Dairy Husbandman, Agr. Exp. Sta. (1946). B. S. A., University of Saskatchewan (Canada); M. S., Ph. D., Iowa State University.
- WILLIAM J. COLLINS, Assistant Professor of Dairy Husbandry; Assistant in Dairy Improvement, Agr. Exp. Sta. (1958). B. S., Montana State College; M. S., Cornell University.
- THEODORE J. COLSON, Instructor in Dairy Husbandry, Agr. Exp. Sta. (1959). B. S., Kansas State University.
- HARRY H. CONVERSE, Agricultural Engineer, U. S. D. A., Off Farm Conditioning, Handling and Storage of Grain; Agr. Exp. Sta. (1954). B. S., M. S., Kansas State University.
- RUFUS FRANCIS COX, Professor; Head of Department of Animal Husbandry; Animal Husbandman in charge, Agr. Exp. Sta. (1930, 1950). B. S., Oklahoma State University; M. S., Iowa State University; Ph. D., Cornell University.
- JAMES V. CRAIG, Associate Professor of Poultry Husbandry; Associate Poultry Husbandman, Agr. Exp. Sta. (1955). B. S., M. S., University of Illinois; Ph. D., University of Wisconsin.
- FLOYD EWING DAVIDSON, Professor and Superintendent in charge, Mound Valley Branch Agr. Exp. Sta. (1934, 1952). B. S., M. S., Kansas State University.
- CHARLES DeFOREST DAVIS, Professor of Agronomy, Emeritus (1921, 1949). B. S., M. S., Kansas State University.
- CHESTER P. DAVIS, Associate Agricultural Engineer, U. S. D. A., Heat Pump Experiments (1954). B. S., Oklahoma State University; M. S., Purdue University.
- LESTER J. DePEW, Assistant Professor of Entomology; Assistant Entomologist, (P. O. Garden City) (1954, 1959). B. S., Colorado A & M; M. S., University of Minnesota.
- GILBERT R. DODGE, Assistant Professor and Administrative Assistant, Agr. Exp. Sta. (1958). B. S., Kansas State University; C. P. A., Kansas.
- WILBERT WILLIAM DUTSMAN, Associate Professor and Superintendent in charge, Fort Hays Branch Exp. Sta. (1941, 1952). B. S., Kansas State University.

- ROSCOE ELLIS, JR., Associate Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1948, 1955). B. S., M. S., Kansas State University; Ph. D., University of Wisconsin.
- ANDREW BRIAN ERHART, Professor and Superintendent in charge, Garden City Branch Agr. Exp. Sta. (1931, 1952). B. S., Kansas State University.
- ELBERT L. ESHBAUGH, Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1945, 1952). B. S., M. S., Kansas State University.
- EARL LeROY FARMER, Assistant Professor of Dairy Husbandry; Assistant in Dairy Improvement, Agr. Exp. Sta. (1949). B. S., University of Missouri; M. S., Kansas State University.
- EUGENE PATRICK FARRELL, Associate Professor of Flour and Feed Milling Industries; Milling Technologist, Agr. Exp. Sta. (1949, 1954). B. S., M. S., Kansas State University.
- FRANCIS DAVID FARRELL, President, Emeritus (1918, 1943). B. S., Utah State Agricultural College; Agr. D., University of Nebraska; LL. D., Washburn Municipal University.
- GEORGE ALBERT FILINGER, Professor of Horticulture; Pomologist, Agr. Exp. Sta. (1931, 1946). B. S., M. S., Kansas State University; Ph. D., Ohio State University.
- WILLIAM RAY FINDLEY, Associate Agronomist, U. S. D. A. (1956). M. S., Kansas State University.
- KARL FREDERICK FINNEY, Professor of Flour and Feed Milling Industries; Chemist, U. S. D. A., Agr. Exp. Sta. (1938, 1948). A. B., Kansas Wesleyan University; B. S., M. S., Kansas State University.
- JAMES R. FLEMING, Instructor; Assistant in Flour and Feed Milling Industries, Agr. Exp. Sta. (1956, 1958). B. S., University of Nebraska.
- FORREST CHARLES FOUNTAINE, Professor of Dairy Husbandry; Dairy Nutritionist, Agr. Exp. Sta. (1947). B. S., University of Wisconsin; M. S., Ph. D., University of Minnesota.
- JACK L. FRY, Temporary Assistant Professor of Poultry Husbandry; Assistant Poultry Husbandman, Agr. Exp. Sta. (1959). B. S., M. S., Oklahoma State University; Ph. D., Purdue University.
- AL J. GEHRT, Administrative Assistant, U. S. D. A., Agricultural Research Service (1958).
- RUFF L. GENTRY, Assistant Instructor in Agronomy, Agr. Exp. Sta. (1956). B. S. A., M. S., University of Arkansas.
- DON LaDOYT GOOD, Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agr. Exp. Sta. (1947, 1954). B. S., Ohio State University; M. S., Kansas State University; Ph. D., University of Minnesota.
- ALBERT H. GRAVES, Agricultural Engineer, U. S. D. A., Handling and Storage of Grain; Agr. Exp. Sta. (1956). B. S., Kansas State University.
- JAMES KIBLER GREIG, JR., Assistant Professor of Horticulture; Assistant Olericulturist, Agr. Exp. Sta. (1952). B. S., M. S., University of Arkansas; Ph. D., Kansas State University.
- DONALD W. GRIMES, Instructor; Assistant in Irrigation, Garden City Branch Agr. Exp. Sta. (1956). B. S., M. S., Oklahoma State University.
- ROY E. GWIN, JR., Instructor, Assistant in Irrigation, Tribune Branch Agr. Exp. Sta. (1957, 1958). B. S., Kansas State University.
- HAROLD LEROY HACKEROTT, Assistant Professor; Assistant Agronomist, Fort Hays Branch Agr. Exp. Sta. (1954). B. S., M. S., Kansas State University.
- FRED BENTON HADLE, Instructor in Horticulture; Assistant Pomologist, Agr. Exp. Sta. (1951). B. S., M. S., Kansas State University.
- RALPH G. HADLEY, Agricultural Aide, U. S. D. A., Agricultural Research Service (1959).
- CHARLES V. HALL, Assistant Professor of Horticulture; Assistant Olericulturist, Agr. Exp. Sta. (1953). B. S., M. S., University of Arkansas; Ph. D., Kansas State University.
- RONALD JOHN HANKS, Agent (Soil Scientist), U. S. D. A. (1953). B. S., Brigham Young University; M. S., Ph. D., University of Wisconsin.
- WALLACE W. HARRIS, Assistant Professor; Assistant Agronomist, Colby Branch Agr. Exp. Sta. (1954, 1955). B. S., M. S., Kansas State University.
- T. L. HARVEY, Assistant Professor of Entomology; Assistant Entomologist, Agr. Exp. Sta. (1954, 1957). B. S., M. S., Kansas State University.
- WALDON H. HASTINGS, Associate Professor of Flour and Feed Milling Industries; Associate Feed Technologist, Agr. Exp. Sta. (1955). B. S., University of Maine; M. S., University of Minnesota; Ph. D., University of Massachusetts.
- GEORGE M. HERRON, Instructor; Assistant in Soils, Garden City Branch Agr. Exp. Sta. (1956). B. S., M. S., Oklahoma State University.
- LEONARD B. HERTZ, Assistant Professor of Agronomy; Assistant Agronomist, Agr. Exp. Sta. (1955, 1957). B. S., M. S., Ph. D., University of Wisconsin.
- ELMER GEORGE HEYNE, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1936, 1947). B. S., University of Nebraska; M. S., Kansas State University; Ph. D., University of Minnesota.
- JAMES ARTHUR HOBBS, Professor of Agronomy; Agronomist, Agr. Exp. Sta. (1950, 1958). B. S., M. S., University of Manitoba (Winnipeg); Ph. D., Purdue University.
- JULIAN ADAIR HODGES, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1923, 1941). B. S., M. S., University of Kentucky; A. M., Ph. D., Harvard University.
- LEO MICHAEL HOOVER, Professor of Agricultural Economics; Agricultural Economist, Agr. Exp. Sta. (1947, 1959). B. S., Kansas State University; M. S., Iowa State University; Ph. D., Harvard University.
- RUSSELL C. HOSENEY, Analytical Chemist, U. S. D. A., Agricultural Research Service (1956). B. S., Kansas State University.

- KEITH HUSTON, Associate Professor of Dairy Husbandry; Associate Dairy Husbandman, Agr. Exp. Sta. (1954). B. S., M. S., Ph. D., University of Wisconsin.
- JOSEPH D. IVES, Instructor in Agronomy, Assistant Agronomist, Mound Valley Agr. Exp. Sta. (1958). B. A., State University of Iowa; M. S., University of Minnesota.
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- JOHN ALEXANDER JOHNSON, Professor of Flour and Feed Milling Industries; Associate in Milling and Baking Research, Agr. Exp. Sta. (1940, 1955). B. S., North Dakota Agricultural College; M. S., Kansas State University; Ph. D., University of Minnesota.
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- PAUL LEO KELLEY, Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1943, 1957). B. S., M. S., Kansas State University; Ph. D., Iowa State University.
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- HERBERT KNUTSON, Professor; Head, Department of Entomology; Entomologist in charge; Agr. Exp. Sta. (1953). A. B., Wesleyan College; M. S., Southern Methodist University; Ph. D., University of Minnesota.
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- JOSEPH WENDELL KOUDELE, Associate Professor of Agricultural Economics; Associate Agricultural Economist, Agr. Exp. Sta. (1947, 1958). B. S., University of Nebraska; M. S., University of Minnesota; Ph. D., Michigan State University.
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- MILTON LLOYD MANUEL, Professor of Agricultural Economics; Agricultural Economist (Agricultural Cooperatives), Agr. Exp. Sta. (1945, 1959). B. S., M. S., Kansas State University; Ph. D., University of Minnesota.
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- RAYMOND JOHN AGAN, Associate Professor of Education (1958). B. S., M. S., Iowa State University; Ed. D., University of Missouri.
- OSCAR WILLIAM ALM, Professor of Psychology, Emeritus (1929, 1957). A. B., University of Nebraska; M. A., Columbia University; Ph. D., University of Minnesota.
- INEZ ALSOP, Associate Professor of History (1923, 1941). B. S., Kansas State Teachers College (Emporia); M. S., University of Kansas.
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- LAURENCE DEAN BARK, Associate Professor of Physics; Associate Meteorologist, Agr. Exp. Sta. (1956). B. S., M. S., University of Chicago; Ph. D., Rutgers University.
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- ALVIN BOYD CARDWELL, 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., University of Chattanooga; M. S., Ph. D., University of Wisconsin.
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- WALTER HUGO EITNER, Instructor in English (1954). A. B., University of Denver; A. M., University of Michigan; Ph. D., University of Denver.
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- FRITZ GUSTAVE KNORR, Head Wrestling Coach; Assistant Professor of Athletics; Assistant Director of Athletics (1942, 1952). B. S., M. S., Kansas State University.
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- ROY CLINTON LANGFORD, Professor of Psychology (1925, 1941). B. S., M. S., Kansas State University; Ph. D., Leland Stanford Junior University.

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- FRANCIS CHOWING LANNING, Assistant Professor of Chemistry (1942, 1946). B. S., M. S., University of Denver; Ph. D., University of Minnesota.
- INGEMAR WALLACE LARSON, Instructor in Zoology (1955, 1957). B. A., Concordia College; M. S., Kansas State University.
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- BORIS LEAF, Professor of Physics (1946, 1954). B. S., University of Washington; Ph. D., University of Illinois.
- LUTHER OMAR LEAVENGOOD, Professor; Head, Department of Music (1945). B. M., University of Kansas; M. M., University of Michigan.
- HORACE B. LEE, Professor of Athletics; Director of Athletics (1956). A. B., Stanford University.
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- JOE HENRY LOEB, Assistant Professor of Education (1956). B. A., Northeastern State College; M. S., Kansas State Teachers College (Pittsburg); Ed. D., University of Arkansas.
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- CLIFTON E. MELOAN, Assistant Professor of Chemistry (1959). B. S., Iowa State University; Ph. D., Purdue University.
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- LUCILE OSBORN RUST, Professor of Education (1924, 1929). B. S., Kansas State Teachers College (Pittsburg); M. S., Kansas State University.
- ADELBERT BOWER SAGESER, Professor of History (1938, 1941). A. B., Nebraska State Teachers College (Wayne); M. A., Ph. D., University of Nebraska.
- FRANZ SAMELSON, Assistant Professor of Psychology (1957). Diploma in Psychology, University of Munich (Germany); Ph. D., University of Michigan.
- RALPH GRAFTON SANGER, Professor; Head, Department of Mathematics, Agr. Exp. Sta. (1946). B. S., M. S., Ph. D., University of Chicago.
- PAUL STEWARD SCHMIDT, Associate Professor of English (1951, 1959). B. A., State University of Iowa; M. A., University of Chicago; Ph. D., University of Minnesota.
- WILLIAM GEORGE SCHRENK, Professor of Chemistry; Physical Chemist, Agr. Exp. Sta. (1938, 1951). A. B., Westmar College; M. S., Ph. D., Kansas State University.
- ROBERT HANEY SCOTT, Instructor in Economics (1957). A. B., M. A., University of Kansas.
- SCOTT SEARLES, JR., Associate Professor of Chemistry (1952). B. A., M. A., University of California; Ph. D., University of Minnesota.
- HUBER SELF, Assistant Professor of Geography (1947, 1953). B. S., Central Oklahoma State College; M. S., Oklahoma State University.
- HOWARD P. SHANNON, Assistant Professor of Athletics; Assistant Basketball Coach (1954). B. S., Kansas State University.
- CLAUDE WESLEY SHENKEL, JR., Associate Professor of Geology (1949, 1958). B. S., Kansas State University; M. S., Ph. D., University of Colorado.
- DONALD FOX SHOWALTER, Professor of Psychology (1928, 1957). A. B., M. A., University of Nebraska; Ph. D., University of Kansas.
- RALPH SILKER, Professor of Chemistry (1941, 1948). B. A., University of Dubuque; M. S., Ph. D., State University of Iowa.
- WEBSTER HARRISON SILL, JR., Associate Professor of Botany; Associate Plant Pathologist, Agr. Exp. Sta. (1952, 1956). B. S., West Virginia Wesleyan College; M. A. Boston University; Ph. D., University of Wisconsin.
- FLOYD B. SLOAT, Assistant Professor of Mathematics (1946, 1947). B. A., Ouachita College; M. A., University of Arkansas.

