## BULLETIN <br> of

## TEXAS TECHNOLOGICAL COLLEGE

# Thirty-Ninth Annual General Catalog 

With Announcements for 1964-1965



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## Calendar

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## College Calendar, 1964-1965

Fortieth Annual Session

## Fall Semester

## 1964

Sept. 11. Friday. 10 a.m., general faculty meeting, Student Union Ballroom. 2 p.m., school faculty meetings.

Sept. 13. Sunday. 12 Noon, residence halls open for occupancy; first meal, breakfast, Monday, Sept. 14.

Sept. 14. Monday. Fall semester begins. Orientation for entering freshmen and for all undergraduate students entering Texas Tech for the first time.

Sept. 15. Tuesday. Continuation of orientation, testing and counseling for entering freshman. 8 a.m., registration begins.

Sept. 16. Wednesday. Registration.
Sept. 17. Thursday. Registration.
Sept. 18. Friday. 8 a.m., classes begin.
Sept. 19. Saturday. 8 a.m. 12 Noon, registration, restricted to graduate students who have been unable to enroll during the regular registration period.

## REGISTRATION CALENDAR FOR THE FALL SEMESTER 1964

Tuesday, September 15
$\qquad$ 8 a.m. to 12 Noon and $1: 30$ to 6 p.m.

Wednesday, September 16 Registration $\qquad$ 8 a.m. to 12 Noon and $1: 30$ to 6 p.m. Entering Freshman Registration Begins 8 a.m.

Thursday, September 17
Registration 8 a.m. to 12 Noon

Saturday, September 19
8 A.M. to 12 Noon
Registration restricted to graduate students who have been unable to enroll during the regular registration period.
Registration is not complete until fees are paid. Class and lab tickets must be stamped "PAID" by the College Cashier before a student may attend class.

## 8

COLLEGE CALENDAR
Sept. 23. Wednesday. Only day on which students may change sections and add courses.
Oct. 5-7. Monday-Wednesday. Period for 1965 degree candidates to file information forms and photographs with the Placement Service.
Oct. 19. Monday. Grade of "W" will be given for courses dropped on or before this date.
Nov. 9. Monday. 9 a.m., mid-semester grade reports due in Office of the Registrar.
Nov. 25. Wednesday. 10 p.m., classes dismissed for Thanksgiving holidays.

Nov. 30. Monday. 8 a.m., classes resumed.
Dec. 19. Saturday. 12 Noon, classes dismissed for Christmas holidays.

## 1965

Jan. 4. Monday. 8 a.m., classes resumed.
Jan. 5. Tuesday. Last day to drop a course.
Jan. 10-14. Sunday-Thursday. Period of restricted social activities.
Jan. 14. Thursday. Day of no classes.
Jan. 15-22. Friday-Friday. Final examinations for fall semester.
Jan. 23. Saturday. Fall semester ends.
Jan. 25. Monday. 9 a.m., grades and absence reports for fall semester due in Office of the Registrar.

## Spring Semester

## 1965

Jan. 25. Monday. Spring semester begins. 10 a.m., residence halls open to new occupants. 1:30 p.m., orientation and testing for entering freshmen and for all undergraduate students entering Texas Tech for the first time.
Jan. 26. Tuesday. Registration.
Jan. 27. Wednesday. Registration.
Jan. 28. Thursday. 8 a.m.-12 Noon, registration.
Jan. 29, Friday. 8 a.m., classes begin.
Jan. 30. Saturday. 8 a.m.-12 Noon, registration, restricted to graduate students who have been unable to enroll during the regular registration period.

## REGISTRATION CALENDAR FOR SPRING SEMESTER 1965

Tuesday, January 26
$\quad$ Registration ..................... 8 a.m. to 12 Noon and 1:30 to 6 p.m.
Wednesday, January 27

$\quad$| Registration $\ldots . . . . . . . . . . . . . . . . . . ~$ |
| :--- |
| Entering Freshman |

Registration Begins 8 a.m.

Thursday, January 28
Registration 8 a.m. to 12 Noon.

Saturday, January, 30
8 A.M. to 12 Noon ................. Registration restricted to graduate students who have been unable to enroll during the regular registration period.
Registration is not complete until fees are paid. Class and lab tickets must be stamped "PAID" by the College Cashier before a student may attend class.

Feb. 2. Tuesday. Only day on which students may change sections and add courses.

Mar. 1. Monday. The grade of "W" will be given for all courses dropped on or before this date.

Mar. 9. Tuesday. Last day for May degree candidates to file information forms and photographs with the Placement Service.

Mar. 23. Tuesday. Last day for May degree candidates to order academic regalia and invitations at the College Bookstore. Last day for May degree candidates to pay diploma fees at Comptroller's Office.

Mar. 27. Saturday. 9 a.m., mid-semester reports due in Office of the Registrar. 12 Noon, classes dismissed for Spring Vacation.

April 5. Monday. 8 a.m., classes resumed.
April 20 Tuesday. Last day for May degree candidates to complete correspondence courses. (Instructors will file grades on correspondence courses by Wednesday, May 5.) Last day to submit to an academic dean a request to graduate in absentia. Last day for May degree candidates to remove grades of "I" and "P." Instructors will send change-of-grade cards to the student's academic dean as soon as work has been completed.

May 3. Monday. Last day to drop a course.

## 10 COLLEGE CALENDAR

May 12-18. Wednesday-Tuesday. Period of restricted social activities.

May 18. Tuesday. Day of no classes.
May 19-26. Wednesday-Wednesday. Final examinations for spring semester.

May 20. Thursday. Last day to submit to the Graduate Dean the final copy of thesis or dissertation and to pay the binding fee.

May 25. Tuesday. Residence hall dining rooms close with serving of the evening meal.

May 26. Wednesday. 10 a.m., residence halls close. Degree candidates may occupy rooms until 10 a.m., Sunday, May 30.

May 27. Thursday. 2 p.m., grades and absence reports for degree candidates due in Office of the Registrar.

May 28. Friday. 2 p.m., final and official graduation lists due in Office of the Registrar.

May 29. Saturday. 8:30 a.m., graduation rehearsal for all degree candidates. Academic regalia must be obtained at College Bookstore prior to 12 Noon. 8 p.m., Commencement exercises. Spring semester ends.

May 31. Monday. 8 a.m., all grades and absence reports for the spring semester are due in the Office of the Registrar.

## Summer Session, 1965

June 1. Tuesday. Summer session begins.

## Fall Semester, 1965

Sept. 13. Monday. Fall semester begins.

## The Meaning of College

Selecting a college is one of the most important choices a person ever makes. On this decision often depends not only how one spends four years of his life, but also the career he follows, the friends he chooses, and the interests he develops.

The person who contemplates going to college should look upon it as the greatest opportunity of his life. Here he is concerned solely with one thing, learning, and other affairs are subordinated to this. He will read many books (a lifelong habit). He will listen to lectures and take part in classroom discussions. He will perform experiments in the laboratory, write reports, and take field trips. All of these activities are designed to increase his knowledge, sharpen his intellectual powers, test his ideas. College is a place where the student learns to think for himself and to recognize ignorance and prejudice and to overcome them through knowledge and by submitting his beliefs to the test of reason.

Ideally, a college is a community of scholars joined together in the search for knowledge and truth. And at the heart of it lies the one essential element without which there can be no college: intellectual activity fostered by intellectual curiosity. Professors and students are united, as has so often been said, in the effort to roll back the frontiers of knowledge. Thus is knowledge passed on to succeeding generations, new knowledge created, and experts developed for the service of society -the three functions of a university.

Naturally, college offers other things as well. The student may expect to obtain the knowledge necessary for building a successful career and living a useful life. He will form lifelong friendships, become interested in new things (the fine arts or science, perhaps), and participate in athletics. If he has already decided on a career, his years at college will equip him to pursue it. If he is undecided about his life's work, college will enable him to explore many fields of knowledge before deciding on one. In either event his studies will broaden his understanding of the society of which he is a part and of the people who belong to it.

In short, college provides a bridge between protected childhood years and adult life with all of its complexities and responsibilities. It should provide a means for making the transition successfully.

The person contemplating going to college should understand that it is far from being merely a continuation of high school. He will be expected to study harder (about two hours of preparation for every hour spent in class), show a considerable amount of maturity, and assume the responsibility for making his own decisions and regulating his conduct. The student who ranked low in his high school class, who showed little interest in concentrated and sustained effort in his studies, or who scored low on the entrance tests given by Texas Tech, should consider seriously whether he wishes to accept the challenge implicit in his entrance into college work.

## 12 THE MEANING OF COLLEGE

It is the aim of Texas Technological College to provide facilities and instructors so that students may benefit to the maximum extent possible from their college years. The advantage taken of these opportunities depends upon each individual, but it should be noted that competition for a place in the College is becoming stiffer each year. While Texas Tech has not yet had to restrict its enrollment, it does require its students to maintain increasingly high standards if they wish to continue.

This catalog is designed to explain as clearly and as logically as possible the programs and facilities Texas Tech offers, who is admitted and how, regulations currently in force, and how to obtain a degree. It contains a complete record of undergraduate courses offered and of faculty members, and should furnish answers to most questions that may arise. It is suggested that the prospective student become thoroughly familiar with the sections that apply to him and bring his copy with him when he comes to the College. Questions which cannot be answered should be directed to the Dean of Admissions or to the dean of the school in which the student plans to enroll.

## Definitions

The explanations of the following terms in use at Texas Technological College are intended to help the student preparing to enter the College, and for the use of others using this catalog. Other explanations and descriptions are to be found in the body of this bulletin.

ACADEMIC YEAR. The period of the annual session, exclusive of summer school. It is divided into two semesters and extends from September to June.

ACTIVITIES, EXTRACURRICULAR. Activities that are part of student life and generally considered of benefit to the student but which are not part of the curriculum.

ADMISSION. Acceptance of a candidate for enrollment in the College.

ADMISSIONS, DEAN OF. The college officer charged with the responsibility for admitting students. At Texas Technological College he is also the Registrar.

ADVISER. One assigned to help the student with academic and personal problems, generally on the basis of a reciprocal exchange of ideas. The student is his advisee.

BACHELOR'S DEGREE. A first-level degree granted upon completion of a course of study in a given field and based on at least four years of college work or its equivalent.

CLASSIFICATION. A student's status in respect to progress toward the completion of his curriculum-freshman, sophomore, junior, senior-usually based upon the number of hours or courses to his credit at the time or any given registration.

CLASS TICKET. The official form that authorizes admission to a course, course section, or laboratory.

COURSE. Organized subject matter in which instruction is offered within a semester and for which credit toward graduation or certification is usually given.

COURSE, CHANGE OF. The procedure through which a student makes a postregistration change in his schedule of classes.

COURSE, HONORS. A course limited to superior students. Honors programs are available only in the Schools of Arts and Sciences and Business Administration.

COURSE NUMBER. Indicates the class level of a course: freshman, sophomore, junior, senior, graduate; also the number of credit hours it carries.

COURSE PREREQUISITE. The preliminary requirement that must be met before a course can be taken.

## 14 DEFINITIONS

COURSE TITLE. The descriptive name of the course. It gives a general idea of the content of the course.

CREDIT. The award granted for completing a course, usually described in semester hours.

CREDIT HOUR. Defined by the number of hours per week in class and the number of weeks in the session. One credit hour is usually assigned to a class that meets 50 minutes a week over a period of a semester. Laboratory, field work, drawing, music, practical arts, physical education, and other types of instruction, are appropriately equated.

CURRICULUM. A body of courses required for a degree or constituting a major field of study.

DEAN, ACADEMIC. The chief administrative officer of a school of instruction, as Dean of Agriculture, Dean of Arts and Sciences.

DEPARTMENT, ACADEMIC. The College is divided into 6 schools for instructional purposes. The schools are further divided into 43 departments according to subject matter, as the Department of Accounting in the School of Business Administration, Department of English in the School of Arts and Sciences. Each department has a Head, whose name and office number are listed in this catalog under the name of the department.

DISCIPLINARY PROBATION is the middle statis between good standing and suspension. The student remains enrolled but under stated conditions according to college policies. Disciplinary probation covers a stated fiscal period during which it is determined whether the student is returned to good standing having met the stated requirements, or is suspended for failure to meet the stated requirements.

ELECTIVE. Any of a number of courses from which a student is allowed to select. A course not required in the curriculum which the student is following is referred to as a free elective.

FEE, OUT-OF-STATE. The fee, larger in amount than the regular fee, that a state college assesses students whose domicile is outside of the state in which the college is located. See the discussion in this catalog under "Expenses."

GRADE. A grade is a rating or evaluation of a student's achievement. It is expressed on a letter scale. See the discussion of grading on Page 33.

GRADE POINT. The numerical value assigned to each grade a student receives in a course to provide a more exact determination of his scholarship. Every credit hour of A, for example, carries four grade points. F hours carry no grade points. See the discussion of grade points on Page 34.

IDENTIFICATION-ACTIVITY (D) CARD. A card issued during registration which the student retains as evidence of his status as a Texas Tech student; also used as credential for attending athletic events.

LOAD, NORMAL. The load limits within which a full-time program may vary without special permission of the student's academic dean; usually 15-17 semester hours during each semester of the long session and 6 semester hours during each term of the summer session.

MAJOR, or MAJOR FIELD OF STUDY. The student's primary field of emphasis. The field of concentration may fall within a single department of instruction or may overlap several departments. In the latter case the major is described as a combination major.

MATRICULATION. The first registration following admission as a classified student.

MIDSEMESTER REPORTS. Grade evaluations not officially recorded, but given at the midway point in each semester for the student's guidance.

RECOGNIZED ORGANIZATION. One which has been officially examined and approved by the Committee on Student Organizations and is eligible to participate in official campus events and to use College facilities.

REGISTRATION. The enrollment of students in classes. For the student this involves the selection of classes, having them officially accepted, and payment of fees; for faculty, and staff, it includes the preparation of class rolls and related student records, for the orderly beginning of instruction. The plan by which students select courses for a succeeding term in advance of the official opening date of the term is called PREREGISTRATION.

SCHEDULE, CLASS. The list of courses and sections offered, together with the names of the instructors, the days, hours, and places of meeting.

SECTION. A division of a course, as between one or more instructors, but having the same subject matter. For example, English 131, Section 1.

SEMESTER. Half of an academic year, usually 18 weeks.
SOCIAL CALENDAR. The list of approved campus events kept in the Office of the Dean of Women.

SPRING VACATION. A recess for one week in the spring, usually coming shortly after midsemester reports.

SUSPENSION. Suspension is an involuntary separation of the student from the College. It may extend for one semester, or until a specified date, or until a stated condition is met.

TERM. The summer session is divided into two terms of approximately six weeks each.

TRANSCRIPT. A college or university transcript is defined as an unabridged and certified academic record prepared for the purpose of communicating information concerning a student from one institution to another institution or agency. It contains the identification of the

## 16 DEFINITIONS

student, the identification of the issuing institution, a list of courses, grades, and credits earned, and the separation or termination status of the student.

TRANSFER CREDIT. Credit transferred to or from another college or university.

WITHDRAWAL. A release from enrollment. The student notifies the appropriate authorities, thereby making it an OFFICIAL WITHDRAWAL. When the student merely stops attending classes without notifying authorities, failing marks are recorded and charged against him.

All inquiries and correspondence concerning admission to the College should be addressed to:

Dean of Admissions
Texas Technological College
Lubbock, Texas.

Inquiries and correspondence having to do with room reservations in the residence halls should be addressed to:

Supervisor of Residence Hall Room Reservations
Texas Technological College
Lubbock, Texas
Off-campus housing must be approved by the Office of the Dean of Student Life.

# General Information 

# Texas Technological College 

## Historical Sketch

When Texas Technological College welcomed its first students in the fall of 1925 , its uncompleted buildings gazed out over the dusty prairie from the outskirts of the small town of Lubbock. Created under the terms of Senate Bill No. 103 passed in 1923 by the legislature of Texas, the College is a part of the public education system of the state. To indicate how the College has expanded upon the original intent of the legislature, the following quotation from Senate Bill No. 103 is to the point: "Said college . . . shall be a coeducational college giving thorough instruction in technology and textile engineering from which a student may reach the highest degree of education along the lines of manufacturing cotton, wool, leather, and other raw materials produced in Texas, including all branches of textile engineering, the chemistry of materials, the technique of weaving, dyeing, tanning, and the doing of any and all other things necessary for the manufacturing of raw materials into finished products; and said college shall also have complete courses in the arts and sciences, physical, social, political, pure and applied, such as are taught in colleges of the first class leading to the degrees of Bachelor of Science, Bachelor of Arts, Bachelor of Literature, Bachelor of Technology and any and all other degrees given by colleges of the first class; said college being designed to elevate their ideals, enrich the lives, and increase the capacity of the people for democratic self-government and particularly to give instruction in technological, manufacturing, and agricultural pursuits and domestic husbandry and home economics so that the boys and girls of this state may attain their highest usefulness and greatest happiness and in so doing may prepare themselves for producing from the state its greatest possible wealth."

From the first Texas Tech's enrollment exceeded expectations; its student body increased from 914 in the fall of 1925 to 12,036 in the fall of 1963. From six buildings in 1925, it has grown in 1964 to 95 permanent structures spaced over a campus of nearly 2,000 acres; an additional tract of 5,800 acres near Amarillo provides the site for the Texas Technological College Research Farm. Instead of confining its program to technological subjects, the College has expanded its offerings so that today it is in reality a state university with 43 academic departments organized in five undergraduate schools and a graduate school, offering the bachelor's degree in 85 fields, the master's in 39 , and the doctor's in 10.

A recent analysis of the College by a faculty committee gives this concept of its purpose and function: "Texas Technological College can best serve the future by striving to be a multipurpose state university of the first class-the center of learning in West Texas-which provides opportunity for a liberal education and professional training at the

## 18 HISTORY

undergraduate and graduate levels." President R. C. Goodwin has said, "The purpose of Texas Technological College is to provide adequate opportunities in higher education for its students. To be adequate these opportunities must be sufficient in quality, both as to coverage and depth. . . . It is also within the scope and purpose of this College not only to provide instruction to the students but to inspire both the students and the faculty to creative and original work through contemplation and research. A college that does not do so can not rightly be called a college."

Texas Technological College was at first composed of the Colleges of Liberal Arts, Household Economics, Agriculture, and Engineering with its important subdivision of the Department of Textile Engineering. Designations were later changed to divisions, and in 1956 the present designation of schools was adopted. The College of Liberal Arts thus has become the School of Arts and Sciences and the College of Household Economics is now the School of Home Economics. Graduate instruction was begun in the fall of 1927 within the College of Liberal Arts, and in 1935 the Graduate Division was given separate organization. The Division of Commerce was created in 1943, its name changed to Division of Business Administration in 1947 and to the School of Business Administration in 1956. The Division of Extension, established in 1928 to provide off-campus instruction, still retains its original title.