- JEAN C. SLOOP, Instructor in Music (1959). B. A., Gettysburg College; M. A., University of Rochester.
- MARGARET H. SMITH, Instructor in Geography (1946). A. B., Randolph Macon Woman's College; M. A., University of North Carolina; M. S., University of Chicago.
- BENJAMIN LEVI SMITS, Assistant Professor of Chemistry, Emeritus (1926, 1952). B. S., M. S., Ph. D., Michigan State University.
- ROBERT L. SNYDER, Assistant Professor of Speech (1954, 1959). A. B., Wartburg College; M. A., State University of Iowa.
- VERYLE E. SNYDER, Assistant Professor of Physical Education (1954). B. S., M. S., Kansas State University.
- HOMER E. SOCOLOFSKY, Associate Professor of History (1946, 1959). B. S., M. S., Kansas State University; Ph. D., University of Missouri.
- ARTHUR BRADLEY SPERRY, Professor of Geology, Emeritus (1921, 1953). B. S., University of Chicago.
- KARL STACEY, Professor of Geography (1943, 1948, 1959). B. A., M. A., University of Colorado; Ph. D., Clark University.
- WILLIAM L. STAMEY, Associate Professor of Mathematics (1953, 1957). A. B., Colorado State University; M. A., Ph. D., University of Missouri.
- JIM BOB STEPHENSON, Associate Professor of Speech (1960). B. A., M. A., Ph. D., University of Michigan.
- THOMAS BERNARD STEUNENBERG, Professor of Music (1947). B. M., Northwestern University; M. M., University of Michigan; Ph. D., University of Rochester.
- JOSEPH FRANKLIN STOKES, Instructor in Mathematics (1958). B. S., M. A., University of Arkansas.
- CHARLES WILLIAM STRATTON, Professor of Music (1927, 1947). B. M., M. S., Kansas State University.
- WILLIAM TIMOTHY STRATTON, Professor of Mathematics, Emeritus (1910, 1951). A. B., A. M., Indiana University; Ph. D., University of Washington.
- VIVAN LEWIS STRICKLAND, Professor of Education, Emeritus (1917, 1950). A. B., M. S., Ph. D., University of Nebraska.
- ANNA MARIE STURMER, Professor of English, Emerita (1920, 1950). A. B., A. M., University of Nebraska.
- VERNE SEBASTIAN SWEEDLUN, Professor of Social Sciences in General Studies (1941, 1947). A. B., Bethany College; M. A., University of Kansas; Ph. D., University of Nebraska.
- ANITA GRIMM TAYLOR, Instructor in Speech (1957, 1959). B. S., M. S., Kansas State University.
- CECIL R. TAYLOR, Temporary Assistant Professor of Athletics; Assistant Football Coach (1959). B. S., Kansas State University.
- FRANK JAMES THOMPSON, Assistant Professor of Physical Education (1937, 1949). B. Ed., Minnesota State Teachers College (Mankato); M. Ed., M. Ph. Ed., Springfield College.
- ROBERT THORNTON, Professor of English (1960). B. A., Wesleyan University; M. A., Western Reserve University and Harvard University; Ph. D., Harvard University.
- JEAN LAVON THROCKMORTON, Assistant Professor of Humanities in General Studies (1956). A. B., Friends University; M. A., Ph. D., University of Kansas.
- OTTO WILLIAM TIEMEIER, Associate Professor of Zoology; Associate Wildlife Conservationist, Agr. Exp. Sta. (1947, 1957). A. B., M. A., University of Kansas; Ph. D., University of Illinois.
- HARLAN JEAN TRENNEPOHL, Assistant Professor of Education (1956). B. S., M. S., Kansas State Teachers College (Emporia); Ed. D., University of Colorado.
- DON ARTHUR TRUMBO, Assistant Professor of Psychology (1957, 1959). B. S., Western Michigan University; M. A., Ph. D., Michigan State University.
- LOIS BELLE TURNER, Assistant Professor of History (1946, 1955). B. S., M. S., Kansas State University.
- PAGE C. TWISS, Assistant Professor of Geology (1953, 1959). B. S., M. S., Kansas State University; Ph. D., University of Texas.
- WILLEM VAN DER BIJL, Associate Professor of Physics; Associate Meteorologist, Agr. Exp. Sta. (1956). B. Sc., M. Sc., Free University (Netherlands); Ph. D., State University of Utrecht (Netherlands).
- MELVIN H. VOTH, Instructor in Business Administration (1959). B. A., Bethel College; M. B. A., Wichita University.
- WARREN VINCENT WALKER, Associate Professor of Music (1948, 1959). B. A., University of Washington; M. M., Cincinnati Conservatory of Music.
- CHARLES P. WALTERS, Professor of Geology (1936, 1958). B. S., M. S., Kansas State University; Ph. D., Cornell University.
- LOUIS P. WASHBURN, Professor of Physical Education, Emeritus (1926, 1954). B. S., Carleton College; B. P. E., M. P. E., Springfield College.
- RAYMOND AUGUST WAUTHIER, Assistant Professor of Physical Education (1949). B. S., Albion College; M. S., Drake University.
- STANLEY WEARDEN, Associate Professor of Statistics; Associate Statistical Consultant, Agr. Exp. Sta. (1957, 1959). B. S., St. Louis University; M. S., University of Houston; Ph. D., Cornell University.
- DOUGLAS W. WEAVER, Temporary Professor of Athletics; Head Football Coach (1960). B. A., Michigan State University.

- ALFRED EVERETT WHITE, Professor of Mathematics, Emeritus (1909, 1950). B. S., M. S., Purdue University.
- MARY FRANCES WHITE, Assistant Professor of English (1947, 1951). B. S., M. S., Kansas State University; Ph. D., Denver University.
- CARRELL HENRY WHITNAH, Professor of Chemistry; Chemist, Agr. Exp. Sta. (1929, 1957). B. A., University of Nebraska; M. S., University of Chicago; Ph. D., University of Nebraska.
- GEORGE DENT WILCOXON, Professor of History and General Studies (1946, 1948). A. B., M. A., Ph. D., University of California.
- EDWARD JOSEPH WIMMER, Professor of Zoology (1928, 1941). B. A., M. A., Ph. D., University of Wisconsin.
- PAUL SIDNEY WINGARD, Instructor in Geology (1957). A. B., M. S., Miami University.
- MORICE FREDERICK WINTER, Head Basketball Coach; Professor of Athletics (1947, 1953). B. S., University of Southern California.
- GRACE S. WOLDT, Instructor in Mathematics (1946). A. B., Ohio Wesleyan University.
- MAURICE DUFFIELD WOOLF, Professor of Education (1945, 1952). B. S., Northeast Missouri State Teachers College; M. S., Ed. D., University of Missouri.
- HELEN IAMS WROTEN, Assistant Professor of English (1949). B. S., M. S., Kansas State University; Ph. D., University of Illinois.
- PAUL McCLURE YOUNG, Associate Dean; Director of Summer School; Professor of Mathematics (1947, 1957). A. B., Miami University; M. A., Ph. D., Ohio State University.
- JOSEF ZVEROW, Temporary Instructor in Music (1957). M. S., Roosevelt School of Music.

DEPARTMENT OF AIR SCIENCE

- HAROLD OWEN DENTON, Assistant Professor of Air Science (1958), B. B. A., Baylor University; Squadron Officers' School; Supply Officers' School.
- WALTER JAMES FORD, Assistant Professor of Air Science (1958). B. A., Coe College; Squadron Officers' School.
- VICTOR HARRY JASHINSKI, Assistant Professor of Air Science (1959). M. A., George Washington University; B. A., Sacramento State College.
- KENT MARCUS McKUSKER, Assistant Professor of Air Science (1958). B. S., University of Maryland.
- JAMES DONALD SCHLATTER, Assistant Professor of Air Science (1959). A. B., Indiana University.
- GEORGE ROBERT SMITH, Assistant Professor of Air Science (1959). B. A., Fresno State College; Air Command and Staff College.
- GORDON KENNETH STALLINGS, Professor of Air Science (1958). B. A., American International College; Armed Forces Staff College; Command and General Staff School.

DEPARTMENT OF MILITARY SCIENCE

- MALCOLM LEE COY, Assistant Professor of Military Science (1959). B. A., M. A., State University of Iowa; The Armor Officers' Advanced Course.
- WILLARD FREDERICK FRANTZ, JR., Assistant Professor of Military Science (1957). B. CE., University of Minnesota; The Engineers' School.
- EARL FRANKLIN GREENE, Associate Professor of Military Science (1960). B. S., University of Maryland; The Artillery Officers' Advanced Course.
- EARNEST HADEN LANCASTER, Assistant Instructor in Military Science (1956).
- CARL FREEMAN LYONS, Professor of Military Science (1958). B. S., United States Military Academy; Command and General Staff College; Air University; Infantry Officers' Advanced Course.
- HARRISON M. MURPHY, Instructor in Military Science (1954).
- NATHAN PLOTKIN, Assistant Professor of Military Science (1960). B. A., University of Illinois; Associate Signal Officers' Course; Liaison Pilot Course.
- DONALD ARTHUR YODER, Assistant Professor of Military Science (1958). B. S., University of Wichita; Associate Infantry Company Officers' Course.

School of Engineering and Architecture

- JASON CARL ANNIS, Instructor in Mechanical Engineering (1959). B. S., University of Minnesota; M. S., Michigan College of Mining and Technology.
- FREDRIC CARL APPL, Associate Professor of Mechanical Engineering (1960). B. S., M. S., Ph. D., Carnegie Institute of Technology.
- HERBERT DEAN BALL, Instructor in Mechanical Engineering (1958). B. S., M. S., University of Nebraska.
- HERBERT TEMPLETON BATES, Associate Professor of Chemical Engineering (1958). B. S., Iowa State University; M. S., Virginia Polytechnic Institute; Ph. D., Iowa State University.
- MORRIS HENRY BECKMAN, Associate Professor of Architecture (1948, 1956). B. S., Illinois Institute of Technology. Registered Architect.
- EDWARD CLARENCE BERTNOLLI, Instructor in Electrical Engineering (1957, 1958). B. S., Kansas State University.
- BOYD BERTRAND BRAINARD, Professor of Mechanical Engineering (1923, 1938). B. S., University of Colorado; S. M., Massachusetts Institute of Technology. Professional Engineer.
- DANNY NEIL BURGESS, Instructor in Applied Mechanics (1956, 1958). B. S., M. S., Kansas State University.

- EARLE CONRAD BYERS, Assistant Professor of Industrial Arts (1946, 1956). A. B., Greenville College; M. S., Kansas State University.
- NORMAN REDMAN BYERS, Instructor in Mechanical Engineering (1947, 1958). B. S., M. S., Kansas State University. Professional Engineer.
- GORDON EUGENE CARLSON, Instructor in Electrical Engineering (1959). B. S., M. S., Kansas State University.
- WALTER WILLIAM CARLSON, Professor of Industrial Engineering and Industrial Arts, Emeritus (1910, 1950). B. S., M. E., Kansas State University. Professional Engineer.
- ARTHUR MAXWELL CARSON, JR., Assistant Professor of Industrial Engineering (1959). B. I. E., General Motors Institute of Technology; M. S., University of Illinois.
- THEODORE AVERY CHADWICK, Professor of Architecture (1927, 1947). B. S., North Dakota Agricultural College; M. Arch., Massachusetts Institute of Technology. Registered Architect.
- ROBERT WYNANDUS CLACK, Assistant Professor of Nuclear Engineering (1955, 1959). B. S., U. S. Naval Academy. Professional Engineer.
- JOHN PAUL CLIFTON, Associate Professor of Industrial Engineering; Industrial Engineer, Engg. Exp. Sta. (1947, 1956). B. S., University of Kansas; M. S., Kansas State University. Professional Engineer.
- LOWELL EDWIN CONRAD, Professor of Civil Engineering, Emeritus (1908, 1949). B. S., C. E., Cornell College; M. S., Lehigh University. Professional Engineer.
- VINCENT JUNIOR COOL, Assistant Professor of Architecture (1957). B. S., Kansas State University. Registered Architect.
- MELVIN CLYDE COTTOM, Assistant Professor of Electrical Engineering (1955). B. S., M. S., University of Kansas. Professional Engineer.
- ROBERT ROSSITER COTTON, Assistant Professor of Architecture (1958). B. Arch., Massachusetts Institute of Technology; M. S., Pennsylvania State University.
- ROBERT EUGENE CRANK, Assistant Professor of Mechanical Engineering (1947, 1951). B. S., M. S., Kansas State University. Professional Engineer.
- JAMES FRED CRARY, Assistant Professor of Applied Mechanics (1947, 1952). B. S., M. S., Kansas State University. Professional Engineer.
- WILLIAM WESLEY CRAWFORD, Professor of Civil Engineering, Emeritus (1923, 1949). B. Di., M. Di., Iowa State Teachers College; A. B., State University of Iowa; Iowa State University.
- THOMAS FRANKLYN CREECH, Instructor in Applied Mechanics (1957). B. S., Kansas State University.
- EARL GILBERT DARBY, Professor of Industrial Arts (1941, 1952). B. S., M. S., Kansas State University.
- MARTIN DECKER, JR., Instructor in Agricultural Engineering; Assistant Agricultural Engineer, Agr. Exp. Sta. (1951). B. S., M. S., Kansas State University. Professional Engineer.
- GERALD WILLIAM DEIBLER, Instructor in Drawing and Painting (1956). B. A., University of Nebraska; M. F. A., University of Colorado.
- VERNON PHILLIP DEINES, Instructor in Architecture (1957, 1959). B. S., Kansas State University. Professional Engineer.
- HARVEY FREDERICK DIETRICH, Assistant Professor of Industrial Arts (1948, 1957). B. S., Kansas State University.
- ALLEY HUGH DUNCAN, Professor of Mechanical Engineering (1942, 1954). B. S., M. S., Kansas State University. Professional Engineer.
- JACK CLYDE DURGAN, Assistant Professor of Architecture (1954, 1958). B. Arch., Oklahoma State University; M. S., Kansas State University. Registered Architect.
- MERRILL AUGUSTUS DURLAND, Dean; Professor of Mechanical Engineering; Director, Engg. Exp. Sta. (1919, 1947). B. S., M. S., Kansas State University. Professional Engineer.
- LAWRENCE EDWARD EHLERS, Instructor in Applied Mechanics (1957). B. S., M. S., Kansas State University.
- JOHN ROBERT FAGEN, Instructor in Nuclear Engineering (1959). B. S., University of Nebraska.
- GUSTAVE EDMUND FAIRBANKS, Professor of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1941, 1957). B. S., M. S., Kansas State University. Professional Engineer.
- LIANG-TSENG FAN, Assistant Professor of Chemical Engineering (1957, 1959). B. S., National Taiwan University; M. S., Kansas State University; Ph. D., West Virginia University.
- FREDERICK CHARLES FENTON, Professor of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1928). B. S., M. S., Iowa State University. Professional Engineer.
- EMIL CARL FISCHER, Professor; Head, Department of Architecture and Allied Arts; Architect, Engg. Exp. Sta. (1955). A. B., Columbia College; B. S. in Arch., M. S., Columbia University. Registered Architect.
- VERNON R. FISH, Instructor in Mechanical Engineering (1959). B. S., Kansas State University.
- ARTHUR ORAN FLINNER, Professor of Mechanical Engineering (1929, 1947). B. S., M. S., Kansas State University; S. M., Massachusetts Institute of Technology. Professional Engineer.
- FORREST FAYE FRAZIER, Professor of Civil Engineering, Emeritus (1911, 1954). C. E., Ohio State University. Professional Engineer.
- JOHN WILLIAM FUNK, Assistant Professor of Agricultural Engineering; Assistant Engineer, Agr. Exp. Sta. (1947, 1951). B. S., M. S., Kansas State University. Professional Engineer.
- MONROE LYLE FUNK, Instructor in Civil Engineering (1956). B. S., M. S., Kansas State University.
- UGO OSCAR GAGLIARDI, Assistant Professor of Electrical Engineering (1956, 1957). M. S., Columbia University; Dott. Ing., University of Naples.

- KENNETH KING GOWDY, Instructor in Mechanical Engineering; Assistant to Dean (1957, 1959). B. S., Kansas State University.
- ARCHIE RICHARD GRAHAM, Instructor in Mechanical Engineering (1958). B. S., Kansas State University.
- CHARLES AUGUST HALIJAK, Associate Professor of Electrical Engineering (1956). B. S., M. S., Ph. D., University of Wisconsin. Professional Engineer.
- RAYMOND CLARENCE HALL, Assistant Professor of Chemical Engineering (1950, 1952). B. S., Iowa State University; M. S., Kansas State University.
- CARL ULLMAN HANSEN, Instructor in Industrial Engineering (1957). B. S., Kansas State University.
- BURNS EDWARD HEGLER, Instructor in Electrical Engineering (1957). B. S., M. S., Kansas State University. Professional Engineer.
- JOHN CRANSTON HEINTZELMAN, Professor of Architecture (1947, 1954). B. Arch., Massachusetts Institute of Technology; M. Arch., Columbia University. Registered Architect.
- LINN HELANDER, Professor of Mechanical Engineering (1935). B. S., University of Illinois. Professional Engineer.
- JOHN FREDERICK HELM, JR., Professor of Drawing and Painting (1924, 1938). B. D., Syracuse University; D. F. A., Bethany College.
- PING-LIONG HO, Instructor in Electrical Engineering (1957). B. S., University of Wisconsin.
- LELAND STANFORD HOBSON, Professor of Industrial Engineering; Associate Director, Engg. Exp. Sta. (1946, 1953). B. S., Kansas State University. Professional Engineer.
- MURLIN RAY HODGELL, Associate Professor of Architecture (1949, 1957). B. S., Kansas State University; M. S., University of Illinois; M. R. P., Ph. D., Cornell University. Registered Architect.
- TEDDY OMAR HODGES, Professor of Agricultural Engineering (1959). B. S., Texas A. & M.; M. S., Iowa State University; Ph. D., Michigan State University. Professional Engineer.
- WILLIAM HENRY HONSTEAD, Professor of Chemical Engineering; Chemical Engineer, Engg. and Agr. Exp. Sta. (1943, 1957). B. S., M. S., Kansas State University; Ph. D., Iowa State University. Professional Engineer.
- ABRAM ELDRED HOSTETTER, Professor of Industrial Engineering; Metallurgist, Engg. Exp. Sta. (1931, 1952). B. S., McPherson College; M. S., Ph. D., Kansas State University.
- ORVILLE DON HUNT, Professor of Electrical Engineering (1923, 1947). B. S., Washington State University; M. S., Kansas State University. Professional Engineer.
- CLINTON OTTO JACOBS, Assistant Professor of Farm Mechanics (1949, 1955). B. S., M. S., Kansas State University.
- LOUIS MARK JORGENSEN, Professor of Electrical Engineering, Emeritus (1925, 1954). B. S., M. S., Kansas State University. Professional Engineer.
- ALBERT CALVIN KENT, Instructor in Mechanical Engineering (1958). B. S., M. S., University of Missouri.
- RUSSELL MARION KERCHNER, Professor; Head, Department of Electrical Engineering; Electrical Engineer, Engg. Exp. Sta. (1922, 1955). B. S., University of Illinois; M. S., Kansas State University. Professional Engineer.
- WILLIAM ROBERT KIMEL, Professor; Head, Department of Nuclear Engineering; Nuclear Engineer, Engg. Exp. Sta. (1946, 1958). B. S., M. S., Kansas State University; Ph. D., University of Wisconsin. Professional Engineer.
- JOHN EDWARD KIPP, Assistant Professor of Applied Mechanics (1956). B. S., M. S., University of Kansas.
- PHILIP GEORGE KIRMSE, Professor of Applied Mechanics (1942, 1958). B. S., M. S., Ph. D., University of Minnesota.
- ROYCE GERALD KLOEFFLER, Professor of Electrical Engineering (1916, 1923). B. S., University of Michigan; S. M., Massachusetts Institute of Technology. Professional Engineer.
- ALPHIA EUGENE KNAPP, Instructor in Applied Mechanics (1958). B. S., Kansas State University. Professional Engineer.
- HARRY DANIEL KNOSTMAN, Instructor in Applied Mechanics (1957). B. S., Kansas State University.
- ALDEN KRIDER, Associate Professor of Architecture (1949, 1955). B. S., M. S., Kansas State University. Registered Architect.
- WILHELM KARL KUBITZA, Associate Professor of Civil Engineering (1953, 1958). Dipl. Ing., Technical University of Darmstadt. Professional Engineer.
- BENJAMIN GAYLE KYLE, Assistant Professor of Chemical Engineering (1958). B. S., Georgia Institute of Technology; M. S., Ph. D., University of Florida.
- OSCAR VANCE LARMER, Assistant Professor of Drawing and Painting (1950, 1956). B. F. A., University of Kansas; M. F. A., Wichita University.
- GEORGE HERBERT LARSON, Professor; Head, Department of Agricultural Engineering; Agricultural Engineer, Agr. Exp. Sta. (1946, 1956). B. S., M. S., Kansas State University; Ph. D., Michigan State University. Professional Engineer.
- JOHN C. LINDHOLM, Associate Professor of Mechanical Engineering (1960). B. S., Kansas State University; M. S., University of Kansas; Ph. D., Purdue University.
- EDWIN CURGUS LINDLY, Assistant Professor of Applied Mechanics (1949, 1954). B. S., Oklahoma State University; M. S., Purdue University; M. S., Kansas State University. Professional Engineer.
- RALPH IDEN LIPPER, Associate Professor of Agricultural Engineering; Associate Agricultural Engineer, Agr. Exp. Sta. (1946, 1957). B. S., M. S., Kansas State University. Professional Engineer.

- DALE RAYMOND LUMB, Instructor in Electrical Engineering (1959). B. S., M. S., Kansas State University.
- HARRY LEO MANGES, Instructor in Agricultural Engineering: Agricultural Engineer, Agr. Exp. Sta. (1956). B. S., M. S., Kansas State University.
- FERDINANDO MARTONE, Instructor in Electrical Engineering (1959). Dott. Ing., University of Naples.
- FRANK JAMES McCORMICK, Professor of Applied Mechanics (1939, 1947). B. S., M. S., Iowa State University. Professional Engineer.
- JOHN GERALD McENTYRE, Professor of Civil Engineering (1946, 1958). B. S., M. S., Kansas State University; Ph. D., Cornell University. Professional Engineer.
- EUGENE THOMAS McGRAW, Instructor in Architecture (1958). B. A. Arch., Oklahoma State University.
- ENRICO PAUL MERCANTI, Instructor in Mechanical Engineering (1949, 1956). B. S., New York University; M. S., Kansas State University.
- DUANE R. MERRILL, Instructor in Electrical Engineering (1960). B. S., Iowa State University.
- ALVA ERNEST MESSENHEIMER, Assistant Professor of Mechanical Engineering (1942, 1946). B. S., Kansas State University. Professional Engineer.
- KENNETH BRUCE MICHAELS, Instructor in Mechanical Engineering (1958). B. S., Kansas State University.
- SAAD ZAGHLOUL MIKHAIL, Associate Professor of Nuclear Engineering (1958). B. S., M. S., Ph. D., University of Cairo.
- HAROLD JAMES MILLER, Instructor in Architecture (1959). B. S., B. Arch., Kansas State University. Professional Engineer. Registered Architect.
- PAUL LEROY MILLER, JR., Instructor in Mechanical Engineering (1958). B. S., Kansas State University.
- REED FRANKLIN MORSE, Professor; Head, Department of Civil Engineering: Civil Engineer, Engg. Exp. Sta. (1923, 1947). B. A., Cornell College; B. S., Iowa State University; M. S., Kansas State University; Ph. D., Cornell University. Professional Engineer.
- HAROLD HAWLEY MUNGER, Associate Professor of Applied Mechanics (1942, 1954). B. S., M. S., Kansas State University. Professional Engineer.
- HENRY MASON NEELY, JR., Instructor in Mechanical Engineering (1958). B. S., Kansas State University.
- CLARENCE LESLIE NELSON, Instructor in Industrial Arts (1943).
- DWIGHT ALVIN NESMITH, Associate Professor of Engineering, Engg. Exp. Sta. (1948, 1958). B. S., Northwestern University; M. S., Kansas State University.
- JOHN RALPH NEUENSWANDER, Instructor in Electrical Engineering (1958). B. S., University of Kansas.
- RALPH GRIFFITH NEVINS, Professor; Head, Department of Mechanical Engineering: Mechanical Engineer, Engg. Exp. Sta. (1948, 1957). B. M. E., M. S., University of Minnesota; Ph. D., University of Illinois. Professional Engineer.
- FLOYD HOLMES PATTISON, JR., Instructor in Civil Engineering (1958). B. S., Kansas State University.
- ROSS IRWIN PAULI, Assistant Professor of Industrial Arts (1947, 1954). B. A., Westmar College; M. S., Kansas State College of Pittsburg.
- CLINTON ELLICOTT PEARCE, Professor of Mechanical Engineering (1917, 1922). S. B., Massachusetts Institute of Technology; M. S., Cornell University. Professional Engineer.
- ROY EDWARD PIENITKA, Instructor in Mechanical Engineering (1960). B. S., Kansas State University.
- MILTON EDWARD RAVILLE, Professor; Head, Department of Applied Mechanics (1946, 1956). B. S., Norwich University; M. S., Kansas State University; Ph. D., University of Wisconsin. Professional Engineer.
- IRVIN LEIGH REIS, Professor; Head, Department of Industrial Engineering: Industrial Engineer, Engg. Exp. Sta. (1959). B. S., M. S., University of Nebraska; Ph. D., University of Illinois. Professional Engineer.
- WALTER FREDERICK ROBOHN, Assistant Professor of Civil Engineering (1949, 1952). B. S., M. S., Kansas State University. Professional Engineer.
- VERNON HART ROSEBRAUGH, Associate Professor of Civil Engineering (1953, 1954). B. S., Oregon Institute of Technology; B. S., Oregon State College; M. A., University of Portland. Professional Engineer.
- HARRY J. SAUER, JR., Instructor in Mechanical Engineering (1960). B. S., M. S., Missouri School of Mines and Metallurgy.
- MORRIS H. SCHNEIDER, Instructor in Industrial Engineering and Industrial Arts (1960). B. S., University of Nebraska.
- CHARLES HENRY SCHOLER, Professor of Applied Mechanics: Materials Testing Engineer, Engg. Exp. Sta. (1919, 1922). B. S., Kansas State University. Professional Engineer.
- ROY ANDREW SEATON, Dean and Director, Emeritus; Professor of Applied Mechanics, Emeritus (1904, 1954). B. S., M. S., Kansas State University; S. B., Massachusetts Institute of Technology; Sc. D., Northeastern University. Professional Engineer.
- GABE ALFRED SELLERS, Professor of Industrial Engineering (1919, 1946). B. S., M. S., Kansas State University.
- JOHN WALLACE SHUPE, Associate Professor of Applied Mechanics (1948, 1954). B. S., Kansas State University; M. S., University of California; Ph. D., Purdue University.
- WAYNE DELBERT SIEH, Assistant Professor of Mechanical Engineering (1946, 1952). B. S., Kansas State University.

- LAUREN WOODROW SINGLETON, Associate Professor of Applied Mechanics (1956). B. S., Citadel College; M. S., Vanderbilt; M. S., University of Illinois. Professional Engineer.
- EARL LeROY SITZ, Professor of Electrical Engineering (1927, 1948). B. S., Iowa State University; M. S., Kansas State University. Professional Engineer.
- JACOB JAY SMALTZ, Professor of Industrial Engineering (1939, 1952). B. S., Bradley Polytechnic Institute; M. S., Kansas State University.
- HOWARD DeWIGHT SMETHERS, Assistant Professor of Industrial Arts (1947, 1951). B. S., Kansas State Teachers College, Emporia; M. S., Kansas State University.
- BOB LEE SMITH, Assistant Professor of Civil Engineering (1948, 1953). B. S., M. S., Kansas State University. Professional Engineer.
- FLOYD ALONZO SMUTZ, Professor of Mechanical Engineering (1918, 1934). B. S., Kansas State University.
- ROBERT ROSS SNELL, Instructor in Civil Engineering (1957). B. S., M. S., Kansas State University. Professional Engineer.
- PAUL NELSON STEVENSON, Associate Professor of Farm Mechanics (1957). B. S., University of Missouri; M. S., Iowa State University.
- DONALD KARL STROHMEYER, Instructor in Architecture (1957). B. S., University of Kansas; M. S., Kansas State University.
- DELOS CLIFTON TAYLOR, Professor of Applied Mechanics (1931, 1956). B. S., M. S., Kansas State University. Professional Engineer.
- INGOLF EUGENE THORSON, Associate Professor of Architectural Engineering (1948, 1952). B. S., University of Washington. Professional Engineer.
- ELMER JOHN TOMASCH, Associate Professor of Drawing and Painting (1947, 1959). B. S., Western Reserve University; M. S., Kansas State University.
- WILSON TRIPP, Professor of Mechanical Engineering (1936, 1947). B. S., M. S., University of California; Ph. D., University of Illinois. Professional Engineer.
- ISAAC WAKABAYASHI, Instructor in Electrical Engineering (1955). B. S., University of California.
- JOSEPH EVANS WARD, JR., Associate Professor of Electrical Engineering (1940, 1947). B. S., University of Texas; M. S., University of Illinois. Professional Engineer.
- BENTON DUNCAN WEATHERS, Instructor in Electrical Engineering (1958). B. S., M. S., University of Missouri.
- PAUL WEIGEL, Professor of Architecture, Emeritus (1921, 1924). B. Arch., Cornell University. Registered Architect.
- JOHN ADDISON WELKER, Instructor in Architecture (1959). B. Arch., Kansas State University.
- LEO ANDREW WIRTZ, Assistant Professor of Electrical Engineering (1947, 1957). B. S. in E. E., B. S. in B. A., M. S., Kansas State University. Professional Engineer.
- JOE NATE WOOD, Professor of Mechanical Engineering (1936, 1947). B. S., University of Iowa. Professional Engineer.
- CLAUDE LOWELL WOODARD, Assistant Professor of Industrial Arts (1949, 1954). B. S., M. S., Kansas State University.