## Presidents

Robert Cabaniss Goodwin, Ph.D., who joined the faculty in 1930, is now President of the College. He was made Acting President in 1959 and became President in 1960. Other presidents have been Paul Whitfield Horn (1925-1932) ; Bradford Knapp (1932-1938) ; Clifford B. Jones (1938-1944 and President Emeritus since 1944); William Marvin Whyburn (1944-1948); Dossie M. Wiggins (1948-1952); Edward Newlon Jones (1952-1959).

## Income

The College receives a major share of its money from appropriations by the legislature out of general revenue funds of the state. Income from tuition, fees, and services also forms an important part of college revenue. For the construction of academic and general buildings, funds are made available at 10 -year intervals from a constitutional building amendment.

## The Texas Technological College Foundation

This is a nonprofit corporation which serves as the gift-receiving agency of the College. Gifts and grants received through the foundation supplement state funds in supporting research, maintaining scholarships and fellowships, and helping to provide physical facilities and educational materials.

## The College Year

Instruction is offered throughout the year in two semesters of approximately eighteen weeks each, and in two summer terms of six weeks each. The fall semester opens in the middle of September and the spring semester in late January immediately after the close of the fall session. The first term of the summer session begins during the first week in June, and the second summer term begins in the middle of July. Two commencements are held each year, one at the close of the spring semester and one at the close of the second summer term.

Texas Tech draws its students from all parts of Texas and from most states in the Union, as well as from several foreign countries. Since the faculty is drawn from widely diverse institutions, an environment of a fairly cosmopolitan nature has been created in a city of over 130,000 .

## Administrative Organization of the College

## Government

Texas Technological College is governed by a Board of Directors consisting of nine members appointed by the governor. Terms are for six years, except for appointments to fill unexpired terms. The Board of Directors is legally responsible for the conduct of the College; its primary function is to set policy for the institution. The board appoints the President, who directs the operations of the College. Upon recommendation of the President, the Board of Directors appoints all faculty members and employees and fixes their salaries.

The President is responsible for carrying out policies determined by the Board of Directors; all college activities, both educational and financial, are under his supervision. The President is assisted by a Vice President for Academic Affairs who oversees the educational activities of the College, a Vice President for Business Affairs who is the fiscal manager of the College, and a Vice President for Development who has charge of the program of gifts and bequests. The Assistant to the President is also Secretary of the Board of Directors. Upon recommendation of the faculty and under authority vested in him by the Board of Directors, the President confers all degrees granted by the College.

The Dean of Admissions and Registrar has general charge of matters pertaining to registration in any school of the College and also directs registration. He keeps the academic records of all students.

The Dean of Student Life, the Dean of Men, the Dean of Women, and the Director of the Student Health Service are responsible for student health and activities outside the area of academics.

## Academic Divisions

Texas Technological College is made up of the following schools, departments, and divisions, offering the degrees indicated:

## School of Agriculture

Departments. Agricultural Economics; Agricultural Education; Agricultural Engineering; Agronomy and Range Management; Animal Husbandry; Dairy Industry; Park Administration, Horticulture and Entomology.

Areas of Study. Agricultural Economics, Agricultural Education, Agricultural Engineering, Agricultural Science, Animal Business, Animal Production, Animal Science, Crops, Dairy Industry, Entomology, Horticulture, Park Administration, Range Management, Soils.

Degrees Offered. Bachelor of Science, Bachelor of Science in Agricultural Engineering. See the section on The School of Agriculture for degree requirements.

## School of Arts and Sciences

Departments. Biology; Chemistry; Education and Philosophy; English; Foreign Languages; Geosciences; Government; Health, Physical Education, and Recreation for Men; Health, Physical Education, and Recreation for Women; History; Journalism; Mathematics; Music; Physics; Psychology; Sociology and Anthropology; Speech.

Areas of Study. Anthropology, Art, Bacteriology, Biology, Botany, Chemistry, Elementary Education, English, Entomology, French, Geochemistry, Geology, Geophysics, German, Government, Health and Physical Education, History, Journalism, Mathematics, Music, Music Education, Philosophy, Physics, Piano, Pre-Law, Pre-Medical, Psychology, Recreation, Secondary Education, Sociology, Spanish, Speech, Speech Correction, Voice, Zoology.

Degrees Offered. Bachelor of Arts, Bachelor of Science, Bachelor of Science in Education, Bachelor of Science in Medical Technology, Bachelor of Music. See the section on The School of Arts and Sciences for degree requirements.

## School of Business Administration

Departments. Accounting, Business Education and Secretarial Administration, Economics, Finance, Management, Marketing.

Areas of Study. Accounting, Advertising, Business Education, Economics, Finance, Industrial Management, International Trade, Marketing, Office Management, Personnel Management, Pre-Law, Public Administration, Retailing, Secretarial Administration, Traffic Management.

Degrees Offered. Bachelor of Business Administration, Bachelor of Science. See the section on The School of Business Administration for degree requirements.

## School of Engineering

Departments. Architecture and Allied Arts, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering and

Engineering Drawing, Mechanical Engineering, Petroleum Engineering, Textile Engineering.

Areas of Study. Advertising Art and Design, Architecture-construction or design, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering Physics, Industrial Engineering, Mechanical Engineering, Petroleum Engineering, Textile Engineering, Textile Technology and Management.

Degrees Offered. Bachelor of Science in Engineering. See the section on The School of Engineering for degree requirements.

## School of Home Economics

Departments. Applied Arts, Clothing and Textiles, Food and Nutrition, Home Economics Education, Home and Family Life.

Areas of Study. Applied Arts, Clothing and Textiles, Food and Nutrition, General Home Economics, Home Economics Education, Home and Family Life.

Degrees Offered. Bachelor of Science in Home Economics. See the section on The School of Home Economics for degree requirements.

## Graduate School

Degrees Offered. Master of Arts, Master of Business Administration, Master of Education, Master of Science, Master of Science in Chemical Engineering, Master of Science in Civil Engineering, Master of Science in Electrical Engineering, Master of Science in Home Economics, Master of Science in Industrial Engineering, Master of Science in Mechanical Engineering.

Doctor of Education; Doctor of Philosophy with majors in Chemisthy, Engineering, English, Geology, Government, History, Mathematics, Physics, and Psychology.

## Extension Division

For offerings of the Extension Division, see the discussion of the division later in this catalog.

## Interdepartmental Programs

Areas of Study. Bilingual Secretarial Program, Latin American Area Studies, and Art. For the details of each, see the section on The School of Arts and Sciences.

## Accreditation

Texas Technological College is a member of the Southern Association of Colleges and Schools, the accrediting body for this region. In addition, the several schools and departments are accredited with their respective professional associations. The College is also a member of the Association of Texas Colleges and Universities.

## Facilities

## The Campus

The 1,844 -acre campus of Texas Technological College lies in the western portion of Lubbock, a city located on the South Plains of Texas. Elevation above sea-level is approximately 3,256 feet; the climate of the region is dry and invigorating. The basic architectural theme in the permanent buildings on the campus is modified Spanish Renaissance. The newer buildings have been designed to harmonize with this original motif. There are a total of 164 buildings of which 98 are considered permanent. At present the approximate value of the buildings and grounds is $\$ 52,000,000$.

## The Library

The collections of the college library are intended to meet the research needs of faculty and students in support of the academic program and are housed in an air-conditioned building completed in 1962. Holdings now total more than 600,000 items, including books, periodicals, government documents, and other materials. The library maintains the open-shelf principle in order that its holdings may be readily available to students and faculty alike; individual study tables are distributed throughout the stacks. To improve its services, the library maintains readers for microfilm and microprint, provides a rapid copy service, and has individual study rooms for faculty members engaged in research. There is space in the stacks and the reserve and reference rooms for a total of 709 readers. Important additions to our research holdings during the past year include an Atomic Energy Commission depository, designation as a Regional Depository for U. S. Government Documents, and the Mr. and Mrs. J. A. Koger History of Science Collection. Although the library serves principally the faculty and students of the College, it is often able to supplement the services of other libraries in the area.

The library is staffed by 17 professional librarians and 20 subprofessionals who provide service during the following hours: 8 a.m. to 12 midnight, Monday through Friday; 8 a.m. to 5 p.m., Saturday; 2 p.m. to midnight, Sunday. Closed holidays. Summer terms: 7 a.m. to 10 p.m., Monday through Friday; 7 a.m. to 5 p.m., Saturday. Closed Sundays and holidays.

## The Southwest Collection

The Southwest Collection was established as a separate department of the College in 1955. Its basic purpose is the development of a research center in history through the acquisition and preservation of books and archival material of significance to the history of the American Southwest.

The Collection's basic support comes from the College, although much of its growth depends upon private donations of funds and materials. Its quarters in the Social Science Building provide excellent fa-
cilities for study and research and space for archival holdings such as business records, newspaper files, individual manuscripts, an outstanding collection of Southwest maps, and a special library dealing with the history of the area. The Collection serves as the College archives.

The materials listed above are primarily for research purposes and are open to students, faculty, visiting scholars, and other interested persons. Since the preservation of documents is one of the functions of the Collection, materials cannot be removed from its quarters; reading rooms and individual study carrels are available, however, and the staff provides assistance to those engaged in research activities.

## The Museum

The Texas Technological College Museum is a cooperative enterprise between the College and the West Texas Museum Association. The College has title to the buildings and collections, except for certain items of art, and administers the operations. Museum exhibits include a Hall of Earth and Man, objects of scientific, historic, and artistic significance, and the Peter Hurd murals on the walls of the rotunda. The Spitz Plantetarium, located in a building behind The Museum proper, schedules demonstrations for school children during weekdays and holds public demonstrations at regularly scheduled intervals. The Museum is open to students, faculty, school classes, and all interested visitors to Lubbock.

## Research Farms

In addition to the 1500 -acre farm laboratory adjoining the main campus, the School of Agriculture operates the Texas Technological College Research Farm at Pantex, Texas, northeast of Amarillo. This farm consists of approximately 5,821 acres of deeded land and an agricultural use permit on an additional 8,000 acres of the Army Ordnance Plant.

This farm serves as a valuable facility for agricultural research and education, providing strength, flexibility, and prestige to the academic programs at Texas Technological College. Opportunities are provided at the research farm for studies in livestock, crops, soils, and water use.

A new center for scientific research in beef cattle improvement has been constructed at the research farm with a $\$ 500,000$ grant from the estate of Florence Lee and C. L. Killgore. Known as the Killgore Beef Cattle Center this new facility will be the headquarters for all studies in the Panhandle area originating from the research farm.

Field days are held annually and special tours of the research farm are arranged at the request of interested individuals and groups.

## The Computer Center

The Computer Center is a facility designed and operated for the College as a whole. The center possesses both analog and digital com-
puters; they are available to all departments for research and as teaching aids at both graduate and undergraduate levels. Current facilities include the following computers: two IBM 1620's, a Bendix G-15, two CRC-102-A's, a CRC-105, a Litton 20/40, and an Electronics Associates TR-48.

The most important equipment for general usage are the two IBM 1620 computer systems, each with 60,000 positions of storage or memory capacity. Supporting equipment includes the IBM 1622 card input/output units, the IBM 1623 core memory devices, an IBM 407 electronic accounting machine, an IBM 514 card reproducer, an IBM 082 card sorter, and a number of IBM 026 card punches.

Many departments have incorporated computer programming in their course offerings. Computer theory is also available in specialized courses by some departments. Of considerable utility to faculty members and students are periodic one-week short courses in programming sponsored by the Center. The Department of Industrial Engineering offers a two-semester-hour course in Fortran programming normally available each semester and both terms of summer school.

## The Seismological Observatory

The Texas Technological College Seismological Observatory, located adjacent to the Science Building, acts as a research center in seismology and participates in the work of the world-wide seismograph network. To the equipment then available, World Standard Seismograph equipment was added in 1961 through cooperation with the U.S. Coast and Geodetic Survey.

## Textile Research Laboratories

The new Textile Research Laboratories were opened in 1959. Their main objective is to promote greater utilization of Texas cotton through a program of research projects. The laboratories consist of a pilot spinning plant, a fiber-testing laboratory, and a chemical laboratory. They are sponsored by the College and the Cotton Research Committee of Texas and are supported by the Plains Cotton Growers, the United States Department of Agriculture, and others.

The pilot spinning plant is one of two spinning laboratories in the country which can take a bale of cotton and process it completely through to the finished product. It is the only one with complete humidity and temperature controls from the opening room process through that of the weaving room.

## Educational Television

Station KTXT-TV is an open channel, noncommercial educational television station owned and operated by Texas Technological College broadcasting on the frequency of Channel 5 . The studio, transmitter, and 450 -foot tower of KTXT-TV are located on the College campus.

Broadcasts can be received over a 25 - to 30 -mile radius on conventional residential sets.

Courses for residence credit at Texas Tech are broadcast during each semester. Information on the televised courses is available through the Educational Television Office.

During the 1963-1964 academic year, televised courses in economics, accounting, philosophy, and English were offered for credit through regular registration.

KTXT-TV was constructed through the donation of equipment and funds by friends of Texas Tech and is staffed by professional personnel. The availability of State funds in future appropriation bills will permit the expansion of facilities and the scope of programs offered.

Educational television will enable the College to supplement its instructional programs and to accommodate the increasingly large enrollments of the future. It will also enable the College to serve the community through the presentation of cultural and informative programs over and above those broadcast by the commercial stations. The station will also provide laboratory facilities for students enrolled in courses related to television engineering, management, and production.

## KTXT-FM

KTXT-FM is the College-owned radio station with studios in the Speech Building. The station operates on a frequency of 91.9 mc with a power of 10 watts. It is under the direction of the Speech Department and is staffed by students from the College. KTXT-FM attempts to bring a balance of radio programming to the Lubbock area with such regularly scheduled programs as sports, popular and classical music, news, and student-produced programs.

## Academic Regulations

## Admissions

Texas Technological College seeks to admit mature students who will benefit most from its programs, and evidence of satisfactory preparation for college work must therefore be presented. The Dean of Admissions controls admission to the undergraduate schools of the College; correspondence concerning such matters should be directed to him at Texas Technological College, Lubbock, Texas. The Office of the Dean of Admissions and Registrar is located in the northwest corner of the ground floor of the Administration Building.

To enter the College as a freshman, an applicant takes the following steps:

1. Applies for admission on forms furnished by the Dean of Admissions.
2. Provides the Admissions Office with an official transcript of his high school record. The applicant must assume the responsibility for having his records forwarded to the Dean of Admissions. Application forms and transcripts should be sent in immediately following the close of the last semester in high school.

New students applying for admission to the fall semester are urged to submit their applications and transcripts to the Admissions Office by July 1. A student desiring early notification of acceptance may request his high school to submit a copy of his transcript at midterm of his senior year. This transcript must show grades through midterm and list the courses in which he will be enrolled during the last half of the year. Tentative admission may then be granted pending successful completion of high school. Upon graduation, an applicant for admission must submit a supplementary transcript showing final grades and graduation date. While an early application cannot assure preferential treatment, late applicants are more likely to have difficulty enrolling in certain areas for which there is a heavy demand.
3. Files a health data form. This form is to be completed by a physician and must include a statement of successful smallpox vaccination within five years prior to registration. The requirement for this vaccination may be waived on written recommendation by the family physician.
4. Furnishes scores on the Scholastic Aptitude Test of the College Entrance Examination Board.
5. Decides which school or curriculum he wishes to enter. A student needing advice or counseling may come to the campus before registration begins and consult with the dean of his school.

When an applicant's file is complete, that is, after his completed application form and all necessary supporting transcripts and records have been received, the case will be evaluated. Normally the applicant will be notified of his acceptance or rejection before he reaches the campus.
6. Reports to the college campus on the day indicated in the official College Calendar and in notices sent in reply to his application. All entering freshmen must report at the beginning of the freshman orientation period.
7. Pays fees on the days indicated for registration.

## Freshman Preregistration Guidance Testing and Orientation

All entering freshmen are required to assemble at the College for a period of orientation prior to actual registration (see College Calendar). This program has been developed to assist the student in selecting a program of study and to aid the faculty and administration in guiding him.

Along with other credentials in support of their applications for admission, beginning students are required to submit their scores earned on the College Entrance Examination Board Scholastic Aptitude Test.

Test application blanks are supplied by the College Entrance Examination Board, Post Office Box 592, Princeton, New Jersey. High school counselors and principals usually secure the application blanks for those wishing to take the tests.

It is the responsibility of the prospective student at Texas Tech to take these tests during his senior year in high school or during the following summer. They may be taken at the College during the freshman orientation and testing periods preceding the fall and spring registration periods, but students who wait until then to take them will be delayed in registering.

## Uniform Minimum Requirements for Admission

Graduation from an accredited high school is the first entrance requirement for beginning freshmen. The following units are the uniform requirements for admission to the College:

1. English .............................................................................................................. 3
2. Mathematics* (algebra, geometry, trigonometry) .................... 2
3. Social science ........................................................................................................ 2
4. Laboratory science ........................................................................................ 1
5. Electives ......................................................................................................... 7

## Special Admission Requirements and Removal of Deficiencies

For entrance to the Schools of Agriculture, Business Administration, and Home Economics there are no further admission requirements beyond those listed above.

Students applying for entrance to the School of Arts and Sciences will be accepted if they meet the uniform requirements listed above.

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## 28 SPECIAL ADMISSION REQUIREMENTS

However, those who plan to major in chemistry, geosciences, mathematics, or physics must present 2 units in algebra and 1 in plane geometry. Students entering these fields must also submit scores made on the Achievement Test in Advanced Mathematics (of the College Entrance Examination Board) as part of their credentials; those who do not present these scores will be required to remove this deficiency during their first two semesters of attendance at the College.

Acceptance of freshman by the School of Engineering is based on the uniform requirements for admission to this institution; however, because of the specialized nature of the programs offered, it is recommended that the student present the following units:

1. English ........................................................................................................... 4
or
English
3
Foreign Language ..................................................................................... 2
2. Algebra ................................................................................................................. 2
3. Geometry ..................................................................................................... 2
4. Trigonometry ………................................................................................. $1 / 2$
5. Physics ............................................................................................................

Chemistry and advanced algebra or mathematics analysis are strongly recommended, also. Physics is not a prerequisite for majors in either advertising art and design or the design option in architecture, and trigonometry is not a prerequisite for advertising art and design.

For those applicants who do not meet the recommendations listed above but who display clear evidence of intellectual competence and professional promise, the School of Engineering has made special provision for entrance.

Students who plan to major in one of the engineering programs or in the architecture-construction option are advised to take, in addition to the Scholastic Aptitude Test (SAT) required of all entering students the Achievement Test in Advanced Mathematics (AM). This test is required if those students who wish to begin their first year of college work with analytics and calculus. Those who do not make a satisfactory score on this test, or who do not take the test, will follow the Alternate Freshman Year Program shown in the section of this bulletin entitled "School of Engineering," or a variation of this program. Since both trigonometry and the second year of high school algebra are included in the Advanced Mathematics Test referred to above, the student should not take this test until he has completed, or is near the end of, these courses in high school.

A student who is admitted with deficiencies-either in tests or in courses-is required to remove these during his first two semesters of attendance at the College.

## Credit for College-Level Work Done in High School

An entering freshman who has completed college-level work in high school, who has not attended another college, and who submits appropriate scores on the Advanced Placement Examinations of the College Entrance Examination Board (or on locally developed tests) may under certain conditions be granted credit in comparable college courses in the
following areas: chemistry, English, French, German, Latin, Spanish, mathematics, and physics. The dean of the school and the head of the department concerned will decide whether such credit will be granted. Inquiries should be addressed to the Dean of Admissions.

## Admission of Out-of-State Students

An applicant for admission who is not a legal resident of Texas (for tuition purposes) must meet the following minimum requirements:

1. Have been graduated from an accredited high school with at least the 15 units listed above under Uniform Minimum Requirements for Admission.
2. Have ranked in the top half of his high school graduating class.

## Admission of Mature Students on Condition

A mature student ( 21 years of age or over) who did not graduate from high school and has not attended another college may be admitted conditionally as a freshman without having met the formal requirements for admission. Such admission is granted only to an applicant who shows that he is above average in ability and who has not recently attended high school. His admission must be recommended by the Committee on Admissions. The applicant must forward a complete transcript of his high school credits when applying for admission as a mature student. He should apply for an interview at the Admissions Office a minimum of 30 days before the opening of the semester. He may then be directed to the Testing and Counseling Center to take the tests required for this type of admission.

Admission of a person as a mature student places him under special obligation to justify the exception made. He will be assigned to the curriculum of his choice, but neglect of work or other evidence of lack of serious purpose on the part of a person with this standing will be sufficient cause for withdrawal of his status as a student. A grade average of at least a $C$ (2.00) on the first 30 hours of residence work will absolve all admission requirements.

## Admission of Foreign Students

Graduates of foreign secondary schools who believe they have completed the equivalent of at least an American high school diploma may apply for admission to Texas Tech by writing to the Dean of Admissions. With the official application form, foreign applicants should enclose original documents, or official certified copies, indicating the nature and scope of their educational program. A student whose native tongue is not English should also present evidence that he has enough competence in the use of the English language to enable him to pursue a regular program of study in an American university. Texas Technological College does not offer special courses in English for students deficient in that subject.

Foreign students who are not in the United States at the time of application should apply a year in advance. A foreign student will not be admitted to the College until he can prove his ability to support himself financially (a minimum of $\$ 2,000$ for the academic year in addition to travel money is necessary).

## Admission from Other Colleges and Universities

Undergradute students who have attended another accredited college, who are in good standing there, and who are not under disciplinary or scholastic difficulty may be accepted for admission to Texas Technological College if their performance at the other institution meets the standard at Texas Tech.

The student seeking admission from another college must present official transcripts of his entire academic record, both high school and college. His record must meet the minimum standards in one of the following categories:
A. If he originally enrolled for 12 or more semester hours during the last semester in attendance, and:

1. Has registered for only one semester in college, he must have earned at least 6 semester hours of academic credit with grades of $C$ or better.
2. Has registered for 2,3 , or 4 semesters, he must have earned at least 9 semester hours of academic credit with grades of C or better during his last semester.
3. Has registered for five or more semesters, he must have earned at least 12 semester hours of academic credit with grades of C or better during his last semester.
B. If he originally registered for less than 12 semester hours during his last semester in attendance elsewhere, he must have passed one-half of his hours with a grade of C or above during the semester.
Students whose academic standing is so low during their last semester of attendance at Texas Technological College that they are no longer eligible to continue may not gain readmission by attending a summer session at another institution.

## Transfer of Credits from Other Colleges and Universities

Since the College offers a number of degrees which require the fulfillment of widely differing curricula, acceptance of credits from another college by the Admissions Office does not guarantee the use of all these credits in a given curriculum. The usefulness of transferred credit is determined by whether or not the work is equivalent to work in the curriculum or to permissible electives. After being admitted to the College, the student should consult the dean of the school in which he plans to enroll to determine which credits will be acceptable in his particular program.

At the option of the academic dean, transferred courses with a grade of D or the equivalent may not be accepted for credit toward requirements for the degree. Transfer credit in physical education
activity courses, or substitutes for them, is accepted to the extent that it meets degree requirements, but grade points accumulated in such courses cannot be applied to reduce a deficiency of grade points in other subjects.

Students transferring credits from a nonaccredited institution must validate all such credits by earning a 2.00 grade average on the first 30 hours of residence work at this College. The student may be dropped at any time he falls below a 2.00 average during the first 30 semester hours of work at Texas Technological College. Students inadmissible to this College at the time they were admitted to a nonaccredited institution must pass required testing before being admitted here.

A former student of Texas Tech who has afterward attended another institution will be considered as a transfer student when applying for readmission and will be required to meet the standards for such students.

## Admission of Graduate Students

Full details of admission requirements for those wishing to enter the graduate program at Texas Technological College are published in the Bulletin of The Graduate School, which is issued annually. A copy may be secured from the Office of the Dean of Admissions. It may be noted here, however, that those who wish to enter the graduate program in order to work toward a master's or doctor's degree will be required to take the Aptitude Test of the Graduate Record Examination. This may be done before enrollment or at the first suitable examination date thereafter.

## Concurrent Registration at Texas Technological College and Other Institutions

1. A student registered at Texas Technological College who wishes to register concurrently at another institution must obtain written approval from his academic dean at Texas Technological College. This approval applies to all residence courses, extension courses, correspondence courses in progress elsewhere at the time of registration, and to those begun during the semester.
2. A student registered at another institution who wishes to enroll concurrently for credit at Texas Technological College must have written approval from his institution and make application for concurrent registration with the Dean of Admissions at Texas Technological College.
3. Concurrent registration is not permitted during the summer session.
4. In no case will a student at the College be authorized to register concurrently for more than one course per semester at another institution, nor will a student from another institution be permitted to register concurrently for more than one course per semester at Texas Technological College.

## Registration

Each semester and summer term opens with a registration period during which the formal process of admission to the College is completed. Prior to registering for each semester or summer term, each student who completes the admission process as explained abuve is furnished registration materials with his notice of admission. These materials include the application for a registration permit-packet and a form on which the student must indicate his local Lubbock address.

The student should complete and return these forms to the Registrar as soon as possible so that he may be assigned a registration hour. If time permits, the student will be notified by mail when to report for registration. Registration packets are not sent by mail but must be picked up by the student before he begins registration. A student cannot receive his registration permit-packet until his Lubbock residence has been approved by the Dean of Men or Dean of Women.

## Scholastic Order for Registration

The registration hour for an undergraduate student is determined by his scholastic record at the end of each spring semester. All hours passed and grade points earned during his college career are used in arriving at the scholastic order of each student. The larger the total of hours and grade points, the earlier a student will be allowed to register. The scholastic order assigned for the fall semester is also used during registration for the following spring semester.

Transfer students are ranked with students of this College according to the number of hours and grade points accepted in transfer.

Graduate students and entering freshmen are not included in the scholastic order of registration.

## General Regulations

Each student accepted for admission will enroll in one of the six schools of the College: Agriculture, Arts and Sciences, Business Administration, Engineering, Home Economics, or Graduate. The student should consult the dean of his school whenever any question arises concerning his academic status. Matters specifically requiring the academic dean's approval include:

Course load and schedule.
Changes in schedule, including dropping and adding courses.
Withdrawal and honorable dismissal from the College.
Graduation requirements and candidacy for a degree.

## Explanation of Course Offerings

Courses are designated by a name and a number along with a descriptive title. The name normally used is that of the subject. The
first digit in the number indicates the academic level of the course. First digits of $1,2,3$, or 4 indicate that the course is primarily designed for the freshman, sophomore, junior, or senior year, respectively. A number of 5 or above designates a graduate course. The second digit indicates the semester-hour credit of the course. The remaining digit or digits are the distinguishing numbers of the particular course.

When a hyphen appears between the numbers of two courses, both courses must be satisfactorily completed in order for credit to be received on either. The department offering the courses may, in certain instances, allow credit toward graduation for one course in the sequence. For example, Eng. 131-132, College Rhetoric: The 1 means it is a freshman level course, the 3 indicates the credit hours for the semester's work, and the final number is the department's number for the course. The hyphen means both semesters must be completed if credit is to be received.

In the departmental course lists, certain information is placed in parentheses following the course name. The first figure in the parentheses indicates the semester-hour credit of the course; the second figure shows the number of lecture hours per week attended by a student enrolled in the course; and the third figure indicates the number of hours per week during which the student is in a laboratory, practice session, or other activity related to the course. For example, ( $3: 2: 3$ ) following the listing of Botany 232, Taxonomy, means that the course carries 3 semester hours' credit, that 2 hours per week are spent in lecture sections, and that 3 hours per week are spent in the laboratory. Where only one figure appears in the parentheses the course value in semester hours is indicated.

## Grading Practices

A grade is assigned for all courses in which a student is regularly enrolled during any semester or summer term. Only through regular enrollment can a grade be earned. A passing grade may be earned only if the student is enrolled for the duration of the course; and a grade, once given, may not be changed without the approval of the student's dean.

The grades used, with their interpretations, are: A, excellent; B, good; C, average; D, inferior (passing, but not necessarily satisfying degree requirements) ; $F$, failure; $P$, in progress; $I$, incomplete; $W$, withdrawal; WF, withdrawal failing. The letter $R$ designates a course repeated to remove an I. Credit in a course can be earned only when the course grade is $\mathrm{A}, \mathrm{B}, \mathrm{C}$, or D .

The grade $P$ is given only when the work in a course extends beyond the semester or term; it implies satisfactory performance and is used primarily in thesis and dissertation courses.

The grade $I$ is given only when a student's work is satisfactory in quality but, due to reasons beyond his control, has not been completed. It is not given in lieu of an $F$ and can be given only with advance approval of the student's dean. The instructor assigning the grade will stipulate, in writing, at the time the grade is given the conditions under which the I may be removed. The I may be replaced by an $R$ if the

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course is repeated. The appropriate grade will be given for the second registration.

The grade of W is given for a course officially dropped during the first five weeks of a term or for a course officially dropped at any time, provided the student's work is passing at the time the course is dropped.

After the first five weeks of a semester, the grade WF is given when the student's work is not passing at the time the course is dropped or when the student is required by his dean to drop the course for failure to attend the class.

It is the aim of the faculty of Texas Technological College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his own any work which he has not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offender liable to very serious consequences, possibly suspension.

## Grade Points

The grades A, B, C, and D carry with them grade points of 4, 3, 2, and 1, respectively, for each semester hour of credit value of the course in which the grade is received. All other grades have no grade points assigned them.

## Grade-Point Averages

The grade-point average for a semester is determined by dividing the total number of grade points acquired during that semester by the total number of semester hours of all courses in which the student was registered in that semester. In the same manner, the over-all gradepoint average is obtained by dividing the total number of grade points earned in all courses taken at this college by the total number of semester hours of all courses for which the student has registered at this college. Repeated registrations are counted in the total.

A student may repeat courses for credit with the prior approval of his academic dean. When a course is repeated, only the grade made in the last registration is used in calculating the grade-point average for meeting graduation requirements.

With the approval of the student's dean, a grade-point deficiency in degree requirements may be made up by earning sufficient grade points in additional courses.

Only courses taken and grades received at this college are used in calculating grade-point averages.

## Classification of Students

During each calendar year a student making normal progress will complete one-fourth of the semester hours and grade points required for his degree. On this basis students are designated as freshmen, sophomores, juniors, or seniors according to the following criteria:

Freshman: a student who lacks enough semester hours to be classed as a sophomore.

Sophomore: a student who has completed not less than 32 semester hours.

Junior: a student who has completed not less than 64 semester hours:

Senior: a student who has completed not less than 96 semester hours and who has achieved a minimum grade-point average of 2.00 (C).

A student is considered to be making satisfactory progress toward a degree objective when he completes at least 12 credit hours in each semester, achieves a grade-point average of 2.00 or higher in each semester, and maintains an over-all grade-point average of 2.00 or higher.

A full-time student is one who is enrolled for 12 or more credit hours in a given semester.

A part-time student is one who is enrolled for fewer than 12 credit hours in a given semester.

The semester hour is the unit of measure for credit purposes. The student is expected to spend approximately two hours in preparation for each hour of lecture or recitation.

The number of semester hours a student may carry (his course load) is regulated by his academic dean. In determining this load the dean takes into account the quality of scholastic work performed by the student, the types of courses involved, the student's health, and his extracurricular interests and activities. A student who is employed must keep his academic dean informed as to the nature of his employment and his working hours.

## Class Attendance

Responsibility for class attendance rests with the student. Regular and punctual attendance at all scheduled classes is expected, and the College reserves the right to deal at any time with individual cases of nonattendance.

The effect of absences on grades is determined by the instructor, and when absences jeopardize a student's standing in a class, it is the responsibility of the instructor to report that fact to the student's dean. Excessive absences constitute cause for dropping a student from class; in such a case the grade of WF will be given. Should such an action reduce the student's course load to less than 12 semester hours, his extracurricular privileges will be lost. In extreme cases the academic dean may suspend the student from the College.

There are no "excused absences," but when a student has a legitimate reason for being absent from class, such as illness or participation in an official trip or activity, he may establish his eligibility to make up work he has missed by presenting evidence to his instructor. Acceptable evidence includes written statements from the College physician, the student's own doctor, or the sponsor of an activity officially recognized by the College.

## Change of Schedule

Once a complete and accurate program has been approved at registration, no changes in that schedule may be made without the approval of the student's academic dean. If the request originates with the student, the change must be completed within the time specified in the College Calendar. A fee of $\$ 3$ will be charged for each approved request.

The College reserves the right to make changes in a student's schedule; when this occurs, no fee is charged.

With the consent of his academic dean, a student may drop a course. (See Grading Practices above.) No course may be dropped during the last two weeks of a semester or during the last week of a summer term.

All changes in schedules, including adding and dropping courses, must be arranged by the student in person; changes are not official until all steps in the process have been completed.

## Change of Schools

A student desiring to transfer from one school of the College to another must apply to the Dean of Admissions prior to the beginning of the semester in which the change is to take place. The Dean of Admissions will notify the academic deans concerned.

## Enrollment Without Credit

There are two types of enrollment for students who desire to attend classes for no credit:

1. Auditing Courses. A person not regularly enrolled in the College may attend a class for the purpose of hearing or observing only; he does not have the privilege of participating in class discussions or laboratory and field work, of turning in papers, or receiving credit in the course. Permission to audit a class may be denied if the classroom is crowded.

A person desiring to audit a course should secure a letter of permission from the dean of the school in which the course is offered, then pay the fee of $\$ 10$ per course at the Cashier's Office. The letter, properly stamped by the Cashier, is the permit to audit the course.
2. Enrolling for No Credit. A student regularly enrolled in the College in either a regular or a summer session may register for residence courses for no credit and no grade. Such registrations are considered on the same basis as credit registrations in determining fees and course loads. Class cards and tickets are marked "No Credit" by the issuing department at the time of registration. A student registered for no credit has the privilege of taking part in class discussions, submitting papers, and taking examinations.

After the designated date for changing schedules, a course cannot be changed from credit to noncredit or from noncredit to credit.

## Dean's Honor List

A full-time undergraduate student who earns a grade-point average of 3.00 or higher during a semester is eligible for the Dean's Honor List
of the school in which he is enrolled during that semester. Attainment of a place on this roll is indicative of high scholastic achievement.

## Annual Recognition Service

A Recognition Service each spring honors those students who rank scholastically in the upper 3 percent of their class within their school during either of the preceding two semesters and who have a gradepoint average of 3.25 or higher in the other semester. Students who are honored for the first time receive Individual Honors; those recognized for the second time receive Class Honors; those recognized for the third time receive School Honors; and those recognized for the fourth time receive College Honors and are awarded a gold key by the College.

When two-thirds of the members of a student organization earn grade-point averages of 3.00 or higher during a semester, the organization is honored at the next Recognition Service.

Also recognized are undergraduate students who hold scholarships awarded by the College and who have maintained a grade-point average of 3.00 or higher during the spring and fall semesters preceding a service.

At the annual Recognition Service the College Awards Board, a student-faculty committee, recognizes outstanding individual students and student organizations for services and performances which bring distinction to the College. Also as part of the Recognition Service the Student Council honors those students who have made significant contribution in leadership to the student body, and the Athletic Council presents athletic letters and awards.

## Graduation With Honors

Those members of a graduating class who complete their work with a grade-point average of 3.80 or above are graduated With High Honors, and those who complete their work with a grade-point average of 3.50 to 3.80 are graduated With Honors. Appropriate designation of the honor is made on the diploma and on the commencement program. No person is considered for graduation honors unless he has completed at least one-half of his degree credit at this institution, and the half must include the senior year. Only grades earned at this college are counted.

## Fellowships, Scholarships, and Awards

Fellowships, scholarships, and awards are administered by designated faculty members or organizations through the Faculty Committee on Scholarships and Awards. For catalog and recognition purposes, only those grants in which the committee has final choice in selecting recipients and for which there is reasonable expectation for continuation of the grant are considered.

Scholarships are awarded on various bases, such as academic achievement, the demonstration of high qualities of leadership and

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citizenship, and financial need. A student is eligible for only one college-administered scholarship amounting to more than tuition costs during any one semester. In the event a student is offered multiple awards, he has his preference, though this does not apply to scholarships for honor graduates of Texas high schools.

For details consult the current college bulletin, Scholarships, Fellowships and Awards.

## Admission of Undergraduate Students to Graduate Courses

An undergraduate student who is within 12 semester hours of graduation and who has at least a B average in his major subject may enroll for courses carrying graduate credit, subject to the approval of the dean of his school and the Dean of the Graduate School. This approval must be obtained on special forms at the time of registration. No course taken without this approval may be counted for graduate credit.

Unless he has previously taken it, an undergraduate student who is permitted to enroll for graduate credit as indicated above is required to take the Aptitude Test of the Graduate Record Examinations at the first administration of it after his enrollment for graduate work.

The maximum course load which may be carried by an undergraduate taking courses for graduate credit is 16 credit hours in a semester or 6 hours in a summer term. An undergraduate may not accumulate more than 12 semester hours for graduate credit before being admitted to the Graduate School. Undergraduates permitted to enroll for graduate credit are expected to complete all of their undergraduate requirements within the academic year in which they first enroll for graduate credit.

In very special cases a senior student with a high scholastic record may be permitted to enroll in a course listed "For Graduates" and apply the credit to his bachelor's degree, but such permission is granted only on the written recommendation of the department head concerned, the approval of the dean of the undergraduate school in which the student is enrolled, and the approval of the Dean of the Graduate School.