School of Home Economics

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- E. BETH ALSUP, Associate Professor of Foods and Nutrition, Agr. Exp. Sta. (1959). B. S., University of New Mexico; M. S., Ohio State University; Ph. D., Michigan State University.
- LEAH ASCHAM, Professor of Foods and Nutrition, Emerita (1927, 1951). A. B., Ohio Northern University; B. S., Ohio State University; Ph. D., Yale University.
- DOROTHY BARFOOT, Professor; Head, Department of Art (1930, 1935). B. A., State University of Iowa; M. A., Columbia University.
- JANE WILSON BARNES, Assistant Professor (1939, 1954). B. S., M. S., Kansas State University.
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- MYRTLE GUNSELMAN CORRELL, Associate Professor of Family Economics, Emerita; Associate Textile Economist, Agr. Exp. Sta. (1926, 1959). B. S., Kansas State University; A. M., University of Chicago.
- SALLY COULOMB, Instructor in Institutional Management (1959). B. S., Drexel Institute of Technology.
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- GRAYCE E. GOERTZ, Professor of Foods and Nutrition; Associate Food Economist, Agr. Exp. Sta. (1946, 1958). B. S., M. S., Ph. D., Kansas State University.
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Division of Extension

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- ROBERTA ARLENE ANDERSON, Assistant Professor; Assistant State Club Leader (1958). B. S., University of Minnesota; M. S., University of Wisconsin.
- DAISY ELIENE ATKINSON, Assistant Professor; Extension Specialist in Foods and Nutrition (1959). B. A., University of Iowa; M. S., University of Alabama.
- THOMAS BRANKS AVERILL, Assistant Professor; Coordinator, Adult Education and Community Services (1959). B. A., Kent State University; M. S. A., Wayne State University.
- MAE BAIRD, Professor; Department Head; State Home Economics Leader (1954). B. S., University of Nebraska; M. A., Columbia University.
- RICHARD JAMES BAKER, Instructor; Extension Specialist in Marketing and Utilization of Formula Feeds (1959). B. S., M. S., Kansas State University.
- ELLEN MARGARET BATCHELOR, Assistant Professor; Extension Specialist in Home Crafts (1917, 1953). B. S., Kansas State University.
- FRANK GEARHART BIEBERLY, Associate Professor; Extension Specialist in Agronomy (1941, 1949). B. S., M. S., Kansas State University.
- DONALD LEE BIGGS, Instructor; Extension Specialist in Marketing Information (1956, 1959). B. S., Kansas State University.
- ADA GRACE BILLINGS, Professor of History and Government; Continuing Education (1921, 1946). B. S., M. S., Kansas State University.
- CLIFFORD RANDOLPH BISWELL, Instructor; District Extension Forester (1957). B. A., B. S., University of Missouri.
- ELMER WARFORD BLANKENHAGEN, Assistant Professor; District Agent (1950, 1956). B. S., Kansas State University.
- ROBERT ARTHUR BOHANNON, Assistant Professor; Extension Specialist in Soil Testing (1951, 1954). B. S., Michigan State University; M. S., Kansas State University; Ph. D., University of Illinois.
- EDWIN RALPH BONEWITZ, Assistant Professor; Extension Specialist in Dairy Husbandry (1943, 1949). B. S., M. S., Kansas State University.
- CARL ADELBERT BOOTON, Instructor; Conferences and Classes, Government (1956). B. S., M. A., University of Nebraska; M. A., Kansas State University.
- MARGARET ANN BOREN, Instructor; Extension Specialist in Consumer Information (1959). B. S., M. S., Kansas State University.
- VIVIAN BAHR BRIGGS, Assistant Professor; Extension Specialist in Family Life (1946, 1951). B. S., University of Nebraska; M. S., Kansas State University.
- MARTHA ESTHER BRILL, Assistant Professor; Extension Specialist in Health (1946, 1948). B. S., Kansas State University; R. N., University of Kansas.
- JACK MERRIL BURKE, Assistant Professor; Acting Director of Radio Station KSAC (1958). B. S., M. E., North Dakota Agricultural College.
- GLENN MORTON BUSSET, Associate Professor; Assistant State Club Leader (1941, 1958). B. S., Kansas State University; M. S., Cornell University.
- CLYDE S. CARLSON, Radio Broadcasting Engineer (1953).
- EUGENE ARTHUR CLEAVINGER, Professor; Extension Specialist in Agronomy (1926, 1947). B. S., Kansas State University.
- JOHN HERBERT COOLIDGE, Professor; Extension Economist in Farm Management (1926, 1949). B. S., M. S., Kansas State University.
- ROBERT LEON COPPERSMITH, Professor; Livestock Marketing (1960). B. S., Kentucky State College; M. S., University of Kentucky; Ph. D., University of Illinois.
- LAWRENCE JOSEPH COX, Instructor; District Agent (1952, 1959). B. S., Oklahoma State University; M. S., Kansas State University.
- MANFORD LESTER COX, Instructor; Extension Economist in Farm Management (1945, 1960). Manhattan. B. S., Kansas State University.
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- MIRIAM LENORE DEXTER, Assistant Professor; Assistant Extension Editor (1944, 1947). B. S., M. S., Kansas State University.
- ANNABELLE JEANETTE DICKINSON, Assistant Professor; Acting Associate State Home Economics Leader (1940, 1959). B. S., Fort Hays Kansas State College; M. S., University of Missouri.
- ISABEL NAOMI DODRILL, Assistant Professor; District Home Economics Agent (1942, 1954). B. A., Fort Hays Kansas State College; B. S., Kansas State University; M. S., Columbia University.
- DALE HENRY EDELBLUTE, Instructor; Area Extension Agriculturist (1947, 1955). Garden City. B. S., Kansas State University.
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- CLYDE FERGUSON, Instructor in Continuing Education, Extension (1960). B. A., University of Oklahoma; M. A., Ph. D., Duke University.
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- HOBART FREDERICK, Instructor; Extension Economist in Farm Management (1941, 1960). Hutchinson. B. S., Kansas State University.
- HAROLD GREEN GALLAHER, Assistant Professor; Extension Specialist in Farm Forestry (1951). B. S., University of Missouri.
- DELL EDWARD GATES, Assistant Professor; Extension Specialist in Entomology (1948, 1950). B. S., M. S., Kansas State University.
- OTIS BENTON GLOVER, Associate Professor; District Agent (1929, 1956). B. S., Kansas State University.
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- LAURENZ STEPHEN GREENE, Instructor; Extension Economist in Farm Management (1952, 1960). Concordia. B. S., Kansas State University.
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- ARTHUR LAWRENCE HJORT, Administrative Assistant (1947, 1948).
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- DALE EUGENE SCHINDLER, Instructor; Extension Architect (1955). B. Arch., M. S., Kansas State University. Registered Architect.

- LEONARD W. SCHRUBEN, Professor; Extension Specialist in Marketing Information (1958). B. S., Kansas State University; M. S., University of Illinois; M. P. A., M. A., Ph. D., Harvard University.
- WALTER ELSWORTH SELBY, Associate Professor of Extension Engineering; Extension Agricultural Engineer (1944, 1947). B. S., Kansas State University; M. S., University of Nebraska.
- ETHEL WATSON SELF, Associate Professor; Extension Specialist in Home Management (1929, 1953). B. S., M. S., Kansas State University.
- HAROLD GLEASON SHANKLAND, Associate Professor; Associate Extension Editor (1943, 1949). A. B., College of Emporia.
- JOHN FREDERICK SMERCHEK, Instructor; Extension Economist in Farm Management (1942, 1950). Greensburg. B. S., Kansas State University.
- VIRGINIA MARGARET SMITH, Assistant Professor; District Home Economics Agent (1952, 1957). B. S., Kansas State University; M. S., University of Wisconsin.
- GEORGIANA HOPE SMURTHWAITE, Professor, Emerita; Extension Specialist in Home Economics Program Development (1924, 1954). B. S., Utah State College; M. S., Kansas State University.
- BEVERLY DAVID STAGG, Instructor; Extension Economist in Farm Management (1940, 1960). Norton. B. S., Kansas State University.
- WINONA McNEIGHT STARKEY, Assistant Professor; Extension Specialist in Home Furnishings (1944, 1956). B. S., M. S., Kansas State University.
- HAROLD EARL STOVER, Professor; Extension Agricultural Engineer (1936, 1954). B. S., Kansas State University.
- LOT FORMAN TAYLOR, Professor; Extension Specialist in Animal Husbandry (1935, 1953). B. S., M. S., Kansas State University.
- EARL HICKS TEAGARDEN, Professor; Coordinator of Extension Program Analysis (1929, 1952). B. S., Kansas State University.
- MARJORIE ANN TENNANT, Instructor; Assistant Extension Editor (1947, 1952). B. S., M. S., Kansas State University.
- KENNETH EUGENE THOMAS, Associate Professor; Director, Radio Station KSAC (1951, 1956). A. B., Southwestern College; M. S., Kansas State University.
- DANNY DALE TRAYER, Instructor; Extension Economist in Farm Management (1950, 1960). Garden City. B. S., University of Wisconsin.
- JAY L. TREAT, Assistant Professor; Agricultural Specialist, Extension (1960). B. S., University of Arkansas; M. A., University of Missouri.
- SYKES EMIL TRIEB, Instructor; Extension Specialist in Retail Marketing (1958). B. S., Kansas State University.
- ROMAN J. VERHAALLEN, Professor; Head, Department of Continuing Education (1954, 1957). B. A., M. A., Ph. D., Wyoming University.
- MILDRED LUCILLE WALKER, Instructor; Extension Specialist in Consumer Education (1952, 1956). B. S., Kansas State University.
- EUGENE DECATUR WARNER, Associate Professor; Associate Extension Editor (1935, 1947). B. S., Kansas State University.
- RUTH IRENE WELLS, Assistant Professor; Extension Specialist in Foods and Nutrition (1953, 1958). B. S., Central Missouri State College; M. S., Kansas State University.
- LEO THEODORE WENDLING, Assistant Professor; Extension Agricultural Engineer (1947, 1949). B. S., M. S., Kansas State University.
- BESSIE BROOKS WEST, Professor of Institutional Management; Continuing Education (1928, 1958). A. B., M. A., University of California; M. S., Michigan State Normal College.
- NORMAN VINCENT WHITEHAIR, Associate Professor; Extension Economist in Grain Marketing (1946, 1954). B. S., M. S., Kansas State University.
- MARY CHRISTINE WIGGINS, Associate Professor; Extension Specialist in Clothing and Textiles (1930, 1947). B. S., Kansas State University; M. A., Columbia University.
- HOWARD DENSER WILKINS, Instructor; Extension Specialist in Crops and Soils (1959). B. S., M. S., Kansas State University.
- ROGER HAROLD WILKOWSKE, Associate Professor; Extension Specialist in Dairy Marketing (1957). B. S., Kansas State University; M. S., Michigan State University; Ph. D., Pennsylvania State University.

COUNTY CLUB AGENTS

- JOHN HAYDEN BARNES, Harvey County (1953). Newton.
- WILLIAM HENRY BORST, Wyandotte County (1953). Kansas City.
- VIRGIL PHILLIP CARLSON, McPherson County (1957, 1959). McPherson.
- ROBERT GAYLE CARSWELL, Clay County (1958). Clay Center.
- JAMES R. CHILDERS, Reno County (1944). Hutchinson.
- LOIS GLENN DAVIS, Sedgwick County (1957). Wichita.
- LELAND WESLEY ELLIOTT, Washington County (1958, 1959). Washington.
- DONALD LOUIS ESSLINGER, Rice County (1957, 1958). Lyons.
- HAROLD EDWIN EVERSMEYER, Lyon County (1950, 1951). Emporia.
- MERLE LINTON EYESTONE, Shawnee County (1946, 1947). Topeka.
- ALBERT HAROLD GOTTSCH, Butler County (1954). El Dorado.
- ROGER HECHT, Miami County (1952). Paola.

DALE HENSLEY, Montgomery County (1957). Independence.
 WILLIAM CLAY HUNDLEY, JR., Douglas County (1955). Lawrence.
 JOHN WILLIS JORDAN, Labette County (1953). Altamont.
 ALAN ANDREW LINNEBUR, Nemaha County (1958). Seneca.
 DONALD GLEN LOYD, Crawford County (1948, 1949). Girard.
 KENNETH EUGENE MCGINNESS, Johnson County (1954). Olathe.
 PAUL HENRY MAYGINNES, Marion County (1951). Marion.
 CLIFFORD LEO MEIREIS, Pratt County (1955). Pratt.
 CHARLES DALE MIKSCH, Ellsworth County (1958, 1959). Ellsworth.
 SYLVESTER OLIVER NYHART, Russell County (1958, 1959). Russell.
 RALPH BERT RECTOR, Leavenworth County (1948, 1956). Leavenworth.
 LOY DEE REINHARDT, Cherokee County (1959). Columbus.
 HARLAN EUGENE ROSS, Kingman County (1959). Kingman.
 WELDON E. RUSSELL, Cowley County (1958). Winfield.
 LESLIE HERMAN SALLEE, Franklin County (1958). Ottawa.
 JIMMIE WAYNE SMITH, Riley County (1958). Manhattan.
 DON VAN STOUT, Brown County (1959). Hiawatha.
 WILLIAM VINCENT VANSKIKE, Barton County (1956). Great Bend.
 WILL DEE WHITMIRE, Saline County (1956). Salina.
 WILLIAM GRANT WILLIS, Sumner County (1950, 1951). Wellington.
 THURMAN S. WREN, Sedgwick County (1949). Wichita.

COUNTY HOME ECONOMICS AGENTS

LOIS CLARA ADAMS, Jackson County (1957). Holton.
 SHIRLEY FRANCES AIKEN, Chase County (1959). Cottonwood Falls.
 MAHALA MARY ARGANBRIGHT, Norton County (1949). Norton.
 CORA ALICE BLACKWELL, Kearny County (1948, 1955). Lakin.
 CAROLYN SUE BRADSHAW, Woodson County (1958). Yates Center.
 ELSIE PAINTER BRANDEN, Stevens County (1955). Hugoton.
 BLANCHE BROOKS, Osage County (1941, 1942). Lyndon.
 RUTH ALLENE BROTHERS, Hamilton County (1956). Syracuse.
 GERTRUDE IRENE BROWN, Reno County (1959). Hutchinson.
 JEAN KEMPTON CARLSON, Lyon County (1950, 1952). Emporia.
 ANNA GRACE CAUGHRON, Coffey County (1944, 1952). Burlington.
 LUCILE GILKISON CLINE, Sherman County (1955). Goodland.
 DORIS WIERENGA COBB, Osborne County (1956). Osborne.
 JOSEPHINE M. CONLEY, Johnson County (1955). Olathe.
 MABEL COVERDILL, Scott County (1947). Scott City.
 JEANICE BLAUER CRESS, Allen County (1955, 1956). Iola.
 ROSEMARY ALTHEA CRIST, Franklin County (1950). Ottawa.
 TRELLA CURRIE, Cloud County (1955). Concordia.
 ILENE MAE DAVEY, Linn County (1959). Mound City.
 MONA RUTH DREESSEN, Butler County (1958). El Dorado.
 MARY JO DUNBAR, Wyandotte County (1957). Kansas City.
 LENORA ANN EKLUND, Rawlins County (1959). Atwood.
 MARY OLIVE EVANS, Lincoln County (1953). Lincoln.
 PAULINE WOOD FERRELL, Ellsworth County (1952, 1953). Ellsworth.
 WILLA LOIS FICKEN, Grant County (1957). Ulysses.
 SHARON GAY FISHER, Meade County (1959). Meade.
 NEOSHO LOUISE FREDENBURG, Morris County (1953). Council Grove.
 ALICE LETTIE FREY, Clay County (1955). Clay Center.
 GERALDINE LOIS FRITZ, Marion County (1959). Marion.
 MARY LOU GIBBS, Pottawatomie County (1957). Westmoreland.
 VIVIAN EWY GRABER, Kingman County (1955). Kingman.
 NORMA ELLEN GRAMZOW, Wichita County (1958). Leoti.
 GERSILDA GUTHRIE, Hodgeman County (1958). Jetmore.
 MARTHA A. HANSEN, Barber County (1957). Medicine Lodge.
 BARBARA SUE HAZEN, Marshall County (1958). Marysville.
 FRED A. KAYANN HEINLY, Rice County (1957). Lyons.
 MAY BETH HERNDON, Rush County (1953). La Crosse.
 JANE EPP HERSHBERGER, Harvey County (1958). Newton.
 MARIAN V. HESTER, Barton County (1953). Great Bend.
 VIRGINIA LEE HOPPER, Thomas County (1958). Colby.
 GERTRUDE HOVE, Reno County (1949, 1950). Hutchinson.