It is the responsibility of the student to secure the necessary forms and to follow prescribed procedure in registering for any course. An undergraduate student who enrolls in a course for graduate or undergraduate credit without obtaining proper approval will be dropped from that course.

## Suspension and Retention of Undergraduate Students

Certain principles have been utilized in developing the regulations governing eligibility to re-register, suspension by the academic dean, and reinstatement following suspension. These principles include:

1. The College's belief that, so long as its resources permit, each bona fide applicant should be given opportunity to demonstrate his ability to perform acceptable work.
2. The belief that the early assumption of responsibility for one's own actions is a part of the educational process.
3. The belief that the College has a particular obligation to the able student.
4. The recognition that discouragement and mistakes are more likely to occur during the early stages of one's college career than in later semesters.

In addition, the regulations reflect the College's experience that a student's performance over a calendar year will likely provide a better measure of his ability than will his performance in a single semester. Finally, the standards become progressively more rigorous as the student moves toward his degree objective.

## Special Regulations

1. The determination of a student's eligibility to re-register is made only at the close of the spring semester and depends upon (1) the semester hours passed in the spring semester or in the last semester attended, and (2) the total number of semesters in which the student has registered in all colleges attended:
a. The requirement for a student who originally registers for

12 or more semester hours during the last semester attended is:
(1) The student who has registered for only one semester
in college must earn at least 6 semester hours of credit.
(2) The student who has registered for $2,3,4$, or 5 semesters must earn at least 9 semester hours of credit in the last semester attended.
(3) The student who has registered for six or more semesters must earn at least 12 semester hours of credit in the last semester attended.
b. The student who originally registers for less than 12 semester hours in his last semester in attendance must earn credit for at least half of the semester hours for which he registers during that semester.
2. Suspension by the academic dean. Any student who fails to perform his academic duties satisfactorily may be suspended by his academic dean at any time.
3. Period of suspension. A student suspended by his academic dean, or a student who is not eligible to re-register because of his academic record as indicated in Section 1, a or b, above, may not apply for reinstatement until the following periods have elapsed:
a. First suspension: one semester.
b. Second suspension: two semesters. Following this interval, approval by the Committee on Admissions must be obtained before the student may re-register.
4. Reinstatement by attending summer session.
a. A Texas Tech student who receives his first scholastic suspension may lift that suspension and regain eligibility for fall semester registration by attending a full summer session at Texas Technological College and by earning at least 8 semester hours of credit during that summer session. Eligibility for reinstatement
cannot be gained by attending the summer session at another institution.
b. The student who receives two or more academic suspensions may not regain eligibility for registration by attending summer school.
5. A student's application for reinstatement is evaluated on the basis of his record at the close of the last semester attended, or, in the case of a withdrawal, on his record at the time of his withdrawal from college.

A student seeking reinstatement must apply to the Dean of Admissions at least 30 days before the opening of the semester for which he desires to register. As a condition of reinstatement the student may be required to undergo such testing and counseling as his academic dean considers necessary.

## Mid-Semester Reports

After the first half of each semester the Registrar mails a grade report to the parents of each student. Since the grades reported do not become a part of the student's permanent record, the report is only informative. The student also receives a copy of this report.

## Semester Grade Reports

At the close of each semester and each summer term, final course grades are mailed to parents. A copy of his course grade report is prepared for each student.

## Withdrawal from College

A student who finds it necessary to withdraw from the College before the end of a semester or summer term must apply to the dean of the school in which he is enrolled for permission to withdraw with honorable dismissal. A student under 21 years of age should first consult his parents and should secure from them a written statement showing that he has their permission to withdraw. When the student's academic dean is convinced that withdrawal is necessary, the student will receive honorable dismissal from the College and his parents will be notified. Such withdrawal protects the student in case he desires to return to this institution or to transfer to another. The grades of $W$ or WF are recorded in keeping with the regulations set forth in the section above on Grading Practices and are based on the student's standing on the last day of enrollment in each course in which he is registered.

A student who withdraws from a residence course with a grade of $W$ may complete that course through the Division of Extension by registering for correspondence work, provided the course is regularly offered through correspondence and provided the instructor who taught the residence course is assigned as the correspondence instructor. Credit received through the process just described is recorded as correspondence credit.

## Requirements for The Bachelor's Degree

To receive a bachelor's degree at Texas Technological College a student must meet certain uniform requirements together with others which vary with the different schools of the College.

## Residence

The minimum actual residence required of each student is two consecutive semesters or the equivalent, and the minimum amount of residence work required is 30 semester hours applicable toward the degree sought. In addition, the student must complete the last 30 hours at this college, but these may include a maximum of 6 semester hours in correspondence course work provided he has met the minimum residence and course work requirements stated above and provided the correspondence courses are not the final advanced courses in the major and minor fields.

## Quality Points

A minimum grade-point average of 2.00 is required for graduation. The grades on all courses which the student takes at this college are used in determining this average, with these exceptions:

1. When a course has been repeated, only the grade made on the last registration is used, and
2. When a student transfers from one school to another within the College, grades of F and WF are not used provided they were made prior to the first such transfer.

These provisions apply only when the grade-point average is calculated for meeting degree requirements.

## Application for Degree

A candidate should file his application for a degree at least two semesters in advance of graduation, and must file it not later than the beginning of the semester in which he expects to receive the degree.

## Extension Work

Course work taken through the Division of Extension at Texas Technological College or at any other institution will not be counted as residence credit.

## Requirements in Government and History

Under state law all students who receive a bachelor's degree from Texas Technological College must have received credit for 6 semester hours in government, covering the Federal and the Texas constitutions, and 6 semester hours in American history; 3 semester hours in the history of Texas may be substituted for 3 of the American history hours.

## Physical Education

With the exceptions noted below, enrollment in and completion of physical education activity courses is required of all freshmen and sophomore men and women. Four semesters of physical education constitute part of the requirements for all degrees, with these exceptions:

1. When approved by the student's academic dean, band may be substituted for physical education.
2. The basic courses in air science or military science may be taken in place of physical education by any qualified male student. Once entered upon, the satisfactory completion of these two-year basic courses becomes a requirement for graduation unless the student is specifically excused by the Department of Air Science or the Department of Military Science and the student's academic dean.
3. Any student who has been honorably discharged from the Armed Forces with a minimum of 90 days' service may receive credit for two of the semester hours in physical education normally required as part of his curriculum. With one year or more of active service he may receive credit for the four semester hours in physical education normally required. Application for this credit must be made in the first semester of attendance at the College following honorable discharge.
4. A student over 25 years of age may substitute three semester hours of academic work in physical education for the required four semesters in physical education activity work.
5. Students who have a doctor's recommendation for limited physical activity must enroll in the appropriate physical education activity courses (Physical Education for Men and Physical Education for Women). Four semester hours of credit may be earned by repeating one of these courses.

Credits in physical education activity courses or substitutes are accepted in transfer to the extent that they meet degree requirements; however, grade points earned in such courses may not be applied to reduce a grade-point deficiency acquired in other subjects.

## Special Requirements

Additional standards for graduation have been established by certain departments in the Schools of Agriculture, Arts and Sciences, Business Administration, and Engineering. Students majoring in these areas are expected to familiarize themselves with these requirements, which are published in the appropriate school and departmental sections of this catalog.

## Second Bachelor's Degree

No second bachelor's degree is conferred until the candidate has completed at least 24 semester hours in addition to the courses counted toward his first bachelor's degree.

## Personnel Information Forms

Graduating seniors are required to complete Personnel Information Forms and to present two 2" x 3" glossy photographic prints for filing with The Placement Service prior to graduation. This enables the College to complete its personnel files and is required of all graduating seniors whether or not they are seeking a position.

## Commencement Exercises

Diplomas are awarded at commencement exercises which are conducted twice each year: at the end of the spring semester and at the end of the summer session. Students who complete their degree requirements in a fall semester will be awarded diplomas at the next scheduled commencement.

To receive a degree, a student must either attend the commencement exercise or receive approval for graduating in absentia. Application for in absentia graduation must be submitted in writing to the student's academic dean within the time specified in the College Calendar.

## Graduation Under a Particular Bulletin

A student is expected to complete the degree requirements set forth in a particular college bulletin. Normally this will be the bulletin in effect the year the student first registers in the school from which he receives his degree. Only with the specific approval of his academic dean may a different bulletin be selected. In no case may a student complete the requirements set forth in a bulletin more than seven years old. When necessary, a bulletin issued later than the student's first registration may be selected by the academic dean in conference with the student.

The annual General Catalog is published in the spring, and its provisions are applicable during the following school year, September through August. However, a student who registers for the first time in the College during a summer session is subject to the degree requirements set forth in the bulletin effective for the fall semester immediately following his initial enrollment.

## Conditional Admission to Candidacy for Graduation

Any student who registers in the semester or summer session in which he expects to complete the work for a bachelor's degree, but who has less than the number of grade points required for graduation, will be granted only conditional admission to candidacy. In this status, the student acts on his own responsibility in ordering a diploma or making other graduation arrangements.

## Requirements for Admission to The Graduate School and for Advanced Degrees

See the Bulletin of the Graduate School for these requirements.

## Expenses

Every student is necessarily concerned about expenses while attending college. In a large student body such as that at Texas Tech there are so many different tastes, as well as such a wide range of financial resources, that each student must determine his own budget in keeping with his own needs and financial condition. It is possible to live simply and participate moderately in the life of the college community on a modest budget. College authorities can offer their best help to the student in his budget planning by furnishing information about certain definite items of expense and acquainting him with others for which in all probability he will have to make provision.

## Payment of Fees

All fees are payable in full at the time of registration, and a student is not registered until his fees are paid in full. Payment may be made by cash, check, or money order, but all checks, drafts, or money orders are accepted subject to final payment. Texas Technological College reserves the right to change fees in keeping with acts of the Texas State Legislature or the Board of Directors.

## Registration Fee for Resident Students

Each resident of Texas enrolled for 12 or more semester credit hours pays a registration fee of $\$ 50$ per semester. Those enrolled for less than 12 semester hours pay fees on the following basis:

| For 11 | semester hours- $\$ 47.00$ | 6 | semester hours- $\$ 27.00$ |
| ---: | :--- | :--- | :--- |
| 10 | semester hours- 43.00 | 5 | semester hours- 23.00 |
| 9 | semester hours- 39.00 | 4 | semester hours- 19.00 |
| 8 | semester hours- 35.00 | 3 | semester hours |
| 7 | semester hours- 31.00 |  | or less- 15.00 |

## Registration Fee for Nonresident Students

Under authority contained in House Bill 265 passed by the 55th Legislature, each nonresident student is required to pay a nonresident registration fee of $\$ 200$ per semester of the long session. A nonresident student enrolled in the long session for less than 12 semester hours pays fees on the following basis:

For 11 semester hours- $\$ 184.00$
10 semester hours- 167.00
9 semester hours- 150.00
8 semester hours- 134.00
7 semester hours- 117.00

| 6 | semester hours- | $\$ 100.00$ |
| :--- | :--- | ---: |
| 5 | semester hours-r | 84.00 |
| 4 | semester hours- | 67.00 |
| 3 | semester hours |  |
|  |  |  |
|  |  | or less- |
|  | 50.00 |  |

It is the duty of each student to register under the proper residence and pay the correct tuition fees. The explanation below of what con-
stitutes a nonresident is intended to assist the student in properly determining whether or not he qualifies as a resident of the state for tuition purposes. If there is any possible question whether or not he qualifies as a resident of Texas, the student should confer with the Dean of Admissions. For each improper registration there may be a penalty of $\$ 10$. A copy of the law defining nonresidents is available in the Registrar's Office. There can be no change of residence status except upon express authorization by the Dean of Admissions.

## Resident and Nonresident Students

1. A student under 21 years of age is considered to be a resident student if his parents are living in Texas at the time of his registration and have lived in the state continuously for at least the 12 months immediately preceding his registration.
2. A student under 21 years of age is considered to be a nonresident if his parents do not live in Texas or have not lived in the state during the full 12 months preceding his registration.
3. A student over 21 years of age who comes from outside of Texas is considered to be a nonresident unless he has resided in the state for the full 12 months immediately preceding his enrollment and has not been enrolled in an educational institution during that time.
4. Persons in the military services who are assigned to duty in Texas are considered as residents. The actual duty station must be here, and the person must be paying his own tuition. Military personnel may enroll themselves, their wives, or husbands, and their children by paying the tuition fees and other charges paid by regular residents of the state, without regard to the length of time such officers, enlisted men, selectees, or draftees have been stationed on active duty within the state.

While enrolled at Texas Tech, the wife or child of military personnel must have on file in the Registrar's Office a letter from the commanding officer of the student's husband or father certifying the student's status as a military dependent and to the fact that the husband or father is stationed in Texas.
5. An alien is considered to be a nonresident unless he has applied for naturalization in the United States. An alien who has petitioned for citizenship has the same opportunity of qualifying for status as a resident of Texas as do citizens of the United States. His 12-month period required to establish residency begins with the acceptance of his petition.

## Interpretations of Residency

The Texas Commission on Higher Education has made the following interpretations of the state law defining the residence status of students. They are intended to clarify certain points and answer some of the questions that occur. Additional information may be had in detail from the Registrar's Office.

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1. It is the responsibility of the student to pay the correct registration fee at the beginning of each semester.
2. The legal residence of one under 21 years of age is usually that of the father; if the father dies, it becomes that of the mother.
3. If his parents are divorced, a minor has the same residence status as the parent with whom he has lived for the 12 months preceding registration. If he has not lived with either parent, and there is no court-appointed guardian, the minor takes the same residence as the parent with whom he last lived. If he has lived with or been dependent on a grandparent for more than a year preceding registration, a minor takes the same residence as the grandparent. If custody is granted to some person other than a parent, the minor takes the same residence as that person for as long as he actually makes his home with such person.
4. The residence of a wife is that of her husband. Therefore, a woman student who is a resident of Texas and who marries a nonresident will be considered a nonresident and will be required to pay the nonresident tuition fee in subsequent semesters. A nonresident woman student who marries a resident of Texas is entitled to reclassification as a resident student upon submission of evidence of her marriage and of her husband's residence.
5. The principle is followed that a student's residence while in school is primarily for the purpose of education and not to establish residence, and that decisions of an individual as to a residence are generally made after the completion of an education and not before. Registration in an educational institution within 12 months after entering the state is considered evidence that the person is in the state for educational purposes.
6. A student classified as a nonresident when he first registers will continue to be considered a nonresident while a student, unless he provides conclusive evidence (such as buying a homestead with a substantial down payment, full-time employment prior to registration, entering business) of his intention of becoming a permanent resident. But the student still must reside in the state 12 months before becoming eligible for reclassification as a resident student. Such reclassification will not be granted merely because of the payment of a poll tax, taking out of a Texas driver's license, or payment of personal property taxes.
7. Appointment to the teaching or research staff or the holding of a scholarship or assistantship does not affect the residence status of a student.
8. If the parents of a resident student move out of the state, that student will be classified as a nonresident for all future semesters.
9. Every student classified as a nonresident retains that status until he applies in writing to the Dean of Admissions for reclassification as a resident, and until he obtains the reclassification in writing from that dean.

## Other Fees and Deposits

## General Property Deposit

Each student enrolled in the College must make a general property deposit of $\$ 7$. This deposit is subject to charges for property loss, damages, breakages, or violation of rules in the Library or laboratories.

If the charges incurred for any semester reduce the deposit by 50 percent, the student, upon notice from the Comptroller, will be required to restore the deposit to its original amount by paying the charges at once; pending payment, no credit will be allowed for the work of that semester or term, and the student will be ineligible to reenter the College. At his request this deposit, less charges, will be returned to the student upon termination of his tenure here as a student. Deposits will be held at least 60 days after the close of a semester, or after a student withdraws during a semester, so that all charges and fines may be accumulated from the various departments.

Under state law deposits which remain without call for a refund for a period of four years from the date of last attendance will be forfeited and transferred to the Student Property Deposit Scholarship Account.

## Laboratory Fees

A laboratory fee of $\$ 2$ per semester is charged for all courses in which the combined lecture and laboratory credit is from 1 to 3 semester hours. For courses in which the semester credit is 4 semester hours or more the laboratory fee is $\$ 4$ per semester.

## Student Services Fee

This is a $\$ 17$ fee every student must pay each semester of the long session if he is enrolled for 6 semester hours or more.

## Student Union Fee

This is a $\$ 5$ fee authorized by state law and to be paid each semester of the long session by every student enrolled for 3 semester hours or more.

## Fee for Change in Class Schedule

Each time a student initiates one or more changes in his previously approved class schedule he must pay a fee of $\$ 3$; no charge will be made when the change is made for the convenience of the College. This fee will not be collected after the 10 th week of any semester.

## Enrolling for No Grade

Students regularly enrolled in either the summer session or the long session are entitled to register in residence courses for no grade and no credit. In making the student's schedule such registrations are

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to be considered on the same basis as registrations for credit courses, both in paying of fees and in consideration of the amount of work to be carried.

## Visitor's Fee

A person not enrolled in the College must pay a fee of $\$ 10$ for the privilege of visiting any course. No credit may be obtained for auditing courses in this manner. (See section titled "Enrollment Without Credit.")

## Graduation Fee

Graduating students will be charged a graduation fee of $\$ 5$ for each degree granted. The fee will be refunded, provided the student cancels his graduation intentions before the diploma has been printed and before other related steps are taken.

If the student's intention to graduate is not cancelled in time, he will be charged $\$ 2$ for reordering the diploma insert. If both the insert and the cover have to be reordered, the charge will be $\$ 5$, as in the initial order.

A student who is graduated in absentia must pay an additional fee of $\$ 1.50$.

## Replacement of Lost ID-Activity Cards

Students who lose their ID-ACTIVITY cards may have them replaced by paying the charges as indicated by the following schedule:

| Fall | Spring | Cost |
| :--- | :--- | ---: |
| After Oct. 15 | After March 1 | $\$ 12.75$ |
| After Nov. 15 | After April 1 | 8.50 |
| After Dec. 15 | After May 1 | 4.25 |

## Duplicate Receipt Fee

A fee of 50 cents will be charged for each duplicate registration receipt issued.

## Miscellaneous Special Fees

## Music Fees for Private Instruction

The college registration fee does not cover the following costs for individual instruction offered by the Department of Music in voice, wind and string instruments. When instruction is given in one of the following courses in applied music the charges listed are made for each course, payable in full at the time of registration:

Applied Music 115, 116, 215, 216, 315, $316 \ldots . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ~ \$ 15.00 ~$
Applied Music 025, 026, 125, 126, 225, 226, 235, 236, $325,326,345,346,425,426,435,436,445,446$
The following charges are made for practice room use and piano rentals; they are payable at the College Business Office:
One hour per day per semester ............................................................. \$ 5.00
Each additional hour .......................................................................................... $2 .{ }^{-1}$
Musical instrument rental for class strings, woodwinds,
brasses (each class) ............................................................................ 2.0

## Fees for Use of Gymnasium Facilities

Students not enrolled in a physical education laboratory course who wish to use the college gymnasium facilities will pay a fee of $\$ 1$ per semester for use of a locker, if one is available. Towel service may be secured by payment of a $\$ 1$ deposit which will be refunded upon return of the towel.

Faculty members using the gymnasium-natatorium facilities will pay a $\$ 2$ fee for each fiscal year or any part of a fiscal year.

## Refund of Fees

Any student officially withdrawing during a semester, either at his request or at the request of the College because of failure to comply with a condition upon which his enrollment was approved, will receive a refund on registration fees, applied music fees, and activity fees according to the following schedule:

1st class day through 14th class day 80 percent
15 th class day through 20 th class day 60 percent
21 st class day through 25 th class day 40 percent
26 th class day through 30 th class day 20 percent
No refund will be made after the 30th class day.
The official College Calendar near the front of this catalog indicates the official date of the beginning of each semester.

Refund of tuition and fees will be made when the College is at fault. Refund of tuition or fees will not be made on courses of less than six weeks' duration. In no case will fees be refunded to a student suspended from the College by college authorities.

If the student is permitted to re-enter school during the same semester in which he officially withdraws or is suspended, a re-entrance fee of $\$ 5$ will be charged.

Once a student has registered for a laboratory class and has attended the class, no refund of the laboratory fee will be made unless the College is at fault.

Students who complete registration and are later dropped under conditions set forth in the section of this catalog entitled "General Regulations" will be ineligible to receive refund of fees.

## Exemption from Fees Because of Honorable Discharge from The Armed Forces

Men and women who were legal residents of Texas at the time of entry into the Armed Forces and who have been legal residents of

Texas for a period of not less than 12 months immediately preceding their registration in Texas Technological College, and who hold an honorable discharge from the Armed Forces of the United States after service during the Spanish American War, World War I, World War II, or the Korean War, are by state law exempt from the payment of all fees except library and laboratory fees or similar deposits and fees, or charges for room and board. The provisions of this act shall apply to the benefit of all nurses, members of the Women's Auxiliary Corps and Women's Auxiliary Volunteer Emergency Service. The benefits and provisions of this act shall also apply to the benefit of the children of members of the United States Armed Forces where such members of the Armed Forces were killed in action or died while in the service during World War II or the Korean War. The provisions of this act shall not apply to or include any member of such United States Armed Forces or other persons herein above named who were discharged from the service because of being over the age of 38 or because of a personal request on the part of such person to be discharged from such service.

Discharge papers must be presented by the student to the Coordinator of Veterans' Affairs, who will in turn certify the student's eligibility to the Business Office.

Veterans are not eligible to the above outlined benefits under state law until their eligibility to educational benefits from Federal funds through the Veterans' Administration has expired.

## Summary of Registration Expenses

Each student should have approximately $\$ 310$ available at the time of his first enrollment. All registration expenses must be paid in full at the time of registration.

To enable the resident student to approximate his expenses at the time of entering college, the following estimates are offered:

|  | Fall | Spring |  |
| :--- | ---: | ---: | ---: |
| Registration Fee | $\$ 50.00$ | $\$ 50.00$ |  |
| Laboratory Fees (estimated) | 4.00 | 4.00 |  |
| Student Services Fee | 17.00 | 17.00 |  |
| Student Union Fee | 5.00 | 5.00 |  |
| General Property Deposit (new student) | 7.00 |  |  |
| Books and Incidentals (estimated) | 65.00 | 50.00 |  |
|  |  | $\$ 148.00$ | $\$ 126.00$ |

For estimated costs, including residence hall room and board, add charges for the proper residence hall as shown below in the section entitled "Charges for Room and Board in College Residence Halls."

The student who is not a resident of Texas should add an additional $\$ 150$ per semester to the above estimate to cover the nonresident tuition fee.

The cost of books and supplies will vary with the different curricula of the College. Engineering students are required to purchase their own drawing equipment, slide rules, etc., which, plus books, cost approximately $\$ 100$ the first year, or an average of $\$ 50$ per semester.

## Charges for Room and Board in College Residence Halls

All prices indicated below are subject to change without notice prior to registration date and with 10 days' notice thereafter.

Payments may be made in several ways: (1) for the full ninemonth period; (2) September through January; (3) February through May; (4) by the month as outlined in the schedule below.

Charges for room and board in West, Sneed, Bledsoe, Gordon, Doak, Drane, Horn and Knapp Halls will be $\$ 630.00^{*}$ per nine-month period for the regular double rooms occupied by two students.

| Sept. and Oct. | $\$ 168.00$ | March | $\$ 66.00$ |
| :--- | ---: | :--- | ---: |
| Nov. | 66.00 | April | 66.00 |
| Dec. | 66.00 | May | 66.00 |
| Jan. | 66.00 |  |  |
| Feb. | (a) 66.00 |  | Total |

(a) Will be $\$ 117.00$ for students entering the residence halls at the beginning of the spring semester.

Charges for room and board in Thompson, Gaston, Wells, Carpenter, and Weeks Halls will be $\$ 696.00^{*}$ per nine-month period for the regular double rooms occupied by two students.

| Sept. and Oct. | $\$ 178.00$ | March | $\$ 74.00$ |
| :--- | ---: | :--- | ---: |
| Nov. | 74.00 | April | 74.00 |
| Dec. | 74.00 | May | 74.00 |
| Jan. | 74.00 |  |  |
| Feb. | (b) 74.00 |  | Total |

(b) Will be $\$ 126.00$ for students entering the residence halls at the beginning of the spring semester.

Charges for room and board in the new air-conditioned residence halls for women will be $\$ 760.00^{*}$ per nine-month period for the regular double rooms occupied by two students.

| Sept. and Oct. | $\$ 200.00$ | March | $\$ 80.00$ |
| :--- | ---: | :--- | ---: |
| Nov. | 80.00 | April | 80.00 |
| Dec. | 80.00 | May | 80.00 |
| Jan. | 80.00 |  |  |
| Feb. | (c) 80.00 |  | Total |

(c) Will be $\$ 140.00$ for students entering the residence halls at the beginning of the spring semester.

In some residence halls there are a few rooms with private baths for which there will be an additional charge of $\$ 7.50$ per month per person.

If facilities are available, one student may occupy a double room for an additional charge of $\$ 7.50$ per month.

Payment for room and board is due in advance and is to be made from the first through the fifth business day of each month except at the beginning of a semester, at which time it is payable during the first five business days of the semester. An additional charge of 50 cents per day will be made after the fifth business day of the pay period.

[^1]
## 52 RESIDENCE HALL RESERVATIONS

Refund of room and board to students who move out during the nine-month period will be figured on a straight percentage basis, using calendar days.

No charge is made for electrical appliances; however, only certain appliances will be permitted in the rooms. Each student will be furnished a list of the permitted appliances.

## Residence Hall Reservations

Application for residence hall reservations will be made to the Office of Room Reservations. A check for $\$ 40$ must accompany the request. This will serve as a reservation fee and will be held as a residence hall property deposit. It will be refunded, less any breakage charges, if the student graduates at the end of the fall semester; does not return to school for the spring semester and notifies the Office of Room Reservations in writing by January 10 of his intent; is forced to withdraw at the end of the fall semester for scholastic deficiencies; or at the end of the nine-month period. The deposit will not be returned if the student moves from his residence hall at any other time during the nine-month period for any other reason; this includes the student who is dropped from school for disciplinary reasons.

Should a student find it impossible to enroll in the College, he will receive a refund of his reservation fee if application is made not later than July 31 for the fall semester, January 10 for the spring semester, May 15 for the first term of summer session and June 30 for the second term of summer. All unclaimed rooms in the residence halls will be declared vacant at 8 a.m. on the first day of classes, and the $\$ 40$ deposit will be forfeited.

All arrangements for housing accommodations off campus are made through the Offices of the Dean of Men and Dean of Women.

## Check-Cashing Services

For convenience of the student, personal checks may be cashed for limited amounts at the College Bookstore and the Tech Union upon presentation of the student's ID card. All checks are accepted subject to final payment. Checks returned by the bank on repeated occasions will subject the student to suspension.

# Student Activities and Services 

Student Life

James G. Allen, Dean of Student Life<br>Lewis N. Jones, Dean of Men<br>Florence Phillips, Dean of Women<br>Thomas P. Stover, Adviser to Fraternities, Foreign Students and for Student Loans<br>Jacqueline Olsen, Assistant Dean of Women<br>Nelson H. Longley, Director of Tech Union<br>Mrs. Karen Moore, Program Director of Tech Union

The Office of the Dean of Student Life is concerned with the general welfare of the student. The staff exerts its efforts toward seeing that every phase of the college experience represents an opportunity for the growth of the student; it bases its program on the premise that all of college life, both in and out of class, represents a real and significant part of educational development.

Student life staff members afford counseling and guidance service to all students enrolled in the College and are in a position to refer a student to the many service agencies interested in his welfare. In addition to giving counsel and guidance on personal, social, and individual problems, the staff is prepared through training and experience to bring the student to full understanding of himself as a part of the rich and full opportunity which is a college education. The student life staff includes the Dean of Men, The Dean of Women, and their assistant deans, advisers on loans, fraternities, and foreign students, and the Director of the Tech Union.

## Housing

Approval of housing for all students, a part of registration, is the responsibility of the Dean of Men and the Dean of Women. The College maintains 18 residence halls which house over 7,000 students. The College requires that students live in the College residence halls as long as there are vacancies. Students who cannot be accommodated in a residence hall at the time of registration and who are not excepted on one of the bases given below are required to move into a residence hall upon notification by the College.

Students who live with their parents, students who are married and live with their wives or husbands in Lubbock or its vicinity, students whose health condition demands special services and living conditions, and students whose part-time employment prohibits their securing meals regularly in a residence hall may be approved for off-campus residence. (See section entitled "Charges for Room and Board in College Residence Halls" under "Expenses".)

The student is required to obtain the approval of the Dean of Men or the Dean of Women before changing his residence, and as the final
step in obtaining this approval, he must file a change of address notice with the Office of the Dean of Men or of the Dean of Women. Failure to notify the College of his change of address may cause the student to be dropped from the rolls of the College. Students are urged to consult with the Dean of Men or Dean of Women before changing residence.

Casa Linda. Located adjacent to the campus, Casa Linda furnishes an opportunity for cooperative living in a pleasant and dignified environment under residence hall standards. It accommodates 18 women students who share co-operatively in its management under the direction of upperclass women. Casa Linda is completely furnished except for bedding and linens, which the students are expected to provide. The charge covers the actual cost of operation as established by a carefully worked out budget. Application for residence in Casa Linda should be made through the Office of the Dean of Women.

## Residence Hall Regulation and Government

The College maintains its residence halls in the belief that the experience in group living which they afford helps materially in the development of the mature person, with a conviction that the selfdiscipline inherent in residence-hall living is wholesome and contributes to academic achievement.

Residence halls are supervised by a staff of trained and experienced personnel. Each men's residence hall has a resident supervisor. Each women's hall has a counselor selected on the bases of professional training, experience, and special qualifications for the counseling and guidance of college students.

Each of the residence halls has its own student governing body which sets the pattern of living and sponsors a program of cultural, social, and recreational events.

## Citizenship - Honesty

Honesty and integrity in class work as well as respect for the rights of others, along with a regard for the laws of this state, the county, the city ordinances and the campus regulations, are reflected in the ability of the college student to establish sound values.

Cooperation with the plan of traffic control on the campus, financial responsibility on and off campus, the individual's official college records, and respect for the privileges offered through the Identification (I.D.-Activity) Card are significant instances of opportunities each student assumes in demonstrating mature judgment.

Each student evaluates his own citizenship by demonstrating his ability to manage himself as he relates to the College and to the community.

## Eligibility for Participation in Extracurricular Activities

Any undergraduate student not on disciplinary probation and who is enrolled for 12 or more semester hours* is eligible to become a

[^2]candidate for or to hold student office or to represent the College in any extracurricular activity, provided such student has a grade-point average of at least 2.00 for both the whole of his work at Texas Tech and that of the preceding semester on the complete scholastic load. For the method of computing the grade-point average, see the discussion on grade points in the section of this catalog entitled "Academic Regulations." A transfer student may establish eligibility by earning a C (2.00) average on all courses at midsemester of his first semester in residence. A student with less than a 2.00 average may establish eligibility by attending summer school* and averaging his summer term work with his previous semester's course grades so that his average reaches 2.00 .

The above eligibility standards must be met by any student who serves as a college or class officer or representative, as an officer or representative of a recognized club or organization, or as a member of an academic, departmental, or intramural athletic squad or committee.

A student holding a bachelor's degree is ordinarily not eligible to hold office in a student organization or to participate in college-sponsored extracurricular activities in general.

To be eligible to participate in out-of-town trips or field trips which require absence from any class other than that for which the trip is assigned, a student must have a 2.00 grade average, must not be on disciplinary probation, and must have a current academic standing satisfactory to his academic dean. Exceptions to this academic requirement for off-campus trips are student organization-sponsored trips approved by the College and beginning Saturday noon and ending not later than Monday morning at 8 o'clock, or between the end of the last scheduled final examination and the beginning of the next registration.

Other eligibility requirements than those given above may be determined by student organizations and agencies but operate within the framework of the eligibility requirements as stated above. Eligibility rules for the Southwest Conference are administered by the Texas Tech Athletic Council.

## Student Organizations

The broad program of extracurricular activities described below is offered to students in order to provide fellowship, opportunities for leadership, recreation, and joint participation with members of the faculty. Students may elect to participate in clubs and societies, publications, sports, music, drama, or forensics as their abilities and tastes suggest.

## Clubs and Societies

Nearly every academic department has its own club or society. Some are honoraries, with membership determined by scholarship, while others are social or professional in nature, with membership open to those interested in that particular discipline. Other classifications of recognized organizations may be described as service, mutual interest,

[^3]and coordinating. In addition, 11 national social fraternities have chapters on the campus, as do 12 national sororities.

The Dean of Student Life has general supervision of campus clubs and societies.

Recognition of these, and the plan under which they function is the assignment of the Committee on Student Organizations, a student-faculty committee appointed by the President of the College. Recognition of a student organization automatically gives it the right and responsibility to schedule on the Social Calendar, and entitles it to the sponsorship of College faculty and administration, and to the use of such College facilities as may be designated for that purpose. The recognition of a club or society on Texas Technological College campus is based on the assumption that such an organization satisfies a student need for professional, scholastic, social, religious, service, or common-interest expression consistent with the best college achievement.

The Board of Student Organizations, composed of the presidents of all recognized clubs, serves as a coordinating agent for student organizations recognized by the College, the chairman of the executive committee of the board serving as a member of the Committee on Student Organizations. The Inter-Fraternity Council and the Panhellenic Council serve as governing boards for the national social fraternities and sororities. Women's residence hall and men's residence hall councils serve as coordinating agencies for student government in the residence halls for men and for women.

Honorary organizations are local or national in scope, and membership is based on selectivity, either by scholarship, leadership, service, high moral character, or some combination of the four. Those whose selection is based on academic excellence alone usually must meet a minimum grade requirement of from 3.25 to 3.50 . The departmental honoraries usually require a 2.00 to 2.50 overall grade average but establish higher requirements in the academic area of the honorary. Many of the honoraries are restricted to electing to membership a certain percentage of a class or department. Selection may be based on certain minimum requirements but meeting them does not automatically insure membership. Vote of the members and extension of an invitation are necessary for membership in an honorary organization.

Department, school, and/or professional organizations are defined as those which are sponsored by a department or school and are a means of disseminating information concerning fields of activity to be found in the department or school. They may or may not have professional standards as requirements for membership. The constitution of a departmental, school, or professional club will determine the basis of membership.

Mutual interest organizations are those whose members are brought together on the basis of common interest in an activity consistent with the objectives of a college education.

Student organization coordinating agencies are for the coordination of the activities of student organizations in the same classifications, and are recognized by the Committee on Student Organizations. Detailed information on the procedure by which a student group may be recognized by the College is available through the chairman of this committee.

The Code of Student Affairs is a bulletin stating the College policies on procedures and regulations as they affect both.individual students and recognized student organizations.