DOROTHY LOUISE HUFFMAN, Pratt County (1952, 1953). Pratt.
 FAYE ANNE JOHNSON, Russell County (1955). Russell.
 JUANITA BILLINGTON JOHNSON, Crawford County (1948). Girard.
 MARIELLEN JONES, Greenwood County (1955, 1958). Eureka.
 NANCY JO KENT, Comanche County (1959). Coldwater.
 BEVERLY LOUISE KINDLER, Decatur County (1951). Oberlin.
 KATHERINE LOUISE KIRTON, Washington County (1958). Washington.
 ELEANORA LEIKAM, Gray County (1954). Cimarron.
 ANNABELLE BRAKKE LONG, Shawnee County (1955). Topeka.
 BETTY GRACE McBEE, Cheyenne County (1952). St. Francis.
 ELIN K. McCANDLESS, Logan and Gove Counties (1958). Oakley.
 EULA NEAL McCAULEY, Doniphan County (1930, 1959). Troy.
 ESTHER EDWARDS McCLURE, Republic County (1958). Belleville.
 ELDORA ZANNA McREYNOLDS, Clark County (1959). Ashland.
 EVA PEARL MANSFIELD, Leavenworth County (1953). Leavenworth.
 MARGARET NETTLETON MAUK, Saline County (1944, 1945). Salina.
 MARY E. MEEK, Dickinson County (1953). Abilene.
 NANCY ALICE MERIWETHER, Nemaha County (1958, 1960). Seneca.
 ALICE LOUISE MILLER, Ford County (1953, 1955). Dodge City.
 AMY CAROLYN MOBERLY, Elk County (1958, 1959). Howard.
 DIXIE IRENE MOLZ, Stafford County (1953). St. John.
 ALVERDA MOORE, Riley County (1955). Manhattan.
 ERMA M. NEELLY, Trego County (1950). Wakeeney.
 DOROTHY H. NEUFELD, Pawnee County (1957). Larned.
 OCIE ALICE NEUSCHWANDER, Greeley County (1957). Tribune.
 ALICE McKAUGHEN OLEN, Seward County (1956). Liberal.
 RACHEL FEATHERINGILL PALMER, Sedgwick County (1941). Wichita.
 MARILYN JOAN PARKER, Johnson County (1958). Olathe.
 INEZ PASS, Ottawa County (1947). Minneapolis.
 MURIEL FRANCES PEASE, Bourbon County (1957). Fort Scott.
 MARJORIE ELEANOR PRICE, Neosho County (1957). Erie.
 ARRIA NEAL PTACEK, Sheridan County (1954). Hoxie.
 VELDA FRANCES RANKIN, Sumner County (1952). Wellington.
 CLAYRE DONNELLY RATZLAFF, Cherokee County (1948). Columbus.
 DONNA LEE REEVES, Montgomery County (1959). Independence.
 BILLIE LOU RICKARD, Haskell County (1958, 1960). Sublette.
 MARY ALICE ROSSILLON, Brown County (1958, 1960). Hiawatha.
 ARDELLA RUTH RUSK, Jefferson County (1957). Oskaloosa.
 DOROTHEA ANN SCHROEDER, Wyandotte County (1942, 1943). Kansas City.
 BETTY ANN SELLERS, Graham County (1957, 1958). Hill City.
 MABEL RACHEL SMITH, Rice County (1929, 1941). Lyons.
 DOLORES ROSE STOVER, Sedgwick County (1957). Wichita.
 LUCILLE STUBBS, Smith County (1955, 1958). Smith Center.
 KATHERYN SUGHRUE, Finney County (1937). Garden City.
 RUBY CORR TRUAX, Sedgwick County (1959). Wichita.
 FAYE EVELYN VICE, Labette County (1946, 1959). Altamont.
 MAE K. WEAVER, Barton County (1952). Great Bend.
 KATHERYN FAIRES WEINHOLD, Phillips County (1959). Phillipsburg.
 BARBARA ANNE WINTER, Saline County (1959). Salina.
 ELIZABETH WONER, Harper County (1948, 1950). Anthony.
 OLETHA L. YATES, Douglas County (1959). Lawrence.

COUNTY AGRICULTURAL AGENTS

KENNETH BAIRD ALBRIGHT, Ellis County (1955, 1957). Hays.
 CHARLES JACK BAIRD, Mitchell County (1953, 1954). Beloit.
 EDWARD KIRK BAKER, Russell County (1955). Russell.
 ARNOLD BARBER, Atchison County (1955). Effingham.
 W. H. BARKER, Nemaha County (1950). Seneca.
 FREEMAN E. BIERY, Jewell County (1953). Mankato.
 WILLIS LEE BLUME, Haskell County (1948). Sublette.
 ROBERT WAYNE BOZWORTH, Montgomery County (1960). Independence.
 HAROLD EUGENE BROADIE, Stevens County (1955). Hugoton.
 DONALD ALBERT BROWN, Franklin County (1949, 1950). Ottawa.
 HERBERT WILLIAM BULK, Shawnee County (1949). Topeka.

ELGIN R. BUTTON, McPherson County (1943). McPherson.
 HAL DEAN BYARLAY, Lincoln County (1953). Lincoln.
 LOWELL HARTLEY BYARLAY, Smith County (1959). Smith Center.
 JOHNNY VAN CAREY, Cherokee County (1955). Columbus.
 BILLIE DUANE CHADD, Seward County (1959, 1960). Liberal.
 MONTE CHARLES CLARK, Kiowa County (1949, 1955). Greensburg.
 BILLY DEAN COLLINS, Harvey County (1954, 1959). Newton.
 WILLIAM EDWARD COX, Crawford County (1957, 1958). Girard.
 LEO LAWRENCE CRAM, McPherson County (1958). McPherson.
 DARRELL DEAN DICKEN, Scott County (1942). Scott City.
 JOE BENDER DIVINE, Osage County (1944). Lyndon.
 HARRY GARFIELD DUCKERS, JR., Wyandotte County (1943). Kansas City.
 KERMIT VERNON ENGLE, Ellsworth County (1936). Ellsworth.
 RAY WADE ETHERIDGE, Barber County (1954, 1959). Medicine Lodge.
 DONALD LEE FAIDLEY, Phillips County (1956). Phillipsburg.
 GERALD KEITH FISH, Trego County (1958). Wakeeney.
 DALE LEWIS FOOSHEE, Elk County (1958). Howard.
 LESLIE PEARL FRAZIER, Rice County (1943, 1944). Lyons.
 KENNETH WILLIAM FROMM, Lane County (1953, 1956). Dighton.
 RAYMOND GLENN FRYE, Sumner County (1943). Wellington.
 JEWELL OLIVER GEBHART, Washington County (1945). Washington.
 RALPH F. GERMANN, Hodgeman County (1935, 1937). Jetmore.
 HARVEY E. GOERTZ, Brown County (1937, 1943). Hiawatha.
 RICHARD ELMER GOLLADAY, Hamilton County (1957, 1959). Syracuse.
 LESTER EDWARD GRIFFITH, Wilson County (1949, 1960). Fredonia.
 OTIS RAY GRIGGS, Reno County (1949, 1951). Hutchinson.
 HENRY PAUL GRONEWOLLER, Decatur County (1952). Oberlin.
 CHARLES TOMAS HALL, Johnson County (1934). Olathe.
 ROBERT JOHN HAMILTON, Rush County (1956). La Crosse.
 WARREN GAMALIEL HARDING, Rawlins County (1955). Atwood.
 MAURICE CLAREN HARRINGTON, Anderson County (1958, 1960). Garnett.
 ALFRED EUGENE HARRIS, Meade County (1938). Meade.
 LOREN EMORY HARRIS, Saline County (1958, 1959). Salina.
 EDWIN HEDSTROM, Marshall County (1935). Marysville.
 ROGER LYMAN HENDERSHOT, Harper County (1941, 1946). Anthony.
 LARRY GAY HENRY, Greeley County (1956, 1958). Tribune.
 JON GREVE HEROD, Morton County (1957, 1960). Elkhart.
 PAUL NELSON HINES, Dickinson County (1944, 1960). Abilene.
 CLARENCE ATHEL HOLLINGSWORTH, Greenwood County (1937, 1939). Eureka.
 JERRY CLIFTON HOPE, Labette County (1955). Altamont.
 GERALD LEE HUNTINGTON, Sedgwick County (1955, 1957). Wichita.
 CLARENCE IMEL, Kingman County (1950). Kingman.
 DONALD WALTER INGLE, Sedgwick County (1930). Wichita.
 RICHARD LOUIS JEPSEN, Sheridan County (1953). Hoxie.
 ARTHUR RUSSELL JOHNSON, Shawnee County (1958, 1960). Topeka.
 DAVID PAUL KAISER, Johnson County (1959, 1960). Olathe.
 HARRY LEE KIVETT, Edwards County (1957). Kinsley.
 JOHN WILLIAM KNOX, Barton County (1951). Great Bend.
 WILBUR S. KRAISINGER, Pratt County (1947). Pratt.
 RICHARD S. KUBIK, Thomas County (1949). Colby.
 MERLIN ELMER LINE, Kearny County (1946). Lakin.
 DONALD EDWIN LOVE, Cheyenne County (1952). St. Francis.
 RAE C. LUGINSLAND, Pratt County (1959). Pratt.
 GEORGE DANIEL McCALLUM, Chautauqua County (1958, 1959). Sedan.
 BEN D. McKAY, Ness County (1957, 1960). Ness City.
 BRUCE EDWARD McLAURY, Miami County (1950, 1951). Paola.
 GERALD ORESTES McMASTER, Rooks County (1951, 1960). Stockton.
 KENNETH LEROY McREYNOLDS, Clay County (1949, 1956). Clay Center.
 DONALD DALE McWILLIAMS, Logan County (1956). Oakley.
 ALBERT GLENN MADDUX, Finney County (1959, 1960). Garden City.
 ALVIN EDWARD MALEY, Morris County (1953). Council Grove.
 RAY DAMPTON MANN, Wallace County (1956, 1957). Sharon Springs.
 E. CLIFFORD MANRY, Pawnee County (1940, 1947). Larned.
 DAROLD DEAN MARLOW, Wabaunsee County (1950). Alma.
 THOMAS ROBERT MAXWELL, Allen County (1954, 1960). Iola.

WILLIAM A. MONTGOMERY, Jackson County (1955). Holton.
DOUGLAS HAROLD MORRIS, Osborne County (1954, 1955). Osborne.
WESLEY GALE MULLEN, Neosho County (1950). Erie.
JOSEPH P. NEILL, Cloud County (1957). Concordia.
BOB WELDON NEWSOME, Jefferson County (1941, 1942). Independence.
BRYCE ORR, Coffey County (1952, 1953). Burlington.
CALVIN COOLIDGE ORR, Pottawatomie County (1950). Westmoreland.
THOMAS W. ORWIG, Dickinson County (1955, 1960). Abilene.
GENE OWEN OTT, Graham County (1953). Hill City.
LEONARD CALVIN PARKER, Smith County (1956). Smith Center.
RALPH STANLEY PARSONS, Lyon County (1952). Emporia.
DONALD KEITH PETERSON, Jewell County (1955, 1959). Mankato.
DAN PHERIGO, Cloud County (1958, 1960). Concordia.
DON DALE PRETZER, Linn County (1958, 1959). Mound City.
JOHN F. ROBERTSON, Comanche County (1956). Coldwater.
JOHN WESLEY ROBINSON, Lane County (1959, 1960). Dighton.
EUGENE ROSS, Stafford County (1955). St. John.
JOHN RALPH SCHLENDER, Saline County (1951, 1956). Salina.
NORMAN EDWARD SCHLESENER, Ottawa County (1956, 1958). Minneapolis.
DEAL DEMI SIX, Douglas County (1935). Lawrence.
CHARLES WESLEY SMITH, Cowley County (1955). Winfield.
JOHN FREDERICK SMITH, Leavenworth County (1956, 1959). Leavenworth.
PATRICK EDWARD SMYTHE, Republic County (1956, 1958). Belleville.
DONALD CHARLES SPITZE, Stanton County (1957, 1958). Johnson.
RICHARD DEE STROADE, Graham County (1959, 1960). Hill City.
NELSON EDWIN STROUD, Geary County (1952). Junction City.
JAMES WADELL STURDEVANT, Butler County (1948). El Dorado.
WILTON BRADLEY THOMAS, Dickinson County (1946, 1960). Abilene.
WAYNE HOWARD TYLER, Bourbon County (1954, 1955). Fort Scott.
MARSHALL FRANCIS WALKER, JR., Grant County (1949, 1951). Ulysses.
RAYMOND EDWARD WARY, Woodson County (1958, 1960). Yates Center.
JAY ALFRED WEST, Doniphan County (1952). Troy.
HERMAN WILLIAM WESTMEYER, Ford County (1936). Dodge City.
LOREN EDGAR WHIPPS, Sherman County (1946, 1959). Goodland.
WILBUR WALDO WHITE, Gove County (1942, 1943). Gove.
DON KOENIG WILES, Clark County (1956, 1958). Ashland.
JACK HARLAN WILSON, Wichita County (1946, 1950). Leoti.
PAUL HENRY WILSON, Barton County (1946, 1947). Great Bend.