## The following clubs and societies are recognized by the College:

Agricultural Economics Club Agronomy Club
AIME Society for Petroleum Engineers
Air Force ROTC Association
Alpha Chi Omega (Social Sorority)
Alpha Delta Sigma (Advertising-Men)
Alpha Epsilon Delta (Pre-Medicine Honorary)
Alpha Lambda Delta (Freshman Women's Honorary)
Alpha Phi (Social Sorority)
Alpha Phi Omega (Men's Service Organization)
Alpha Pi Mu (Industrial Engineering Honorary)
Alpha Psi Omega (Drama)
Alpha Tau Omega (Social Fraternity)
Alpha Zeta (Agriculture)
American Chemical Society
American Institute of Architects
American Institute of Chemical Engineers
American Institute of Interior Designers
American Institute of Physics
American Marketing Society
American Society of Agricultural Engineers
American Society of Civil Engineers
American Society of Mechanical Engineers
American Society of Range Management
Angel Flight
Army ROTC Association
Arnold Air Society (Air Force ROTC)
Association of the United States Army
Association of Women Students (Coordinating)
Baptist Student Union
Beta Alpha Psi (Accounting)
Beta Gamma Sigma (Business Administration Honorary)
Bledsoe Hall Association
(Men's Residence)
Block and Bridle (Animal Husbandry)
Board of Student Organizations (Coordinating)
Campus Service Council
Canterbury Club (Episcopal)
Capa y Espada (Spanish)
Carpenter Hall Association (Men's Residence)
Casa Linda (Women's Residence)
Catena (Town Girls)
Channing Club (Unitarian)
Chi Chi Epsilon (Chemistry)
Chi Omega (Social Sorority)
Christian Science Organization
Circle ' K " Club (Men's Service)
College Panhellenic Association
(Coordinating)
Cosmopolitan Club (International)
Dairy Industry Club
Delta Delta Delta (Social Sorority)
Delta Gamma (Social Sorority)
Delta Phi Alpha (German)
Delta Sigma Pi (Business AdministrationMen)
Delta Sigma Rho (Forensics Honorary)
Delta Tau Delta (Social Fraternity)
Der Liederkranz (German)
Disciples Student Fellowship
(Christian Church)
Doak Hall Association (Women's Residence)
Dolphin Fraternity (Swimming)
Double " $T$ "' Association (Athletic Lettermen)
Drane Hall Association (Women's Residence।

Economics and Finance Society
Engineering Society
Eta Kappa Nu (Electrical Engineering Honorary)
Freshman Council (Coordinating)
Future Farmers of America
Gamma Alpha Chi (Advertising-Women)
Gamma Delta (Lutheran)
Gamma Phi Beta (Social Sorority)
Gaston Hall Association (Men's Residence)
Gordon Hall Association (Men's Residence)
Home Economics Association
Honors Council (Arts and Sciences)
Horn Hall Association (Women's Residence)
Interfraternity Council (Coordinating)
International Trade Soclety
Junior Class (Coordinating)
Junor Council (Junior Women's Service Honorary)
KTXT-FM Radio Station (College Radio Station)
Kappa Alpha Order (Social Fraternity)
Kappa Alpha Theta (Social Sorority)
Kappa Kappa Gamma (Social Sorority)
Kappa Kappa Psi (Band-Men)
Kappa Mu Epsilon (Mathematics)
Kappa Sigma (Social Fraternity)
Knapp Hall Association (Women's Residence)
Le Cercle Francais (French)
Lutheran Students Association
Major-Minor Club (Physical EducationWomen)
Men's Residence Council (Coordinating)
Modern Dance Club
Mortar Board (Senior Women's Service Honorary)
Mu Phi Epsilon (Music-Women)
Newman Club (Catholic)
Omicron Delta Epsilon (Economics Honorary)
Optimates (Latin)
Phi Alpha Kappa (Finance)
Phi Alpha Theta (History Honorary)
Phi Delta Theta (Social Fraternity)
Phi Epsilon Kappa (Physical EducationMen)
Phi Eta Sigma (Freshman Men's Honorary)
Phi Gamma Delta (Social Fraternity)
Phi Gamma Nu (Bus!ness Administration Women)
Phi Kappa Phi (Junior, Senior, and
Graduate Men and Women's Honorary)
Phi Kappa Psi (Social Fraternity)
Phi Mu (Social Sorority)
Phi Mu Alpha (Music-Men)
Phi Upsilon Omicron (Home Economics)
Phi Psi (Professional Fraternity,
Textile Engineering)
Pi Beta Phi (Social Sorority)
Pi Delta Phi (French)
Pi Kappa Alpha (Social Fraternity)
Pi Omega Pi (Business Education)
Pi Sigma Alpha (Government Honorary)
Pre-Law Society
Pre-Medical Society
Presbyterian Student Association
Psi Chi (Psychology)
Saddle Tramps (Men's Service)
Scabbard and Blade
Senior Class (Coordinating)
Sigma Alpha Epsilon (Social Fraternity)
Sigma Alpha Eta (Speech)
Sigma Chi (Social Fraternity)

Sigma Deita Chi (Journalism-Men)
Sigma Delta PI (Spanish)
Sigma Iota Epsilon (Management)
Sigma Kappa (Social Sorority)
Sigma Nu (Social Fraternity)
Sigma PI Sigma (Physics Honorary)
Slgma Tau Delta (English)
Sneed Hall Association (Men's Residence)
Society for Advancement of Management
Society of American Military Engineers
Sock and Buskin (Dramatics)
Sophomore Class (Coordinating)
Student Agricultural Councll (Coordinating)
student Association (Coordinating)
Student Education Association
Tau Beta PI (Men's Engineering Honorary)
Tau Beta Sigma (Band-Women)
Tau Sigma Delta Architecture and
Allied Arts Honorary)
Texas Tech Accounting Society
Texas Tech Entomology Club
Texas Tech Forensics Union

Texas Tech Geology Club
Texas Tech Horticulture Club
Texas Tech Retailing Club
Texas Tech Rodeo Association
Texas Tech Sociology Club
Texas Tech Union Program Counell (Coordinating)
Theta Sigma Phi (Journalism-Women)
Thompson Hall Association (Men's Residence)
Tyrian Rifles
Weeks Hall Association (Women's Residence)
Wells Hall Association (Men's Residence)
Wesley Foundation (Methodist)
West Hall Assoclation (Men's Residence)
Women's Residence Councll (Coordinating)
Women's Residence Hall VI Association
Women's Residence Hall VII Association
Women's Service Organization
Zeta Tau Alpha (Soclal Sorority)

## Student Association

By enrolling in the College all undergraduate students automatically become members of the Student Association of Texas Technological College. The Student Council serves as the executive council of the association.

The Student Council plans, publicizes, and supervises student elections. It supports student enterprises and organizations through funds it receives from student service fees, and plays a leading role in the administration of student affairs. It appoints from its membership representatives on the College Athletic Council, the College Awards Board, the Discipline Committee, the Student Welfare Committee, the Student Publications Committee, the Union Board, the Committee on Student Organizations, and the Student Traffic Court.

## Association of Women Students

The Association of Women Students serves as a coordinating body in all activities concerning women students. Every woman who enrolls in the College automatically becomes a member of the association. The governing body is composed of elected officers and representatives from every women's organization on the campus. The association is a member of the Intercollegiate Association of Women Students, a national organization made up of member schools throughout the country.

At the beginning of the school year the Association of Women Students assists in orienting freshman women in college life through its Big Sister-Little Sister program and Howdy Party. Other activities include Women's Day and Dad's Day programs, training workshops for legislators and officers of the women's residence halls, and other college service projects.

## Religious Activities

The churches of Lubbock cordially invite students to become associated with them while at Texas Technological College; a number of
denominations maintain student centers near the campus. These are staffed by qualified advisers and leaders who assist the students in planning religious and social programs during the academic year. Among active student religious groups are the Baptist Student Union, Canterbury Club, Channing Club, Christian Science Organization, Disciples Student Fellowship, Gamma Delta, Newman Club, Presbyterian Student Association and the Wesley Foundation.

Each year, usually early in the spring semester, the Willson Lectures are scheduled. These four lectures are delivered by a person of national distinction in the fields of science and religion.

## Science and Engineering Show, Home Economics Open House

Each spring the Engineering Society sponsors a two-day showing of engineering exhibits to the public. Annually some 10,000 visitors see this student-planned and produced display of scientific and engineering talent.

On the same weekend the Home Economics Association holds open house for all visitors to the campus. Demonstrations in all fields of home economics are on display.

## Musical Organizations

The College is represented by the following official touring musical organizations: Tech Choir, Madrigal Singers, the Tech Opera Theater, the Tech Symphony Orchestra, and the Concert Band. Students may also participate in the Men's Glee Club, Women's Chorus, Tech Singers, Tech Stage Band, Court Jesters, Symphonic Winds, and Varsity Band. Each organization is under the direction of a faculty member of the Department of Music and is open to any student who is officially enrolled in the College and meets academic requirements. Each group performs a broad repertoire and gives a number of public performances annually.

## Forensics and Dramatics

Students who meet general eligibility requirements may participate in intramural and intercollegiate debate, group discussions, extempore speaking, impromptu speaking, after-dinner speaking, oratory, radio speaking, prose and poetry reading, and similar events. Both contest and noncontest events are held on campus and at other colleges. The Texas Tech Forensics Union and Delta Sigma Rho are active in sponsoring campus-wide speech activities.

Students meeting eligibility requirements may also participate in the plays presented by the Speech Department and its related organizations, Sock and Buskin and Alpha Psi Omega. Participation may be in acting, stage makeup, lighting, scene design and construction, publicity, ticket sales, and other activities connected with play production. Usually four full-length plays and several one-act plays are produced each year.

## Student Publications

"The Toreador," the college newspaper, is published daily Tuesday through Saturday. "La Ventana" is the college yearbook, published annually. Both of these publications draw their editors, business managers, and other personnel from the student body. The Committee on Student Publications, a faculty-student committee, has general supervision of both publications. Creative writing done by students is recognized through publication in "The Harbinger," a literary magazine issued once each semester by Sigma Tau Delta, the professional English society.

## Intercollegiate Athletics

Texas Technological College maintains a well-rounded program of intercollegiate athletics in football, basketball, track, baseball, golf, swimming, and tennis. It is the intention of the College to place its main emphasis on academic excellence and within this framework to conduct a superior athletic program as an integral part of campus activities. The College holds membership in the Southwest Athletic Conference and the National Collegiate Athletic Association and conducts its program under the rules and regulations of these bodies. College policy is set by the Athletic Council composed of members from the faculty, the student body, and the Ex-Students Association. The Department of Athletics is organized under the Director of Athletics, with head coaches in each of the sports responsible to the director.

## Intramural Sports

Students not participating in intercollegiate activities are offered a variety of team and individual sports in which they may compete. These programs are supervised by the Departments of Health, Physical Education, and Recreation for Men and for Women. Participation is on a voluntary basis and enables the student to choose the sport best suited to his abilities and interests.

## Hazing Pledge

Each applicant is required to sign the following pledge each time he registers at Texas Tech:

In becoming a student of Texas Technological College, I hereby pledge absolute obedience to the laws of the State of Texas, the United States of America, and the regulations of the Texas Technological College. I pledge conformity to those highest standards of conduct which are universally recognized in good society and among honorable men and women. I especially pledge obedience to the laws of the State of Texas against hazing, and to refrain from encouraging, aiding, or assisting any other person in any hazing enterprise.

## Ex-Students Association

The Ex-Students Association is an independent organization cooperating with and serving the College and providing an opportunity
for continued friendship and a close relationship among ex-students. Every former student of the College is eligible for membership on application to the association. Besides serving as an alumni organization, the association performs a number of services for the College. It maintains records of alumni, recruits outstanding academic students, provides scholarships and loan funds, and publishes news of college and alumni activities through The Texas Techsan and Tex Talks.

## Loan Funds

Texas Technological College administers a number of loan funds upon which students may draw for assistance in meeting their expenses. Donors have in some instances restricted their funds to certain groups of students. In addition, in order to qualify for any loan fund administered by the office of the Dean of Student Life (except the National Defense Student Loan Fund) the student must present evidence of the following:
a. Need.
b. Satisfactory academic achievement ( 2.00 overall grade-point average, or above, for previous college work, or in the case of first-semester freshmen, a high school record which indicates the ability to maintain a 2.00 grade-point average at Texas Tech).
c. Satisfactory citizenship.
d. Full-time student status.

The following is a complete list of loan funds administered by the office of the Dean of Student Life. Application for loans from these funds should be made to the Student Loan Adviser, Room 163, Administration Building.

Listed below those funds administered by the office of the Dean of Student Life are some of the other loan funds administered by other offices and agencies. Application should be made as indicated in the description of the fund.

Not listed here are fellowships, scholarships, and awards. For a description of these, see the official publication of the College, Fellowships, Scholarships, and Awards. A cofy may be obtained from the Office of the Dean of Admissions.

## Loan Funds Administered by the Office of the Dean of Student Life

American Society of Mechanical Engineers Loan Fund. The American Society of Mechanical Engineers has established a small loan fund for students in the School of Engineering. These loans are only for those students who are taking interview trips and must be repaid before the end of the semester or term in which they are borrowed.

The Brown Memorial Trust Loan Fund. This loan fund was made available from funds of the Brown Memorial Trust, a division of the T. J. Brown and C. A. Lupton Foundation, Inc., Fort Worth. Loans from this fund are made only to students who are within three semesters of graduation.

The Dean of Student Life Special Loan Fund. Loans are made from this fund to students who, for some acceptable reason, do not qualify for loans from any other loan fund. The student must be of exceptionally high moral character.

The A. H. Douglas Loan Fund. This fund makes available loans to students of junior classification who are majoring in foreign languages. Applicants must have an overall grade-point average of 2.50. At least one year ( 24 credit hours or more) of the student's previous college work must have been completed at Texas Tech. This loan may be repaid after graduation.

The Ex-Students Association Loan Fund. This loan fund is made available by the Texas Tech Ex-Students Association. Junior and senior students may borrow from this fund provided they meet the general qualifications for student loan funds. These loans may be repaid within one year following graduation.

The Garvey Student Loan Fund. This was established by James S. Garvey of Fort Worth. Loans are available only to students within one year of graduation. Loans from this fund should be repaid before the end of the semester in which they are received but may, under unusual circumstances, be repaid within one year following graduation.

George T. Morrow Loan Fund. George T. Morrow, a prominent Lubbock businessman for a number of years, left this fund to the College. Loans are available only to juniors and seniors and may be repaid following graduation.

The Kathryn Sowder Whatley Loan Fund. This was established at the request of the late Mrs. Eppie Sowder of Lubbock. The fund was established for deserving students who wish to attend Texas Technological College. Loans are available only to entering freshmen and transfer students, or prospective students.

The Chris Mansell Loan Fund. This fund, created as a memorial to the late Dr. Chris Mansell of Lubbock by his friends and colleagues, is available to pre-medical students who have completed at least 30 semester hours of residence work at Texas Tech. Some interest-free short-term loans are available to qualified students from this loan fund.

Mrs. Harry Morris Foreign Student Loan Fund. This loan fund is available to foreign students enrolled in the College. It is primarily designed to meet financial emergencies of international students. Loans are short-term and must be repaid within the semester borrowed.

The Perry E. Roddy Loan Fund. This fund has been established in the name of Perry E. Roddy by the Lubbock County Association for Mental Health. Applicants must, in addition to meeting the general qualifications listed previously, have completed at least one-half semester at Texas Tech and be preparing for work in some area of mental health. In some instances loans may be repaid following graduation.

The Petroleum Industry Electrical Association's Student Assistance Loan Fund. This was established by the association to enable capable junior, senior, and graduate students majoring in electrical engineering to continue doing high quality academic work. A committee, composed primarily of members of the faculty of the Electrical Engineering Department, considers applications on the basis of the applicant's scholarship, citizenship, need, and potential ability in electrical engineering.

The Dr. R. J. Hall Loan Fund. This fund was established at the request of the late Dr. R. J. Hall of Lubbock. Loans are available to qualified undergraduate students who have completed at least one-half semester at Texas Tech. The amount of the loan must enable the student to complete the semester or semesters for which it is borrowed.

The Lubbock Rotary Club Student Loan Fund. This was established to assist upperclassmen-primarily of late junior and senior classification-to defray college and college-related expenses which might otherwise cause the student to suffer hardships which might affect his studies. These loans are approved by a committee of the Lubbock Rotary Club and may be repaid after graduation.

The Student Emergency Loan Fund. This makes available small, short-term loans to all qualified students enrolled in the College who have incurred financial emergencies due to college or college-related expenses. This loan fund is made available through the proceeds from the sale of freshman caps.

Student Memorial Loan Fund. This fund was made available to the College by the will of the late Will C. Hogg of Houston. It is administered by a board of directors appointed in accordance with the directions of Mr. Hogg's will. The fund is available to upperclassmen only.

National Defense Student Loans. The College has been allotted funds through the National Defense Education Act of 1958 to be used for student loans. Matching funds in the amount of one-ninth of the total provided by the federal government have been provided by existing loan funds and the Texas Tech Foundation. Loan funds are administered by the U.S. Office of Education.

Applicants must show genuine evidence of need. They must also demonstrate the capacity for good academic achievement through actual performance. In addition, the integrity and reliability of the applicant will be considered by the Loan Fund Committee, which has the final disposition of each application.

Entering freshman applicants are required to have on file with the Testing and Counseling Center at Texas Technological College their results on the Scholastic Aptitude Test, administered by the College Entrance Examination Board, Box 592, Princeton, New Jersey. An entering freshman applicant should contact his high school principal or write to the Testing and Counseling Center, Texas Technological College, Lubbock, Texas, for further information about taking this test.

Need is determined by a financial statement completed by the parent or guardian of the applicant and by a budget which the applicant completes for the period for which aid is requested. Good academic achievement of undergraduates is interpreted as having, or being capable of achieving, an average of 2.50 or better at Texas Tech. Graduate students must have, or be capable of achieving, an average of 3.50 or better at Texas Tech. The student is expected to contribute to the financing of his college education by obtaining summer employment unless he is attending college. The parent or guardian of the applicant is expected to contribute to the applicant's education in an amount the financial statement, completed by the parent or guardian, would seem to indicate can be afforded. Should there be any change in
need as reflected in the application or in the financial statement which the parent or guardian has provided, the applicant is required to indicate immediately these changes to the chairman of the Student Loan Fund Committee.

Special consideration is given to students with a superior academic background who express a desire to teach in public elementary or secondary schools, and to students whose academic background indicates a superior capacity or preparation in mathematics, engineering, the sciences, or a modern foreign language.

Applicants must also be enrolled for a full course of study. A full course of study for the undergraduate student is interpreted as being a minimum hour-load of 12 semester hours and completion of the requirements for the degree in the normal length of time.

A full course of study for the graduate student is an interpretation made by the Dean of the Graduate School.

Students enrolled only in summer school or in correspondence courses are not considered full-time students.

The maximum amount a student may borrow for one semester (spring or fall) is $\$ 400$ and for one summer session is $\$ 100$.

The maximum amount of money any one student may borrow for one government fiscal year may not exceed $\$ 1,000$, which, if the maximum is borrowed, is disbursed at registration periods in $\$ 400$ advancements for the long semesters and $\$ 100$ advancements for the summer sessions. Loans can be received only during the registration periods, only for the semester or term for which the student is registering, and only for the period for which the loan was granted by the committee. The total maximum amount of money available to any one student may not exceed $\$ 5,000$. The actual amount lent to any one student will be determined by the Loan Fund Committee. Loans carry interest at the rate of 3 percent of the unpaid balance per year and may be repaid over a 10 -year period following termination of attendance as a full-time student in an institution of higher learning.

Interest begins to accrue one year after the date when the borrower ceases to be a full-time student in an institution of higher education. The first yearly repayment installment falls due 24 months after the date the borrower ceases to be a full-time student in an institution of higher education. Students are encouraged, however, to repay loans as quickly as possible in order that the College can assist other worthy students. If the student enters the teaching profession at either the public elementary or secondary level, 10 percent of the loan will be canceled for each year of service as a full-time public elementary or secondary teacher. In this manner, a maximum of 50 percent of the loan may be canceled.

Applications should be made to the Student Loan Adviser before July 15 for the fall semester, November 15 for the spring semester, and May 1 for the summer session.

## Other Loan Funds

Applications for loans from the following loan funds should be made to the individuals or organizations designated:

Agricultural Club Loan Fund. The Agricultural Club has established a loan fund to aid agricultural students in emergencies. Applications for loans should be made to the Agricultural Club sponsor.

Robert K. Allen Loan Fund. This fund was established in 1946 by Robert K. Allen, an alumnus of the College, and loans are available to students of the School of Agriculture. Application should be made to the Dean of Agriculture.

The American Institute of Industrial Engineers Loan Fund. This loan fund, made up from the general property deposit refunds donated by graduating seniors of the Industrial Engineering Department, is available to any industrial engineering student. Application should be made to the faculty sponsor of the campus chapter of AIIE.

Engineering Society Loan Fund. The Engineering Society maintains a loan fund which is available to engineering students who have completed at least 50 percent of the required work toward graduation. Approximately two weeks are required to process a loan. Application should be made to Prof. C. C. Perryman.