Statistical Summary for 1957-58

Students by States, Foreign Countries, and Kansas Counties

States

Alabama	3	Kentucky	2	Ohio	6
Alaska	2	Louisiana	3	Oklahoma	27
Arizona	6	Maine	3	Oregon	7
Arkansas	16	Maryland	10	Pennsylvania	21
California	24	Massachusetts	7	South Carolina	2
Colorado	26	Michigan	8	South Dakota	29
Connecticut	12	Minnesota	20	Tennessee	6
Delaware	2	Mississippi	3	Texas	28
District of Columbia	2	Missouri	179	Utah	9
Florida	6	Montana	3	Vermont	1
Georgia	5	Nebraska	127	Virginia	14
Idaho	6	New Jersey	26	Washington	3
Illinois	79	New Mexico	9	West Virginia	6
Indiana	33	New York	55	Wisconsin	28
Iowa	14	North Carolina	4	Wyoming	2
Kansas	6912	North Dakota	6	Total	7802

Foreign Countries and Territories Outside the Continental United States

Arabia	2	Hawaii	22	Peru	1
Aruba	1	Honduras	2	Philippines	9
Australia	1	India	52	Puerto Rico	19
Bolivia	1	Iran	2	Ryukyus	1
Brazil	4	Iraq	9	Spain	1
British Guiana	1	Israel	4	Sudan	3
British West Indies	1	Italy	1	Switzerland	2
Canada	3	Japan	6	Syria	2
Canal Zone	3	Jaya	1	Taiwan	2
Chile	2	Jordan	8	Thailand	2
China	32	Korea	6	Turkey	4
Colombia	2	Lebanon	2	Yugoslavia	3
Cyprus	1	Malaya	1	Total	244
Egypt	3	Mexico	4	Grand Total:	
England	1	Nigeria	3	States	7802
Ethiopia	2	Norway	1	Countries	244
France	1	Pakistan	4		
Germany	3	Panama	1		
Greece	1	Persia	1		8046

Kansas Counties

Allen	31	Greeley	7	Osborne	51
Anderson	21	Greenwood	51	Ottawa	56
Atchison	56	Hamilton	4	Pawnee	37
Barber	35	Harper	38	Phillips	51
Barton	137	Harvey	49	Pottawatomie	123
Bourbon	30	Haskell	7	Pratt	62
Brown	74	Hodgeman	20	Rawlins	30
Butler	120	Jackson	53	Reno	175
Chase	21	Jefferson	26	Republic	73
Chautauqua	14	Jewell	56	Rice	80
Cherokee	24	Johnson	194	Riley	1077
Cheyenne	21	Kearny	7	Rooks	34
Clark	17	Kingman	25	Rush	20
Clay	119	Kiowa	23	Russell	41
Cloud	81	Labette	49	Saline	214
Coffey	33	Lane	13	Scott	25
Comanche	16	Leavenworth	41	Sedgwick	320
Cowley	79	Lincoln	46	Seward	27
Crawford	48	Linn	24	Shawnee	271
Decatur	31	Logan	24	Sheridan	16
Dickinson	149	Lyon	58	Sherman	57
Doniphan	25	McPherson	117	Smith	34
Douglas	32	Marion	53	Stafford	58
Edwards	27	Marshall	141	Stanton	2
Elk	16	Meade	11	Stevens	8
Ellis	40	Miami	39	Sumner	89
Ellsworth	62	Mitchell	60	Thomas	52
Finney	50	Montgomery	99	Trego	12
Ford	45	Morris	56	Wabaunsee	57
Franklin	52	Morton	5	Wallace	8
Geary	200	Nemaha	49	Washington	87
Gove	12	Neosho	48	Wichita	11
Graham	22	Ness	27	Wilson	29
Grant	15	Norton	62	Woodson	15
Gray	16	Osage	65	Wyandotte	192
				Total	6912

Statistical Summary for 1958-59
Students by States, Foreign Countries, and Kansas Counties

States			
Alabama	6	Kentucky	2
Arizona	6	Louisiana	5
Arkansas	13	Maine	3
California	32	Maryland	10
Colorado	30	Massachusetts	10
Connecticut	10	Michigan	12
Delaware	2	Minnesota	19
District of Columbia	1	Mississippi	7
Florida	5	Missouri	174
Georgia	5	Montana	3
Hawaii	21	Nebraska	119
Idaho	6	New Jersey	29
Illinois	74	New Mexico	13
Indiana	33	New York	47
Iowa	25	North Carolina	7
Kansas	6751	North Dakota	11
		Ohio	15
		Oklahoma	33
		Oregon	6
		Pennsylvania	21
		Rhode Island	1
		South Carolina	2
		South Dakota	21
		Tennessee	4
		Texas	31
		Utah	7
		Vermont	3
		Virginia	10
		Washington	7
		West Virginia	7
		Wisconsin	26
		Wyoming	5
Total			7690

Foreign Countries and Territories Outside the Continental United States

Africa	1	Ethiopia	2	Mexico	4
Arabia	1	Formosa	1	Nigeria	4
Aruba	4	Germany	1	Norway	2
Bogota	1	Greece	5	Pakistan	2
Bolivia	1	Guam	1	Peru	2
Brazil	1	Honduras	2	Philippines	1
British Guiana	1	India	66	Ryukyus	1
British West Indies	1	Iran	2	Sudan	4
Canada	3	Iraq	5	Syria	1
Chile	2	Israel	1	Taiwan	2
China	39	Italy	2	Thailand	2
Colombia	1	Japan	4	Turkey	5
Cuba	1	Java	1	Venezuela	1
Cyprus	2	Jordan	5	West Pakistan	4
Egypt	3	Korea	9	Yugoslavia	1
England	1	Lebanon	5		
Total				211	

Kansas Counties

Allen	35	Greeley	5	Osborne	45
Anderson	19	Greenwood	42	Ottawa	54
Atchison	60	Hamilton	6	Pawnee	39
Barber	34	Harper	36	Phillips	49
Barton	132	Harvey	46	Pottawatomie	134
Bourbon	34	Haskell	9	Pratt	61
Brown	66	Hodgeman	14	Rawlins	28
Butler	110	Jackson	56	Reno	161
Chase	24	Jefferson	24	Republic	68
Chautauqua	10	Jewell	58	Rice	72
Cherokee	31	Johnson	226	Riley	1075
Cheyenne	20	Kearny	6	Rooks	39
Clark	17	Kingman	31	Rush	24
Clay	123	Kiowa	22	Russell	43
Cloud	89	Labette	53	Saline	188
Coffey	31	Lane	15	Scott	33
Comanche	17	Leavenworth	52	Sedgwick	293
Cowley	73	Lincoln	39	Seward	30
Crawford	44	Linn	23	Shawnee	244
Decatur	32	Logan	22	Sheridan	22
Dickinson	155	Lyon	49	Sherman	51
Doniphan	21	McPherson	124	Smith	46
Douglas	23	Marion	49	Stafford	57
Edwards	26	Marshall	139	Stanton	3
Elk	9	Meade	14	Stevens	10
Ellis	44	Miami	49	Sumner	86
Ellsworth	45	Mitchell	75	Thomas	48
Finney	38	Montgomery	78	Trego	15
Ford	40	Morris	48	Wabaunsee	50
Franklin	52	Morton	1	Wallace	8
Geary	178	Nemaha	55	Washington	70
Gove	10	Neosho	52	Wichita	16
Graham	17	Ness	27	Wilson	34
Grant	11	Norton	68	Woodson	21
Gray	17	Osage	57	Wyandotte	177
Total				6751	

Degrees Conferred in the Year 1958

SCHOOL	Men	Women	Total
SCHOOL OF AGRICULTURE (B. S.)	214		214
Agriculture	174		174
Agricultural Journalism	2		2
Feed Technology	20		20
Landscape Design	7		7
Milling Industry	11		11
SCHOOL OF ARTS AND SCIENCES (B. S.)	444	227	671
Bachelor of Arts	8	21	29
Bachelor of Science	265	76	341
Business Administration	129	14	143
Chemistry	7	1	8
Elementary Education	8	93	101
Bachelor of Music Education	4	8	12
Physical Education	16	6	22
Technical Journalism	7	8	15
SCHOOL OF ENGINEERING AND ARCHITECTURE (B. S.)	345		345
Agricultural Engineering	16		16
Architectural Engineering	15		15
Architecture	28		28
Chemical Engineering	19		19
Civil Engineering	42		42
Electrical Engineering	106		106
Industrial Education	7		7
Industrial Engineering	22		22
Industrial Technology	6		6
Mechanical Engineering	74		74
Nuclear Engineering	10		10
SCHOOL OF HOME ECONOMICS (B. S.)	2	110	112
Home Economics	1	87	88
Home Economics & Journalism		5	5
Home Economics & Nursing		18	18
Restaurant Management	1		1
Total Undergraduate Degrees	1005	337	1342
SCHOOL OF VETERINARY MEDICINE (D. V. M.)	64	1	65
Veterinary Medicine	64	1	65
GRADUATE SCHOOL (M. S.)	155	29	184
Agricultural Economics	17		17
Agricultural Engineering	2		2
Agronomy	11		11
Animal Husbandry	7		7
Applied Mechanics	1		1
Architecture	2		2
Bacteriology	1		1
Botany	2		2
Chemical Engineering	4		4
Chemistry	6		6
Civil Engineering	4		4
Clothing and Textiles		5	5
Dairy Husbandry	5		5
Economics	3		3
Education	7	2	9
Electrical Engineering	7		7
English		1	1
Entomology	8	1	9
Extension Education	2		2
Family Economics		1	1
Family and Child Development		4	4
Farm Mechanics	1		1
Foods and Nutrition		4	4
Geology	10		10
Government	1		1
History	3	1	4
Home Economics Education		1	1
Horticulture	4		4
Industrial Engineering	1		1
Institutional Management		1	1
Mathematics	5	1	6
Mechanical Engineering	4		4
Milling Industry	3	1	4
Music	1	2	3

Degrees Conferred in the Year 1958—Concluded

SCHOOL	Men	Women	Total
Pathology	5	.....	5
Physical Education	3	.....	3
Physical Science Teaching	1	.....	1
Physics	9	.....	9
Poultry Husbandry	3	.....	3
Psychology	4	.....	4
Speech	1	2	3
Surgery and Medicine	2	.....	2
Technical Journalism	1	.....	1
Zoology	5	1	6
GRADUATE SCHOOL (Ph. D.)	24	.....	24
Agronomy	4	.....	4
Animal Breeding	1	.....	1
Animal Nutrition	1	.....	1
Bacteriology	2	.....	2
Chemistry	7	.....	7
Entomology	3	.....	3
Genetics	3	.....	3
Parasitology	3	.....	3
Grand Total	1248	367	1615

Degrees Conferred in the Year 1959

SCHOOL	Men	Women	Total
SCHOOL OF AGRICULTURE (B. S.)	202	1	203
Agriculture	168	1	169
Agricultural Journalism	4	.....	4
Feed Technology	14	.....	14
Landscape Design	8	.....	8
Milling Industry	8	.....	8
SCHOOL OF ARTS AND SCIENCES (B. S.)	492	229	721
Bachelor of Arts	22	26	48
Bachelor of Science	284	67	351
Business Administration	147	13	160
Chemistry	7	1	8
Elementary Education	6	95	101
Bachelor of Music Education	6	8	14
Physical Education	16	12	28
Technical Journalism	4	6	10
Bachelor of Music .....	.....	1	1
SCHOOL OF ENGINEERING AND ARCHITECTURE (B. S.)	361	5	366
Agricultural Engineering	19	.....	19
Architectural Engineering	6	.....	6
Architecture	27	5	32
Chemical Engineering	26	.....	26
Civil Engineering	53	.....	53
Electrical Engineering	98	.....	98
Industrial Education	4	.....	4
Industrial Engineering	23	.....	23
Industrial Technology	8	.....	8
Mechanical Engineering	86	.....	86
Nuclear Engineering	11	.....	11
SCHOOL OF HOME ECONOMICS (B. S.)	2	109	111
Home Economics .....	.....	90	90
Home Economics & Journalism .....	.....	9	9
Home Economics & Nursing .....	.....	10	10
Restaurant Management	2	.....	2
Total Undergraduate Degrees	1057	344	1401
SCHOOL OF VETERINARY MEDICINE (D. V. M.)	70	.....	70
Veterinary Medicine	70	.....	70
GRADUATE SCHOOL (M. S.)	209	25	234
Agricultural Economics	13	.....	13
Agricultural Education	5	.....	5
Agricultural Engineering	6	.....	6
Agronomy	16	.....	16
Anatomy	2	.....	2

Degrees Conferred in the Year 1959—Concluded

SCHOOL	Men	Women	Total
Animal Husbandry	8	.....	8
Applied Mechanics	2	.....	2
Architecture	2	1	3
Bacteriology	5	.....	5
Business Administration	3	.....	3
Botany and Plant Pathology	3	.....	3
Chemical Engineering	5	.....	5
Chemistry	6	.....	6
Civil Engineering	5	.....	5
Clothing and Textiles .....	.....	2	2
Dairy Husbandry	3	.....	3
Economics	5	.....	5
Education	17	5	22
Electrical Engineering	3	.....	3
English	4	1	5
Entomology	5	1	6
Extension Education	1	.....	1
Family and Child Development .....	.....	1	1
Family Economics .....	.....	3	3
Foods and Nutrition .....	.....	1	1
General Home Economics .....	.....	1	1
Geology	14	.....	14
Government	2	.....	2
History	2	2	4
Home Economics Education .....	.....	1	1
Horticulture	9	.....	9
Industrial Education	2	.....	2
Industrial Engineering	1	.....	1
Institutional Management .....	.....	2	2
Mathematics	11	.....	11
Mechanical Engineering	11	.....	11
Milling Industry .....	.....	1	1
Modern Languages .....	.....	2	2
Music	2	.....	2
Pathology	7	.....	7
Physical Education	5	.....	5
Physics	6	.....	6
Physiology	2	.....	2
Poultry Husbandry	1	.....	1
Psychology	3	.....	3
Sociology	1	.....	1
Speech	3	1	4
Surgery and Medicine	2	.....	2
Technical Journalism	2	.....	2
Zoology	4	.....	4
GRADUATE SCHOOL (Ph. D.)	24	2	26
Animal Breeding	1	.....	1
Animal Nutrition	2	.....	2
Bacteriology	8	.....	8
Botany	3	1	4
Chemistry	4	.....	4
Entomology	3	.....	3
Foods and Nutrition .....	.....	1	1
Parasitology	1	.....	1
Physics	2	.....	2
Grand Total	1360	371	1731

Tabulation for First Semester 1957-58

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	110	1	71		52	1	87	1	2		322	3	325
Agricultural Administration			4		14		21				39		39
Agricultural Economics	7		22		15		13		1		58		58
Agric. Economics (Tech.)	1						1				2		2
Agric. Education (Tech.)	27		43		36		47		1		154		154
Agricultural Journalism	2		1		3		4				10		10
Dairy Manufacturing	4		6		11		17				38		38
Feed Technology	35		19		19		23		1		97		97
Horticulture (Specialized)	6		6	1	2		3				17	1	18
Landscape Design	5		4		5		10				24		24
Milling Technology	8		9		9		12				38		38
Technical Agronomy	11		5		8		19				43		43
Special Students										1		1	1
TOTAL	216	1	190	1	174	1	257	1	5	1	842	5	847

SCHOOL OF ARTS AND SCIENCES

Biological Science	10	37	9	28	15	22	20	4			54	91	145
Humanities	15	37	25	31	15	21	19	31	1	1	75	121	196
Physical Science	9	6	13	6	21	3	33	5	1		77	20	97
Social Science	34	21	45	21	36	15	43	20		2	158	79	237
Pre-medicine	20	2	27	6	13	1	17				77	9	86
Business Administration	105	32	113	24	131	18	135	16	1		485	90	575
Applied Music (Instrument)		1										1	1
Applied Music (Voice Major)				1		1						2	2
Music Education	6	9		5		2	2	3		1	8	20	28
Music Educ. (Instr. Maj.)		1	2	4	2	6	5	2			9	13	22
Chemistry (Professional)	4	4	10	1	11	2	10	2			35	9	44
Elementary Education	3	81	2	84	1	84	6	69			12	318	330
Geology (Professional)	23		29		23		47				122		122
Secondary Education	6	30	15	21	16	12	9	21			46	84	130
Physical Education	31	10	20	11	25	12	20	6			96	39	135
Physics (Professional)	7	2	4		11	1	8	1			30	4	34
Pre-veterinary	57	2	113	2	1		1				172	4	176
Technical Journalism	8	6	13	5	12	9	7	7			40	27	67
Special Students									12	18	12	18	30
TOTAL	338	281	440	250	333	209	382	187	15	22	1508	949	2457

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	22		28		23		23		2		98		98
Architectural Engineering	23		20		9		19		1		72		72
Architecture	44		46		47	1	53	5	4		194	6	200
Chemical Engineering	44	2	27		40		32				143	2	145
Civil Engineering	70		57		80		54		9		270		270
Electrical Engineering	114		152		145		124		7		542		542
Industrial Education	2		5		3		4		1		15		15
Industrial Technology	6		16		13		6		1		42		42
Industrial Engineering	12		14		13	1	26		2		67	1	68
Mechanical Engineering	159	1	151	1	119		108		9		546	2	548
Nuclear Engineering	39	1	23	1	12		11		1		86	2	88
Special Students									2		2		2
TOTAL	535	4	539	2	504	2	460	5	39		2077	13	2090

SCHOOL OF HOME ECONOMICS

Home Economics		138		94		85		76			393		393
Dietetics and Inst. Mngt.		4		4	1	9	1	4			2	21	23
Home Econ. and Journ.		14		6		7		4			31		31
Home Econ. and Nursing		26		20		3					49		49
Restaurant Management		1			2		1				3	1	4
Special Students										6		6	6
TOTAL		183		124	3	104	2	84		6	5	501	506

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	70		67	2	70		65	1			272	3	275
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SUMMARY

Total Undergraduate	1159	469	1236	379	1084	316	1166	278	59	29	4704	1471	6175
Dual Assignment			1		2		11	3			14	3	17
Net Total Undergraduates	1159	469	1235	379	1082	316	1155	275	59	29	4690	1468	6158
Graduate School											511	79	590
Total											5201	1547	6748
Undergraduate Students Taking Graduate Work											52	1	53
GRAND TOTAL											5149	1546	6695

Tabulation for Second Semester 1957-58

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	85	1	67	.....	61	1	68	1	.....	.....	281	3	284
Agricultural Administration .....	.....	.....	5	.....	13	.....	16	.....	.....	.....	34	.....	34
Agricultural Economics	13	.....	30	.....	18	.....	14	.....	1	.....	76	.....	76
Agric. Economics (Tech.)	1	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....	2
Agricultural Education	29	.....	42	.....	33	.....	38	.....	1	.....	143	.....	143
Agricultural Journalism	3	.....	.....	.....	2	.....	5	.....	.....	.....	10	.....	10
Dairy Manufacturing	4	.....	5	.....	13	.....	16	.....	.....	.....	38	.....	38
Feed Technology	24	.....	23	.....	19	.....	21	.....	.....	.....	87	.....	87
Horticulture (Specialized)	5	.....	5	1	3	.....	4	.....	.....	.....	17	1	18
Landscape Design	8	.....	7	.....	8	.....	9	.....	.....	.....	32	.....	32
Milling Technology	7	.....	7	.....	7	.....	9	.....	.....	.....	30	.....	30
Technical Agronomy	14	.....	10	.....	9	.....	16	.....	1	.....	50	.....	50
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	2	1	3
TOTAL	193	1	201	1	186	1	217	1	5	1	802	5	807

SCHOOL OF ARTS AND SCIENCES

Biological Science	66	31	106	18	20	24	18	3	1	1	211	77	288
Humanities	17	42	22	38	14	22	19	24	.....	3	72	129	201
Physical Science	10	8	14	6	27	4	29	5	.....	1	80	24	104
Social Science	39	24	39	21	41	15	44	15	1	.....	164	75	239
Education	48	126	40	120	44	111	34	84	2	5	168	446	614
General	19	8	23	15	14	2	16	.....	2	3	74	28	102
Business Administration	113	33	130	23	127	15	124	12	2	1	496	84	580
Applied Music	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	2
Voice, Music, Applied .....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	2	2
Chemistry (Professional)	5	4	9	.....	10	2	10	1	.....	.....	34	7	41
Geology (Professional)	18	.....	30	.....	30	.....	42	.....	1	.....	121	.....	121
Music Education, Instrument .....	.....	2	2	4	3	6	5	2	.....	.....	10	14	24
Physics (Professional)	6	2	5	.....	9	.....	8	.....	1	.....	29	2	31
Technical Journalism	7	8	13	6	12	10	5	5	.....	.....	37	29	66
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	12	25	12	25	37
TOTAL	349	289	433	252	351	212	354	151	22	39	1509	943	2452

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	17	.....	27	.....	20	.....	15	.....	.....	.....	79	.....	79
Architectural Engineering	19	.....	15	.....	10	.....	15	.....	2	.....	61	.....	61
Architecture	43	.....	55	.....	48	1	55	5	3	.....	204	6	210
Chemical Engineering	31	1	20	.....	37	.....	31	.....	1	.....	120	1	121
Civil Engineering	58	.....	54	.....	75	.....	37	.....	6	.....	230	.....	230
Electrical Engineering	106	.....	141	.....	139	.....	98	.....	7	.....	491	.....	491
Industrial Education	2	.....	8	.....	3	.....	1	.....	1	.....	15	.....	15
Industrial Technology	11	.....	18	.....	14	.....	4	.....	.....	.....	47	.....	47
Industrial Engineering	11	.....	16	.....	30	1	23	.....	.....	.....	80	1	81
Mechanical Engineering	129	.....	133	1	110	.....	76	.....	8	.....	456	1	457
Nuclear Engineering	37	1	20	1	10	.....	14	.....	.....	.....	81	2	83
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	1
TOTAL	464	2	507	2	496	2	369	5	29	.....	1865	11	1876

SCHOOL OF HOME ECONOMICS

Home Economics .....	.....	124	.....	89	.....	81	.....	66	.....	.....	.....	360	360
Diet. and Inst. Mngt.	1	5	.....	3	.....	8	1	6	.....	.....	2	22	24
Home Econ. and Journ. ....	.....	12	.....	7	.....	10	.....	4	.....	.....	.....	33	33
Home Econ. and Nursing ....	.....	23	.....	17	.....	.....	.....	.....	.....	1	.....	41	41
Restaurant Management .....	.....	1	.....	.....	3	.....	.....	.....	.....	.....	3	1	4
TOTAL	1	165	.....	116	3	99	1	76	.....	1	5	457	462

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	70		66	2	70		64	1			270	3	273
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SUMMARY

Total Undergraduate	1077	457	1207	373	1106	314	1005	234	56	41	4451	1419	5870
Dual Assignment .....	.....	.....	1	.....	.....	1	23	3	.....	.....	24	4	28
Net Total Undergraduate	1077	457	1206	373	1106	313	982	231	56	41	4427	1415	5842
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	587	104	691
Total .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5014	1519	6533
Undergraduate Students Taking Graduate Work .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72	3	75
GRAND TOTAL .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4942	1516	6458

Tabulation for Summer Session 1958

SCHOOL OF AGRICULTURE													
	Freshmen		Sopho- mores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	6	.....	6	.....	10	.....	6	.....	.....	.....	28	.....	28
Agricultural Administration .....	.....	.....	1	.....	1	.....	3	.....	.....	.....	5	.....	5
Agricultural Economics	2	.....	6	.....	5	.....	5	.....	1	.....	19	.....	19
Agric. Economics (Tech.) ....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Agricultural Education	1	.....	9	.....	6	.....	5	.....	.....	.....	21	.....	21
Agricultural Journalism .....	.....	.....	.....	.....	1	.....	2	.....	.....	.....	3	.....	3
Dairy Manufacturing	1	.....	2	.....	4	.....	2	.....	.....	.....	9	.....	9
Feed Technology	2	.....	2	.....	.....	.....	7	.....	.....	.....	11	.....	11
Horticulture (Specialized) ....	.....	.....	1	.....	2	.....	.....	.....	.....	.....	3	.....	3
Landscape Design	1	.....	.....	.....	2	.....	3	.....	.....	.....	6	.....	6
Milling Technology	2	.....	2	.....	2	.....	1	.....	.....	.....	7	.....	7
Technical Agronomy	4	.....	1	.....	1	.....	3	.....	.....	.....	9	.....	9
TOTAL	19	.....	31	.....	34	.....	37	.....	1	.....	122	.....	122

Tabulation for First Semester 1958-59

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	107	1	53	.....	47	.....	67	.....	.....	.....	274	1	275
Agricultural Administration .....	.....	.....	.....	.....	3	.....	14	.....	.....	.....	17	.....	17
Agricultural Economics	24	.....	17	.....	29	.....	19	.....	.....	.....	89	.....	89
Agric. Economics (Tech.) .....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	4	.....	4
Agricultural Education	25	.....	18	.....	36	.....	44	.....	.....	.....	123	.....	123
Agricultural Journalism .....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	5	.....	5
Dairy Manufacturing	8	.....	4	.....	7	.....	15	.....	.....	.....	34	.....	34
Feed Technology	24	.....	20	.....	19	.....	22	.....	.....	.....	85	.....	85
Horticulture (Specialized)	3	.....	5	1	6	1	4	.....	.....	.....	18	2	20
Landscape Design	2	.....	6	.....	5	.....	12	.....	.....	.....	25	.....	25
Milling Technology	9	.....	7	.....	9	.....	7	.....	1	.....	33	.....	33
Technical Agronomy	9	.....	13	.....	13	.....	16	.....	.....	.....	51	.....	51
TOTAL	211	1	147	1	174	1	225	.....	1	.....	758	3	761

SCHOOL OF ARTS AND SCIENCES

Biological Science	89	22	92	27	14	14	20	6	.....	.....	215	69	284
Humanities	23	38	17	35	16	28	23	28	.....	.....	79	129	208
Physical Science	57	11	25	6	31	3	37	4	.....	.....	150	24	174
Social Science	36	32	47	25	36	22	44	12	.....	.....	163	91	254
Education	54	141	43	132	48	109	53	100	2	1	200	483	683
General	61	34	20	11	21	11	15	1	1	.....	118	57	175
Business Administration	114	30	87	27	101	16	141	11	3	.....	446	84	530
Applied Music	1	5	.....	.....	.....	.....	.....	.....	.....	.....	1	5	6
Applied Music (Voice Major) .....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	2	2
Chemistry (Professional)	2	.....	4	3	5	.....	12	1	.....	.....	23	4	27
Geology (Professional)	4	.....	9	.....	19	.....	43	.....	.....	.....	75	.....	75
Music Educ. (Instrumental) .....	.....	.....	.....	.....	2	3	5	7	.....	.....	7	10	17
Physics (Professional)	1	.....	5	1	2	.....	7	1	.....	.....	15	2	17
Technical Journalism	2	2	7	8	9	3	8	7	.....	.....	26	20	46
Special Students	1	1	.....	.....	.....	.....	.....	.....	18	21	19	22	41
TOTAL	445	316	356	275	304	210	408	179	24	22	1537	1002	2539

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	30	.....	21	.....	18	.....	21	.....	.....	.....	90	.....	90
Architectural Engineering	14	.....	17	.....	14	.....	11	.....	.....	.....	56	.....	56
Architecture	52	1	55	.....	41	.....	63	5	2	.....	213	6	219
Chemical Engineering	44	.....	21	.....	20	.....	33	.....	2	.....	120	.....	120
Civil Engineering	68	.....	76	.....	44	1	70	.....	6	.....	264	1	265
Electrical Engineering	98	.....	133	.....	144	.....	138	.....	11	.....	524	.....	524
Industrial Arts .....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	1
Industrial Education	7	.....	5	.....	9	.....	2	.....	1	.....	24	.....	24
Industrial Engineering	8	.....	16	.....	31	.....	28	1	1	.....	84	1	85
Industrial Technology	6	.....	14	.....	17	.....	13	.....	1	.....	51	.....	51
Mechanical Engineering	100	.....	110	.....	115	1	107	.....	8	.....	440	1	441
Nuclear Engineering	50	2	30	1	17	.....	13	.....	1	1	111	4	115
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	2	1	3
TOTAL	477	3	498	1	471	2	499	6	35	2	1980	14	1994

SCHOOL OF HOME ECONOMICS

Home Economics	2	117	.....	101	.....	81	.....	76	.....	.....	2	375	377
Diet. and Inst. Management .....	.....	7	.....	7	.....	4	.....	9	.....	.....	.....	27	27
Home Econ. and Journ. ....	.....	14	.....	6	.....	3	.....	10	.....	.....	.....	33	33
Home Econ. and Nursing .....	.....	29	.....	22	.....	4	.....	.....	.....	.....	.....	55	55
Restaurant Management	2	.....	1	1	1	1	3	.....	.....	.....	7	2	9
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	3	3
TOTAL	4	167	1	137	1	93	3	95	.....	3	9	495	504

SCHOOL OF VETERINARY MEDICINE

Veterinary Medicine	67	3	66		67	2	70				270	5	275
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SUMMARY

Net Total Undergraduate	1204	490	1068	414	1017	308	1205	280	60	27	4554	1519	6073
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	580	101	681
Total .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5134	1620	6754
Undergraduate Students Taking Graduate Work .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	46	2	48
GRAND TOTAL .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5088	1618	6706