Home Economics Club Loan Fund. This fund, known as the Margaret Weeks Loan Fund, was established during the first year of the College by the Home Economics Club. This fund is open to home economics students. Application should be made to the Dean of Home Economics.

The Houston City Panhellenic Association Loan Fund. This association has an available fund from which loans may be made to junior or senior women students who are residents of Harris County. Students interested in applying for a loan should see the Dean of Women.

Kenneth M. Renner Memorial Loan Fund. This fund was established by donations from alumni, former students, industry, friends of the late Professor Renner, and funds from the Dairy Industry Club. This fund is available to junior and senior students majoring in dairy industry. Applications should be made to the Head of the Department of Dairy Industry.

Vocational Rehabilitation Aid. The Texas Education Agency through the vocational rehabilitation program offers assistance for tuition and fees to students in Texas colleges who have specified physical disabilities. Application for services of this program should be made to the nearest Office for Vocational Rehabilitation under the Texas Education Agency. The local office is in the Great Plains Life Building.

Assistance for this phase of the program of vocational rehabilitation is based on physical disabilities resulting in a vocational handicap and on established financial or economic need.

## Student Health Service

The College endeavors to protect the health of the student body by insuring healthful conditions on the campus and by furnishing a staff of physicians and nurses to care for those students who become ill. An 18-bed college infirmary provides accommodations for those regularly
enrolled students who become sick enough to require constant supervision. Students are admitted to the Infirmary by the College physician and are under the constant supervision of the physician and a registered nurse. Students are entitled to a maximum of 7 days' care without charge except for the cost of special medications, examinations, treatments, X-ray examinations, and special laboratory tests. For each day beyond the 7-day period, patients are charged a modest fee to cover the cost of food, drugs, supplies, and special services. In case the Infirmary is filled to capacity, the College is not obligated to provide students with hospital services elsewhere.

The Health Service also maintains an out-patient clinic for those not requiring hospitalization. Students may receive emergency treatment outside clinic hours by reporting to the nurse on duty in the Infirmary, which is open day and night. The services of the College physicians and nurses are restricted to the Infirmary and clinic.

The Health Service is not staffed or equipped to provide services for students requiring treatment by specialists or admission to a general hospital. The staff will notify the parents, guardian, or nearest relative of a patient believed to be threatened with a serious illness or thought to be in need of an emergency surgical operation. In such cases the Health Service will provide the student with emergency treatment and assist in his transferal to a general hospital.

The Health Service cannot be responsible for the continued medical care of students suffering from chronic diseases such as epilepsy, heart disease, severe asthma, rheumatic fever, diabetes, nephritis, peptic ulcer, etc. Students suffering from such diseases should, upon their arrival in Lubbock, arrange to come under the care of a private physician. The College physician will be glad to recommend competent doctors and specialists to give special care to students who need it and who are unacquainted with the physicians in Lubbock.

The Health Service attempts to screen out all students who have communicable diseases and to control such diseases on the campus. Students may be required to have chest X-rays and skin tests before registration. The College requires that all students with communicable diseases be isolated until the danger of transmission has passed. Students are expected to obey the laws of the sanitary code of the city and state, and the College physician may recommend the dismissal of any student who refuses medical advice or who wilfully exposes his associates to a contagious disease.

The College is not responsible for the care of students during vacations, and the Health Service will be closed while the College residence halls are closed. Special arrangements may be made for the continued care of patients who become ill before the vacation period begins.

Students who desire it may subscribe to a Student Accident and Sickness Plan which provides year-long coverage whether at home or school and while traveling. The cut-off date for this insurance is October 1 for the fall semester, for 9 to 12 months' coverage; and March 1 for the spring semester for 9 -month coverage. This insurance is not available for the summer session only. Information concerning this insurance may be secured from the Student Council Office or the Office of the Dean of Student Life.

## Testing and Counseling Center

The College maintains a Testing and Counseling Center to aid students in the selection of careers, in planning their course programs, and in the solution of personal problems. Counseling, which is conducted on a fee basis, is carried on individually and in strict confidence. Tests and inventories are used to determine aptitudes, achievements, and special interests of those students who elect to utilize this service.

Under the auspices of the Center, a non-credit reading improvement course is available to Texas Tech students. In addition, an IBM test-scoring service is maintained for the various departments of the College and for school systems of the area.

## The Placement Service

The Placement Service is a central agency, which brings together employers, faculty, and students. Its services are available to all students of the College, regardless of major field of study or professional interest. Alumni and ex-students also may use the services.

Students who need part-time employment may seek assistance from The Placement Service to find positions with Lubbock business firms or with the College.

## The College Bookstore

The College Bookstore enables students to purchase textbooks, books for extension courses, supplies, and other equipment for classroom and laboratory work. It also provides such services as special ordering, wrapping packages for mail, repair service, and repurchase of usable textbooks. Conveniently located near the Administration Building, the College Bookstore is a modern self-service enterprise. It is self-supporting and is owned and operated by the College. All profits from its operation are returned to student welfare and recreation uses.

## West Texas Cooperative Audio-Visual Services

The West Texas Cooperative Audio-Visual Services is a cooperative owned and operated by the public schools of greater West Texas and Texas Technological College. Educational films, tape recordings, and consultant services are available to departments of Texas Tech and to the public schools. Current distribution of these materials is reaching some 85,000 college and public school students.

Offices, the film library, and preview rooms are located in the Social Science Building. College instructors and public school teachers may borrow tapes or films from the audio-visual services for use in campus classes and may also reserve the use of the audio-visual services projection room for use by their classes.

## Interdepartmental Programs

In recognition of the contribution each of the schools and departments of the College can make to the education of all students, Texas Technological College is steadily developing programs more general in nature and not limited to specific departmental areas.

## Teacher Education

The preparation of new teachers and the improvement of teachers already in service is an important function of the College at both the undergraduate and graduate levels. The coordination of the total teacher education program is a responsibility of the Director of Teacher Education. The Teacher Education Council, appointed by the President of the College, has the authority and responsibility to approve teacher education curricula.

General advisement on degree requirements occurs in the offices of the several academic deans. Advisement on general teacher education requirements and certification is a responsibility of the Office of the Director of Teacher Education. Advisement for courses in the various teaching fields and/or areas of specialization is a responsibility of the particular departments involved. Advisement for courses in professional education is a responsibility of the Department of Education.

## Teacher Certificates

Requirements for a certificate to teach in the public schools of Texas are based on the 1955 Law on Certification of School Personnel as modified. Under this law there are two classes of teachers' certificates; these are designated as the Provisional Certificate and the Professional Certificate. Each certificate, once issued, is permanent, valid for life unless cancelled by lawful authority.

It should be noted that the teachers' certificates listed above are issued only to persons who have completed a bachelor's degree.

The Texas Education Agency, the administrative office for teacher certification in the state, issues a teacher's certificate to an individual only when the agency receives from the College:
(1) Verification that the applicant has satisfactorily completed an approved program in teacher education, and
(2) A statement that the applicant possesses those moral and personal characteristics which indicate he will become a successful teacher.

In addition to the specific requirements listed below under the two classes of certificates, a student must meet the following grade requirements to obtain a teaching certificate through Texas Technological College:
(1) Possess a grade-point average of 2.00 or higher on all his college work;
(2) Possess a grade-point average of 2.25 or higher in professional education courses, in each of the teaching fields (for secondary teaching), and in the areas of specialization (for elementary teaching).

## The Provisional Certificate

Provisional certificate programs have been approved for Texas Tech at the elementary level and at the secondary level. In addition, all-level programs have been approved which qualify the individual for certification in his special subject at both the elementary and secondary levels.

## 1. Provisional Certificate-Elementary

A student seeking certification to teach in the elementary (grades 1-8) schools must earn a bachelor's degree, complete approximately two years of course work in "Academic Foundations," approximately 36 semester hours in "Academic Specialization" courses, and 30 semester hours in professional education and elementary content courses. The requirements in professional education include 6 semester hours in student teaching.
(Areas of academic specialization are: biology, English, French, German, government, health and physical education for men, health and physical education for women, history, mathematics, music, sociology, Spanish, speech-drama.)

## 2. Provisional Certificate-Secondary

A student seeking a provisional certificate to teach in the secondary (grades 7-12) schools must earn a bachelor's degree, complete approximately two years of course work in "Academic Foundations," 18 semester hours in professional education courses, including 6 semester hours in student teaching, and a minimum of 48 hours in "Academic Specialization." In completing the requirements in academic specialization, a student may select one of three routes (plans) to his certification objective. Plan I requires him to elect two fields (subjects) in which he expects to teach and to complete a minimum of 24 semester hours in each. At Texas Tech, the selection may be made from the following:

| Biology | Journalism |
| :--- | :--- |
| Chemistry | Latin |
| English | Mathematics |
| French | Music |
| German | Physics |
| Government | Spanish |
| Health and Physical Education | Speech-Drama |
| History |  |

The student following Plan I must consult the heads of the departments in which he plans to qualify for certification in order to determine the specific courses which are required.

Plan II is sometimes referred to as the broad field or composite program. This requires the completion of 48 semester hours in a broad field of related subjects such as art, or science, or business education. Such composite programs do not require an additional teaching field. At Texas Tech, the student who elects to follow Plan II may select one of the following broad fields:

| Art | Science |
| :--- | :--- |
| Business Education | Social Science |
| Music |  |

The student who expects to teach in one of the broad fields listed above should consult the academic department in which he plans to complete the major portion of his studies in order to plan the details of his program; that department will advise him concerning all the courses required in the composite area.

Plan III is restricted to those who are preparing to teach in the vocational fields; at this college, agricultural education and home economics education meet the requirements set forth in the State Plan for Vocational Education. A student who wishes to obtain a certificate in either vocational agriculture or home economics education should consult the head of the appropriate department regarding his course requirements.

## 3. All-Level Provisional Certificates

All-level certificate programs are approved at Texas Tech in the following:

| Art Education | Music Education |
| :--- | :--- |
| Health and Physical Education | Speech-Drama |

The student qualifying for an all-level certificate must earn a bachelor's degree and must complete the course work prescribed for the certificate. For a certificate in health and physical education or in music education, the head of the appropriate department must be consulted regarding the details of his academic specialization.

A person seeking certification in speech-drama must confer with the Department of Speech regarding specific courses in the specialization area and with the Department of Education regarding required work in professional education.

All-level certification in art education is a joint program involving work in the Department of Architecture and Allied Arts and in the Department of Applied Arts; either of these department heads may be consulted regarding the required courses in art.

## 4. Provisional Certificates-Teaching Exceptional Children

Certificate programs for teaching exceptional children are approved at Texas Technological College in the following fields:

Mentally Retarded
Speech and Hearing Therapy

## The Professional Certificate

The professional certificate is the highest teacher's certificate issued in Texas. Each program leading to professional certification is designed to prepare the applicant for a specific professional position.

The professional certificate may be issued to a person who (1) has earned a bachelor's degree, (2) possesses at least three years of teaching experience, and (3) has completed 30 semester hours of graduate level course work beyond a bachelor's degree. If properly planned, the graduate level work may fulfill the requirements for a master's degree.

At Texas Tech, approved professional certification programs exist in the following:

Elementary
Secondary
General
Health and Physical
Education
Music
Speech-Drama

Special Service
Counselor
Principal
Superintendent
Supervisor
Vocational Education
Agricultural Education
Home Economics

A student wishing to work toward a professional certificate in a particular area should first consult the Director of Teacher Education to:
(1) Determine if he is eligible, under state requirements, to enter the program;
(2) Obtain the appropriate certification plan forms;
(3) Secure advice as to which departments will be involved in completing the forms.

While all the professional certificate programs involve interdepartmental cooperation, the program leading to certification in counseling in the public schools is offered jointly by the Departments of Education and Psychology. Under this arrangement, a student seeking certification for counseling in the public schools takes his major in education and his minor in psychology. A student who desires to be certified for counseling and rehabilitation work in the public schools or industry takes his major in psychology and his minor in education.

## Graduate Degrees and Professional Certificates

A student who desires to work toward a graduate degree while absolving professional certification requirements should consult the Dean of the Graduate School regarding degree requirements and the Director of Teacher Certification regarding certification requirements.

## The Certification Plan

Any student working toward a teacher's certificate must file a certification plan with the Director of Teacher Certification during the last semester of his sophomore year.* This requirement applies regardless of the degree being sought, the subjects which the student expects to teach, or the level (elementary, secondary, or all-level) at which he expects to be certified. The certification plan is distinct from the degree plan; the latter is filed with the student's academic dean.

[^4]
## 72 TEACHER EDUCATION

Certification plan forms are obtained from the Director of Teacher Certification. Once the form is secured, the student is responsible for seeing that the proper entries are made by the appropriate college officials and that the completed form is filed with the Director of Teacher Certification.

## Admission to Student Teaching

The completion of 6 semester hours in student teaching is required of every person who obtains a teacher's certificate. Normally a student will take the student teaching course in a single semester during his senior year. Since the teaching experience requires one-half day's time daily during the entire semester, the student teacher is permitted to enroll for no more than 16 semester hours of college work while he is performing his student teaching.

The following are prerequisite to admission to student teaching:
(1) The applicant must have completed a minimum of 90 semester hours of college work. A student seeking certification to teach in secondary schools must have completed a minimum of 15 semester hours required in each of the teaching fields and 9 semester hours in professional education courses. For those seeking certification in the elementary grades, the 90 hours must include: (a) 24 semester hours in the academic specialization area, and (b) the completion of Education 332, 3344,3345 , and 3346 , or their approved equivalents.
(2) Each student, unless he is in agricultural education or home economics education, must file an application with the Department of Education to enroll in student teaching and must do so on or before the April 15 preceding the school year in which he expects to register for the course. Failure to file by the announced date may result in the student's not being allowed to register for the course at the time desired.
(3) The student must pass the health examination required of teachers in the school system in which the student teaching is performed. The examination center will be designated at the time the application is filed.
(4) The applicant must present evidence that he is free from extreme handicaps that are judged by the Committee on Student Teaching to be detrimental to effective classroom instruction.
(5) The student must have a grade-point average of 2.25 or higher on all his college work and a grade-point average of 2.25 or higher in professional education courses, in each of the two teaching fields (for secondary teaching), and in the fields of academic specialization (for elementary teaching).
(6) Proficiency in the use of the English language must be demonstrated.

The Committee on Student Teaching applies the above standards to transfer students on an individual basis. Transfer students must absolve the requirements above by the beginning of the junior year or during the first semester of attendance at this college, whichever is later.

## Bilingual Secretarial Program <br> (French, German, Spanish)

This course of study is offered jointly by the Department of Foreign Languages and the Department of Business Education and Secretarial Administration. Students interested in this program of study should consult the Head of the Department of Foreign Languages. See the section on Arts and Sciences.

## Latin American Area Studies

See the section on Arts and Sciences.

## The Liberal Arts Approach to Engineering

See the section on Arts and Sciences.

## Art

See the section on Arts and Sciences.

## Honors Program

Honors programs at Texas Technological College, currently available in the School of Arts and Sciences and the School of Business Administration, offer special courses and programs of study to superior students who qualify for them. The initiation of these programs, in 1961, was a formalized achievement of a goal toward which the College had for many years aimed: to provide enriched studies in which gifted students may more fully develop their intellectual potential.

Honors students are selected from entering freshmen who present College Entrance Examination Board (CEEB) scores and previous academic records which meet the standards of excellence established by the Honors Council of the particular school and approved by administrators to whom it is responsible. Students other than entering freshmen may, because of excellent achievement following admission to the College, also be invited to participate in an honors program.

The primary objective of honors work is to strengthen opportunities for superior students to obtain outstanding training in the subject which they individually elect as major fields. This objective is achieved through small sections, increased counseling, and special departmental offerings for honors students. The Honors Program of the school in which a student enrolls facilitates his grasp of his particular field of study and increases his understanding of the interrelatedness of various fields. A Student Honors Council, organized by the students themselves, initiates and sponsors extra-curricular colloquia.

Once a student has entered an Honors Program, the department in which he majors and the Honors Council of his school will periodically review his academic achievements both to counsel him and to determine whether he should continue honors studies. Equally as important as grade-point average is persistent evidence of outstanding intellectual curiosity and perceptiveness.

Graduation in an Honors Program with a major in a particular subject is based upon satisfactory completion of the degree requirements in that field, among which are included specific honors sections.

In addition to other academic recognition, including graduation with honors for those who have attained certain grade-point averages, students in an Honors Program will have honors courses so identified on their transcripts. Each student who satisfactorily completes an Honors Program approved by both the department in which he majors and an Honors Council will be graduated with honors in his major field.

The Director of Honors, who meets with the Honors Council of his particular school, is responsible for the coordination and the direct operation of the program offered by his school.

# School of Agriculture 

Gerald W. Thomas, Dean<br>Office: Ag. 204<br>J. Wayland Bennett, Associate Dean<br>Office: Ag. 201-A<br>Agricultural Economics<br>Agricultural Education<br>Agricultural Engineering<br>Agronomy and Range Management<br>Animal Husbandry<br>Dairy Industry<br>Park Administration, Horticulture, and<br>Entomology

Curricula are designed to qualify the student for a place in the modern agricultural industry - an industry that encompasses three closely related segments: (1) the producers of agricultural products on farms and ranches, (2) the suppliers of machinery, fertilizers, feed, seed, and other production resources, and (3) innumerable phases of processing, storage, distribution, and other services associated with our food and fiber economy.

Through proper selection of courses opportunity is provided for training in the business aspects of agriculture in several subjectmatter departments. Those students interested in the highly specialized scientific aspects of the industry will receive more training in mathematics and the basic sciences, followed by well-planned courses in technical agriculture. As the size and complexity of farms and ranches continue to increase, more technology and management information is also needed for students who plan careers as producers of farm and ranch products.

Laboratory facilities in agriculture include the 1,400 -acre college farm and approximately 14,000 acres at the Texas Tech Research Farm near Amarillo. Research in agriculture and service to the industry are a part of the program involving well qualified advanced undergraduate and graduate students. Field trips and participation in intercollegiate contests are a part of the training program, and students have at their disposal a farm which serves as a laboratory well stocked with machinery and farm animals.

Recent surveys indicate that the agricultural industry could employ approximately 15,000 new college graduates each year. At present the major agricultural colleges graduate only about 7,500 young men and women for these positions. With these excellent opportunities for the college graduate, however, are associated demands for better training and highly specialized skills.