Tabulation for Second Semester 1958-59

SCHOOL OF AGRICULTURE													
	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	98	1	58	.....	42	.....	53	.....	2	.....	253	1	254
Agricultural Administration .....	.....	.....	1	.....	3	.....	10	.....	.....	.....	14	.....	14
Agricultural Economics	21	1	25	.....	28	.....	14	.....	.....	.....	88	1	89
Agrie. Economics (Tech.) .....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Agricultural Education	25	.....	18	.....	37	.....	33	.....	.....	.....	113	.....	113
Agricultural Journalism	3	.....	1	.....	.....	.....	2	.....	.....	.....	6	.....	6
Dairy Manufacturing	5	.....	3	.....	8	.....	9	.....	.....	.....	25	.....	25
Feed Technology	26	.....	24	.....	19	.....	16	.....	.....	.....	85	.....	85
Horticulture (Specialized)	1	.....	5	.....	7	1	.....	.....	.....	.....	13	1	14
Landscape Design	2	.....	6	.....	5	.....	9	.....	.....	.....	22	.....	22
Milling Technology	6	.....	13	.....	8	.....	7	.....	2	.....	36	.....	36
Technical Agronomy	9	.....	12	.....	15	.....	4	.....	.....	.....	40	.....	40
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	1
TOTAL	196	2	168	.....	172	1	157	.....	5	.....	698	3	701
SCHOOL OF ARTS AND SCIENCES													
Biological Science	78	17	85	22	16	11	17	4	1	.....	197	54	251
Humanities	22	40	27	34	20	27	21	27	1	1	91	129	220
Physical Science	50	7	41	7	40	2	42	2	1	1	174	19	193
Social Science	49	33	46	23	43	27	34	13	2	.....	174	96	270
Education	84	148	61	134	52	103	58	91	1	1	256	477	733
General	49	32	22	10	21	9	10	.....	1	.....	103	51	154
Business Administration	114	29	112	26	110	15	116	8	6	1	458	79	537
Applied Music	1	3	1	.....	.....	1	.....	1	.....	.....	2	5	7
Chemistry (Professional) .....	.....	.....	3	3	.....	.....	8	1	.....	.....	11	4	15
Geology (Professional)	1	.....	5	.....	16	.....	31	.....	.....	.....	53	.....	53
Physics (Professional) .....	.....	.....	4	1	3	.....	3	1	.....	.....	10	2	12
Technical Journalism	1	.....	7	7	7	2	5	5	.....	.....	20	14	34
Special Students .....	.....	1	1	.....	.....	.....	.....	.....	18	22	19	23	42
TOTAL	449	310	415	267	328	197	345	153	31	26	1568	953	2521
SCHOOL OF ENGINEERING AND ARCHITECTURE													
Agricultural Engineering	23	.....	27	.....	18	.....	12	.....	1	.....	81	.....	81
Architectural Engineering	10	.....	11	.....	14	.....	7	.....	.....	.....	42	.....	42
Architecture	56	1	62	.....	41	.....	59	5	2	.....	220	6	226
Chemical Engineering	37	1	13	.....	18	.....	27	.....	2	.....	97	1	98
Civil Engineering	60	.....	59	.....	43	.....	48	.....	5	.....	215	.....	215
Electrical Engineering	89	.....	128	.....	136	.....	106	.....	7	.....	466	.....	466
Industrial Education	4	.....	6	.....	10	.....	2	.....	1	.....	23	.....	23
Industrial Engineering	4	.....	14	.....	35	.....	24	1	2	.....	79	1	80
Industrial Technology	6	.....	18	.....	16	.....	7	.....	.....	.....	47	.....	47
Mechanical Engineering	71	.....	75	.....	104	1	72	.....	7	.....	329	1	330
Nuclear Engineering	42	1	18	1	18	.....	13	.....	2	.....	93	2	95
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	1	2
TOTAL	402	3	431	1	453	1	377	6	30	1	1693	12	1705
SCHOOL OF HOME ECONOMICS													
Home Economics	2	107	.....	92	.....	81	.....	65	.....	.....	2	345	347
Diet. and Inst. Mngt. ....	.....	7	.....	8	.....	5	.....	8	.....	.....	.....	28	28
Home Econ. and Journ. ....	.....	11	.....	5	.....	3	.....	9	.....	.....	.....	28	28
Home Econ. and Nursing ....	.....	27	.....	19	.....	.....	.....	.....	.....	1	.....	47	47
Restaurant Management	2	.....	1	1	1	1	2	.....	.....	.....	6	2	8
Special Students .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	6	6
TOTAL	4	152	1	125	1	90	2	82	.....	7	8	456	464
SCHOOL OF VETERINARY MEDICINE													
Veterinary Medicine	65	2	65	.....	68	2	70	.....	.....	.....	268	4	272
SUMMARY													
Total Undergraduate	1116	469	1080	393	1022	291	951	241	66	34	4235	1428	5663
Graduate School .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	626	109	735
Total .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4861	1537	6398
Undergraduate Students Taking Graduate Work .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70	8	78
GRAND TOTAL .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4791	1529	6320

Tabulation for Summer Session 1959

SCHOOL OF AGRICULTURE

	Freshmen		Sophomores		Juniors		Seniors		Specials		Totals		Total
	M	W	M	W	M	W	M	W	M	W	M	W	
Agriculture	4		5		11		4				24		24
Agricultural Administration ..					1						1		1
Agricultural Economics			4		8		2				14		14
Agric. Economics (Tech.)			1								1		1
Agricultural Education			3		13		9				25		25
Agricultural Journalism	1						1				2		2
Dairy Manufacturing			1		1						2		2
Feed Technology	1		2		4		3				10		10
Horticulture (Specialized)					2	1					2	1	3
Landscape Design					1		1				2		2
Milling Technology			1				1				2		2
Technical Agronomy	1				6		1				8		8
TOTAL	7		17		47	1	22				93	1	94

SCHOOL OF ARTS AND SCIENCES

Biological Science	5	4	8	6	2	3	5		1	1	21	14	35
Humanities	2	5	5	2	7	3	7	3		1	21	14	35
Physical Science	4	2	10	1	19	1	19		1	1	53	5	58
Social Science	3	5	6	2	13	6	9	3	1		32	16	48
Education	6	25	10	40	22	61	26	62	3	23	67	211	278
General	2	7	3	2	4	1	2		1		12	10	22
Business Administration	10	3	17	3	28		19	1			74	7	81
Music, Applied		1										1	1
Music, Applied (Voice)						1						1	1
Chemistry				1			2				2	1	3
Geology (Professional)	1		2		10	1	16		1		30	1	31
Physics (Professional)			1	1	1		1	1			3	2	5
Technical Journalism			1	1	2	1	1				4	2	6
Special Students									39	45	39	45	84
TOTAL	35	52	63	59	108	78	107	70	47	71	358	330	688

SCHOOL OF ENGINEERING AND ARCHITECTURE

Agricultural Engineering	1		6		4		1				12		12
Architectural Engineering	1		1		6		2				10		10
Architecture	3	1	15		16		28	1	4	1	66	3	69
Chemical Engineering	1	1	2				2	1	1		6	2	8
Civil Engineering	4		2		13		14		3		36		36
Electrical Engineering	12		31		45		24		3		115		115
Industrial Education			2		3		1				6		6
Industrial Engineering			4		16		7				27		27
Industrial Technology	2		5		7		2				16		16
Mechanical Engineering	8		13		29		12		2		64		64
Nuclear Engineering	3		2		8		3		1		17		17
Special Students									4		4		4
TOTAL	35	2	83		147		96	2	18	1	379	5	384

SCHOOL OF HOME ECONOMICS

Home Economics		8		19		15		5				47	47
Diet. and Inst. Mngt.		1		1		2			2			6	6
Home Econ. and Journ.						1						1	1
Home Econ. and Nursing		18		18		1						37	37
Special Students									1			1	1
TOTAL		27		38		19		5	3			92	92

SUMMARY

Net Total Undergraduate	75	81	163	97	302	98	225	77	65	75	830	428	1258
Graduate School											581	177	758
Total											1411	605	2016
Undergraduate Students Taking Graduate Work											8		8
GRAND TOTAL											1403	605	2008

NEW AND DIFFERENT STUDENTS ENROLLED AT KANSAS STATE UNIVERSITY

First Semester, Second Semester and
Summer Session 1958-59

Freshmen	1814
Sophomores	1626
Juniors	1473
Seniors and 5th Year	1576
Specials and Provisionals	251
Graduate	1188

TOTAL 7928

Record of Enrollment and Degrees Conferred, 1863-1959

YEAR	Summer school	Housekeepers' short course	Dairy Mfg. short course	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshman	Vocational school	Freshman	Sophomore	Junior	Senior	Graduate	Counted twice	Net total	Degrees granted	
1863-'64								92			14						106		
1864-'65								91			14	8	1				114		
1865-'66								99			21	3	5				127		
1866-'67								118			11	7	1	5			142	5	
1867-'68								103			6	5	1				115	1	
1868-'69								137			10	10	2		1		160		
1869-'70								119			10	12	1				142		
1870-'71								118			13	5	4	5			145	10	
1871-'72								129			20	11	3	5	2	2	168	4	
1872-'73																	173	3	
1873-'74								137			24	14	3	6			184	5	
1874-'75								103			26	10	2	2			143	3	
1875-'76																	238	5	
1876-'77																	232	10	
1877-'78								75			42	23	5	5			152	4	
1878-'79							1				89	89	16	12			214	11	
1879-'80							1				166	61	35	11	2		276	9	
1880-'81							6				178	48	24	9	2		267	8	
1881-'82							5				227	50	19	11			312	11	
1882-'83							4				241	60	30	12			347	15	
1883-'84							2				255	92	26	18	2		395	17	
1884-'85							2				271	71	36	16	5		401	15	
1885-'86							1				273	91	35	24	4		428	23	
1886-'87											303	100	44	24	10		481	26	
1887-'88											305	92	46	27	2		472	23	
1888-'89											266	103	41	28	7		445	26	
1889-'90							1				307	105	63	28	10		514	29	
1890-'91											343	135	50	53	12		593	54	
1891-'92											336	139	62	37	10		584	35	
1892-'93											339	110	66	43	29		587	48	
1893-'94											275	141	72	42	25		555	45	
1894-'95							5				276	108	89	64	39		572	60	
1895-'96							3				353	121	67	71	32		647	71	
1896-'97							6	67			321	163	69	62	46		734	63	
1897-'98							15	77			316	174	77	82	57	10	803	79	
1898-'99				6		9	40	110			306	177	92	65	40	21	871	63	
1899-1900		24		26		35	57	47	50		376	163	109	69	27	22	1094	61	
1900-'01		47			72	79	109		79		348	183	80	74	40	52	1321	69	
1901-'02		41			66	87	125		19		396	206	120	65	32	59	1396	55	
1902-'03		63			38	78	123		36		471	229	141	86	24	57	1574	55	
1903-'04	17	51			16	72	122		33		403	206	161	114	20	36	1605	103	
1904-'05	15	88			24	99			30		289	198	122	117	26	43	1462	109	
1905-'06	18	92			28	118			46		373	214	145	110	30	64	1690	100	
1906-'07	18	134			23	179			48	144	411	269	149	133	24	88	1937	124	
1907-'08	29	188			26	173			42	134	450	357	202	148	26	82	2192	120	
1908-'09	25	168			18	197			42	134	491	381	243	171	28	86	2308	151	
1909-'10	22	152	4		111	124			87	89	453	456	417	286	170	26	70	2305	146
1910-'11	31	160	9		26	285			107		364	533	412	288	248	34	59	2407	207
1911-'12	94	160	14			280			85		580	337	461	288	261	44	81	2523	236
1912-'13	282	175	11			289			129		654	444	432	355	268	55	166	2928	234
1913-'14	370	149	12			223			112			516	431	324	327	64	159	3027	291
1914-'15	472	127	18			199	98		120		560	575	368	383	321	48	200	3089	229
1915-'16	536	85	17			207	188		175		484	605	454	305	401	76	219	3314	359
1916-'17	586	103	14			228	191		172		422	693	471	378	282	68	279	3339	210
1917-'18	481	84				119	135		138		231	483	349	294	238	36	190	2406	233
1918-'19	519	25	5			160	400		199		216	810	322	254	201	34	144	2991	174
1919-'20	415	57	3			117	362		271		224	894	400	297	273	44	167	3376	271
1920-'21	604	30	10			96	278		270		280	878	602	318	273	42	294	3395	263
1921-'22	820	19	10			59	173		221		297	931	628	422	296	125	813	3560	300
1922-'23	884	19	8			55	83		163		220	1004	656	460	401	118	457	3626	372
1923-'24	978	12	7			43	57		161		167	1160	657	458	413	171	475	3812	385
1924-'25	1120	14	14			55	54		139		47	1391	679	467	347	185	486	4031	388
1925-'26	947	12	11			41	29		89			1494	725	512	344	182	384	4019	392
1926-'27	959		18			52			71		19	1311	854	509	411	179	300	4083	434
1927-'28	966		20			57			88		7	1039	819	584	500	167	418	3878	498
1928-'29	920		18			51			57		9	1084	743	584	537	197	321	3879	545
1929-'30	902		13			59			70		9	1128	787	581	554	*432	548	3987	560
1930-'31	995		24			52			50			1077	790	605	528	506	589	4045	515
1931-'32	1059		12			29			54			933	752	633	572	572	688	3928	605

RECORD OF ENROLLMENT AND DEGREES CONFERRED, 1863-1959—CONCLUDED

YEAR	Summer school	Housekeepers' short course	Dairy Mfg. short course	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshman	Vocational school	Freshman	Sophomore	Junior	Senior	Graduate	Counted twice	Net total	Degrees granted
1932-'33.....	995						72				666	596	552	590	518	630	3359	641
1933-'34.....	655						61				707	558	520	522	327	422	2928	493
1934-'35.....	722						52				1081	616	548	557	316	456	3436	522
1935-'36.....	989						69				1330	820	660	574	391	572	4261	550
1936-'37.....	917						64				1326	947	774	623	440	634	4457	611
1937-'38.....	890						67				1297	972	810	787	409	537	4695	729
1938-'39.....	911						61				1246	959	864	855	463	559	4800	806
1939-'40.....	920						61				1306	958	926	871	490	622	4910	789
1940-'41.....	935						40				1284	969	905	900	524	655	4902	819
1941-'42.....	880						17				1274	926	807	748	417	590	4479	685
1942-'43.....	1178						21				1234	717	587	717	253	846	3861	674
1943-'44†.....	181						21				1234	717	587	717	217	888	3786	.....
1943-'44.....	911						18				483	371	312	440	193	619	2109	418
1944-'45.....	881						48				601	383	289	260	196	594	2064	288
1945-'46.....	2785						227				1730	771	524	468	331	1784	5052	519
1946-'47.....	3559						183				3453	1910	1019	856	383	2849	7814	881
1947-'48.....	2446						97				2100	2325	1595	1123	456	1976	8166	1106
1948-'49†.....	2246						64				1883	1768	1927	1753	550	1825	8366	1666
1949-'50.....	1808						44				1941	1692	1512	1952	775	82	7834	2121
1950-'51.....	1582						42				1802	1487	1263	1446	850	58	6867	1643
1951-'52.....	1043						36				1670	1167	1026	1097	649	47	5598	1210
1952-'53.....	1032						47				1987	1170	950	1009	650	82	5731	1116
1953-'54.....	1246						94				1976	1287	916	960	759	62	5930	1098
1954-'55.....	1513						175				1950	1501	825	1178	812	65	6376	1095
1955-'56.....	1712						154				2025	1788	912	1411	912	77	7125	1181
1956-'57.....	1796						164				1939	1912	1519	1308	894	.....	7736	1346
1957-'58.....	1973						185				1838	1767	1595	1584	1077	.....	8046	1615
1958-'59.....	2008						251				1814	1626	1473	1576	1188	.....	7928	1731

* Figures above this column include neither graduate students in summer session, nor undergraduate students pursuing undergraduate work.

† Beginning with this year this summary is made at the close of the summer session instead of at the close of the spring semester as before.

‡ Beginning with this year, summer school students are included under the captions: Special, Freshman, Sophomore, Junior, Senior, and Graduate.

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