# AGRICULTURAL SCIENCE CURRICULUM 

Bachelor of Science
For Uniform Freshman Year See Page 77

| SOPHOMORE YEAR SEMESTER | 1st | 2nd |
| :---: | :---: | :---: |
| Chem. 142 Gen. Chem. | 4 |  |
| English (200 level or above) | 3 |  |
| Math. 131 Trigonometry | 3 |  |
| P.E., Band, or Basic ROTC | 1-2 |  |
| Ag. courses and electives | 7 |  |
| Ag. Eco. 235 Fund. of Ag. Eco. |  | 3 |
| Bact.. Biol., Bot., or Zool. (200 level or above) |  | 3 |
| English (200 level or above) |  | $\begin{array}{r}3 \\ \hline\end{array}$ |
| P.E., Band, or Basic ROTC |  | 1-2 |
| Ag. courses and electives |  | 19 |
| Total credit hours | 18-19 | 19-20 |



Hours required for graduation exclusive of P.E., Band, or Basic ROTC-144; $\mathbf{4 5}$ hours of total must be taken in the School of Agriculture.

* May substitute Chem. 353, 354.

Degree Requirements: All agricultural students except those majoring in agricultural engineering and pre-veterinary medicine follow a uniform course of study for the first year which is designed to provide a broad base for later specialization. These uniform requirements include a series of orientation lectures, survey courses in various departments of agriculture and basic training in biology, chemistry, mathematics, and English. The total hours required for graduation range from 140 to 144 exclusive of P.E., Band, or Basic ROTC.

The Degree of Bachelor of Science is conferred upon the student who satisfactorily completes the requirements for graduation under the programs as outlined in the following pages. This degree is given with majors in Agricultural Science, Agricultural Economics, Agricultural Education, Agricultural Engineering, Crops, Range Management, Soils, Animal Business, Animal Production, Animal Science, Dairy Industry, Park Administration, Horticulture and Entomology. An undergraduate program is also offered in Pre-Veterinary Medicine.

The Degree of Master of Science is offered through the Graduate School. Discussion of graduate programs will be found in the Graduate Bulletin.

## Curricula and Courses in The School of Agriculture

## Leading to a Bachelor of Science

## Uniform Freshman Year for Students in Agriculture

All students in the School of Agriculture, except those majoring in agricultural engineering and pre-veterinary science, follow a uniform freshman curriculum. Since this is the case, the student majoring in other phases of agriculture need not designate a major interest during the freshman year.

| FRESHMAN | YEAR | - | SEMESTEER | 1st. | 2nd. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Ag. Ed. | 111 | The Agric. Indus. |  | 1 |  |
| Agron. | 131 | Fund. of Agron. |  | 3 |  |
| A.H. | 131 | Gen. Anim. Husb. |  | 3 |  |
| Biol. | 141 | Botany |  | 4 |  |
| Math. | 135 | Intro. College Math or |  |  |  |
| Math. | 133 | College Algebra |  | 3 |  |
| Eng. | 131 | Col. Rhet. |  | 3 |  |
| P.E., Band, | or Basic | ROTC |  | 1 |  |
| Biol. | 142 | Zoology |  |  | 4 |
| Chem. | 141 | Gen. Chem. |  |  | 4 |
| Eng. | 132 | Col. Rhet. |  |  | 3 |
| D.I | 131 | Prin. of Dairy \& Food | Indus. |  | 3 |
| Hort. | $131$ | Prin. of Hort. |  |  | 3 |
| P.E., Band, | or Basic | ROTC |  |  | 1-2 |
|  |  | Total credit hours |  | 18 | 18-19 |

## Agricultural Science Major

The agricultural science curriculum provides a sound background in the basic physical and biological sciences and includes sufficient advanced agricultural courses for the student interested in agricultural

# AGRICULTURAL ECONOMICS CURRICULUM 

Bachelor of Science
For Uniform Freshman Year See Page 77



## AGRICULTURAL BUSINESS EMPHASIS

* In addition to the above courses the student electing the agricultural business emphasis must take the following courses: Ag. Fco. 336, 333, and 334. Acct. 234 and 235 ; Bus. Law 338 and 339 ; Mgt. 331,334 , and 435 ; plus 26 hours of electives, to be approved by the department, of which 12 hours must be selected from the following courses: Fin. 331, 333, and 334 ; Mgt. 339 and 441 ; and Mkt. 232, 339, 433, and 439 .


## AGRICULTURAL MARKETING EMPHASIS

* In addition to the above courses the student electing the agricultural marketing emphasis must take the following courses: Ag. Eco. 336, 333, 431 and 436; Acct. 234 and 235; Bus. Law 338 and 339 ; Mkt. 232, 334, and 339 ; plus 23 hours of electives, to be approved by the department, of which 12 hours must be selected from the following courses: Fin. 333 and 334 ; Mgt. 331, 334, and 335; and Mkt. 433, 434, and 439.


## FARM AND RANCH MANAGEMENT EMPHASIS

* In addition to the above courses the student electing the farm and ranch management emphasis must take the following courses: Ag. Eco. 321, 325, 334, 335, 437, 438, and 4311; Agron. 241; A.H. 331; Chem. 341; Ento. 231; plus 23 hours of electives, to be approved by the department, of which 12 hours must be selected from the following courses: Ag. Engr. 222 and 335; Agron. 332 and 433; A.H. 427, 431, and 441; Ento. 321, 332, 431; Range Mgt. 333, 437 , and 438.
research, in teaching agricultural science in colleges and universities, or work in specialized fields of agricultural science. The curriculum is strongly recommended for students who expect to continue into graduate study. It is administered by the Dean of Agriculture.

Only those students who by their freshman entrance test records are placed in the top 10 percent of their class, or those capable of maintaining an average of B or above, should follow this curriculum. Students electing it must agree to be available for summer employment for 2 years, the place of employment to be approved by the curriculum adviser.

# Department of Agricultural Economics 

Williard F. Williams, Head of the Department Office: Ag. 314<br>Professors:<br>Bennett, Williams<br>Associate Professors:<br>Leonard, Rogers<br>Assistant Professors:<br>Welch, Grubb<br>Intructor:<br>H. Y. Lee

The curriculum in agricultural economics is designed to provide training in the solution of basic economic problems associated with agricultural production and marketing. Students are prepared for careers in the fields of agricultural business, agricultural marketing, or farm and ranch management, and are urged to specialize in one of these three areas. Training is provided for those entering occupations requiring an intimate knowledge of rural-urban business relationships, such as agricultural representatives of banks, chambers of commerce, transportation agencies, federal and state agencies, extension services, and wholesale merchandising firms. The curriculum affords sufficient flexibility for students interested in positions with groups such as processing firms, marketing organizations, rural electric organizations, and businesses supplying goods and equipment to farmers. Majors are prepared for graduate study or further research in agricultural economics.

## Courses in Agricultural Economics

## FOR UNDERGRADUATES

[^5]236. Principles of Marketing Agricultural Products. (3:3:0)

Prerequisite: Ag. Eco. 235. Analysis of various agents performing the functions in the purchase, sale, and distribution of agricultural products.
321. Land Economics. (2:2:0)

Prerequisite: Junior standing in agriculture. Land as a factor of production; classification and utilization; land income; tenure, property rights, deeds, credits, and taxation.

## 325. Farm Laws. (2:2:0)

Prerequisite: Ag. Eco. 236 or permission of the instructor. Legal problems and practices affecting the farmer in his business relations with neighbors and the business agents with whom he deals.

## 331. Agricultural Statistics. (3:2:3)

Prerequisite: Junior standing and 3 hours of mathematics. Principles involved in the collection and interpretation of agricultural data.
332. Production Economics. (3:3:0)

Prerequisite: Ag. Eco. 236. The basic tools of economic theory are used to analyze agricultural economic problems. Illustrations are used to show the use of the theoretical concepts in solving empirical problems.
333. Cooperatives in Agriculture. (3:3:0)

Prerequisite: Ag. Eco. 236. Organization and operation of agricultural cooperatives.
334. Farm Management.. (3:2:3)

Prerequisite: Ag. Eco. 236 and junior standing. The organization and management of the individual farm. Field trips to nearby farms.

## 335. Agricultural Records and Analysis. (3:2:2)

Prerequisite: Ag. Eco. 236 and junior standing. Accounts in modern agriculture; methods and systems of recording and analyzing farm and ranch operational data; summarizing and using records as effective alds to improve farming and ranching. Laboratory practice in record keeping and analysis for operational efficiency.

## 336. Advanced Agricultural Marketing. (3:3:0)

Application of economic principles to marketing problems with emphasis on field crops, dairy and horticultural products; pricing, costs, market structure, marketing programs and research procedures.

## 411. Seminar. (1:1:0)

Assigned readings, informal discussion, written and oral reports on subjects relating to agricultural economics and agribusiness.

## FOR UNDERGRADUATES AND GRADUATES

430. Special Problems in Agricultural Economics. (3)

Prerequisite: Senior standing and approval of the Department Head. Individual Instruction and assigned research on a special problem of interest to the individual student. May be repeated with the approval of the Department Head.
431. Livestock Marketing. (3:3:0)

Prerequisite: Junior standing in agriculture including Ag. Eco 236. Livestock marketing practices and problems.
432. Statistical Methods in Agricultural Research. (3:3:0)

Prerequisite: Approval of the instructor. Advanced work in the field of statistical research using tests of significance and variability. Fisher's tests, correlation (multiple and curvilinear relationships), chi-square, regression and analysis of variance and covariance. Application of statistical methods to the field of agricultural research.

## 435. Agricultural Policies and Organizations. (3:3:0)

Prerequisite: Junior standing or permission of the instructor. An examination of the history of the present farm organizations both public and private. Current public policies of these organizations in operation in the field of agriculture.

## 436. World Trade in Agricultural Products. (3:3:0)

Prerequisite: Senior standing or permission of the instructor. An economic analysis of the trade policies under which the world's supplies of agricultural products are obtained. Forelgn and domestic relationships in world trade affecting agriculture.

## 43\%. Farm and Ranch Appraisal. (3:2:3)

Prerequisite: Senior standing or permission of the instructor. Factors governing the price of land; emphasis on valuation procedure. Appraisal of lands for use, for sale, for purposes of making loans, for condemnation, settlement of estates, and for taxation. Appraisal reports.

## 438. Range and Ranch Economics. (3:3:0)

Prerequisite: Ag. Eco. 236 and junior standing. Economics of production and marketing, current financing problems, ranch appraisal, land conservation, and field trips to ranches.
439. Agricultural Prices. (3:3:0)

Prerequisite: Ag. Eco. 332 and junior standing. Analysis of agricultural prices. Individual research applied to an agricultural commodity of the student's selection.

## 4311. Agricultural Finance. (3:3:0)

Prerequisite: Ag. Eco. 236 and junior standing. Scope of agricultural finance and problems of financing agricultural needs. Capital and credit needs in agriculture; cost of credit; sources of credit; payment methods; terms and risks involved in the use of credit. Analysis of private and public agricultural credit agencies.

## 4312. Mathematical Economics and Econometrics for Agriculture. (3:3:0)

Mathematical tools necessary for a treatment of economic theory and providing media for emplrical studies in agriculture. Mathematical formulation of elementary economic models and a survey of statistical techniques for their testing.

## FOR GRADUATES

511. Seminar. (1:1:0)

Assigned readings, written and oral reports, discussions on subjects relating to current agricultural economic problems.
531. Advanced Production Economics. (3:3:0)

Prerequisite: Ag. Eco. 332, graduate standing, and approval of the Head of the Department. Criteria of resource efficiency utilization; inter-industry relationships; uncertainty and expectations; location and timing of production; technological changes; returns to individuals and society.

## 532. Seminar in Agricultural Policy. (3:3:0)

Prerequisite: Approval of the Head of the Department. Development of agricultural policy with particular reference to objectives, procedures, accomplishments, uncertainty and welfare considerations and consequences. Consideration of American agricultural policy in aiding underdeveloped countries.
533. Marketing Problems. (3:3:0)

Prerequisite: Consent of major professor. Problems and practices in marketing of some selected farm products.
534. Research in Agricultural Economics.
A. selected research problem in agricultural economics, farm management, or rural sociology. May be repeated for credit upon the approval of the major professor.
631. Master's Thesis. (3)

Enrollment required at-least twice.

# Department of Agricultural Education 

Thomas Luther Leach, Head of the Department<br>Office: Ag. 320

Professors:<br>Hargrave, Leach<br>Assistant Professor:<br>Eggenberger

The curriculum of the Department of Agricultural Education is designed to qualify the student to teach vocational agriculture under the Federal Vocational Education (Smith-Hughes) Act, and to supplement the student's instruction in technical and professional agriculture.

# AGRICULTURAL EDUCATION CURRICULUM 

Bachelor of Science
For Uniform Freshman Year See Page 77

| SOPHOMORE YEAR | SEMESTEER | 1st | 2nd |
| :---: | :---: | :---: | :---: |
| Ag. Eco. 235 | Fund. of Ag. Eco. | 3 |  |
| Ag. Engr. 220 | Ag. Mech.-Woodwork | 2 |  |
| Chem. 142 | Gen. Chem. | 4 |  |
| Eing. 233 | Tech. Writing | 3 |  |
| Ento. 231 | Intro. Ento. | 3 |  |
| Hist. 231 | Hist. of U.S. to 1865 | 3 |  |
| P.E., Band, or Basic | ROTC | 1-2 |  |
| Ag. Eco. 236 | Mkt. Ag. Prod. |  | 3 |
| Ag. Engr. 221 | Ag. Mech.-Metalwork |  | 2 |
| Chem. 341 | Intro. Org. Chem. |  | 4 |
| Eng. $232$ | Mast. of Lit. or |  |  |
| Spch. 338 | Bus. \& Prof. Spch. |  | 3 |
| Hist. 232 | Hist. of U.S. since 1865 |  | 3 |
| P.H. 231 | Intro. Poult. Husb. |  | 3 |
| P.E., Band, or Basic | ROTC |  | 1-2 |
|  | Total credit hours | 19-20 | 19-20 |



Hours required for graduation exclusive of P.E., Band, or Basic ROTC-140.

* First and second semesters of senior year are interchangeable. Approximately 50 percent of the senior students qualifying to teach vocational agriculture will take the agricultural education work the first semester and the other 50 percent will take it the second semester.

Graduates.also find employment with the Agricultural Extension Service, Soil Conservation Service, other agricultural agencies, and in industries related to agriculture. Excellent training is also given for those who wish to make farming or ranching their business.

## Teacher Education

Upperclass students in agriculture, regardless of their major, who plan to qualify to teach vocational agriculture should observe the following two rules: (1) As soon as the decision to qualify is made, fill out necessary forms in the Department of Agricultural Education; (2) Check with the Department of Agricultural Education to see that full advantage is being taken of electives.

Students expecting to receive a teaching certificate in vocational agriculture must meet the requirements for admittance to student teaching. These are listed in the section of this catalog devoted to Teacher Education.

In order to receive a teaching certificate students must also meet the academic standards as outlined in the section on Teacher Education.

## Courses in Agricultural Education

## FOR UNDERGRADUATES

## 111. The Agricultural Industry. (1:1:0)

Relationship of the student to the college; habits of study. Survey of the field of agriculture, vocational guldance. Required of all freshmen students in the School of Agriculture.
432. Methods in Adult Agricultural Education. (3:2:2)

Prerequisite: Senior standing in agriculture. Young farmer, adult farmer, and community activities. Preparation of teaching materials. Plans for summer activities and professional improvement.
461. Student Teaching.

Prerequisite: Senior standing in agriculture. One-half of one semester off-campus supervised student teaching in high school vocational department approved by the Agricultural Education Department. Opportunity for participation in all-day, young farmer, and adult classes.

## FOR UNDERGRADUATES AND GRADUATES

## 434. Methods of Teaching Vocational Agriculture in the High School. (3:2:3) <br> Prerequisite: Senior standing in agriculture. Analyzing the vocational agriculture teacher's job. The project method of teaching. The loigg-time annual teaching plan, equipment, reports, daily lesson planning.

435. Methods in Supervised Farming and Future Farmer Work. (3:2:3)
[^6]
## FOR GRADUATES

[^7]
## AGRICULTURAL. ENGINEERING CURRICULUM

Bachelor of Science in Agricultural Engineering


Minimum hours required for graduation - 140 - exclusive of P.E., Band or Basic ROTC.

* Note alternate mathematics courses as per engineering section of this catalog.
** All electives must be approved by Agricultural Engineering Department Head.

523. Advanced Methods in Adult Agricultural Education. (2:2:0) Advanced methods of teaching vocational agriculture in part-time and evening schools.
524. Advanced Methods in Future Farmer Work. (2:2:0)
Advanced methods of teaching Future Farmer work.
525. Investigation in the Field of Agricultural Education. (3)

Prerequisite: Consent of the Head of the Department. Investigation of a problem in the field of vocational agriculture of special interest to the student; presentation of a paper. May be repeated for credit.
535. Problems. (3)

Prerequisite: Senior standing. Problems in the figld of vocational agriculture of special interest to the individual student. May be repeated for credit.
536. Advanced Methods of Teaching Farm Mechanics. (3:3:0)

Organization, management, and equipping the farm shop; preparation and use of job sheets; practice in the demonstration of shop techniques; development of a farm mechanics course of study.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Agricultural Engineering 

Willie L. Ulich, Head of the Department<br>Office: Ag. E. 103

Professors:<br>Ulich, Williams<br>Associate Professor:<br>Schwiesow<br>Assistant Professor:<br>Dvoracek, Eggenberger<br>Visiting Instructor: Kirk

The Department of Agricultural Engineering is principally concerned with teaching and research activities for service to agriculture; and with the development and training of professional agricultural engineers. The curriculum is under the joint supervision of the Schools of Agriculture and Engineering.

Agricultural engineering, a relatively new field of work, deals with the application of basic engineering principles to the peculiar conditions and requirements of agriculture as an industry and as a field of applied science. The curriculum is designed for those students who desire to make such engineering applications.

Courses required in the agricultural engineering curriculum provide a basic concept of modern methods of agricultural mechanization. They lean heavily upon production and processing machines, mechanical and electrical power, storage and processing buildings, soil conservation, and water management. There are five areas of specialization within this field:

1. Farm power and machinery
2. Farmstead buildings and structures
3. Farm electrification and utilities
4. Agricultural crop processing
5. Soil and water conservation including irrigation

Rapidly expanding agricultural mechanization has caused an increasing demand for agricultural engineering graduates. Because of background and expansion in this field, many graduates move rapidly into management positions. Employment is well distributed between industrial organizations, individual private enterprises, and government agencies.

Agricultural engineers are employed by agricultural equipment manufacturers producing farm machinery, farm processing equipment, rural electrical equipment, farm structures, and irrigation equipment. They are also employed as distributors, dealers, and company representatives for such firms as farm equipment suppliers; electric service companies; trade associations; agricultural processors; publishers; advertising agencies; consulting engineers; construction firms; and farm engineering and management services.

Many agricultural engineers are self-employed as owners or partners in some of the above types of businesses. Local, state, and federal government agencies employ graduates for teaching, extension, research, and construction work.

# Courses in Agricultural Engineering 

## FOR UNDERGRADUATES

## 220. Agricultural Mechanics I-Woodwork. (2:1:3)

Selection, use, and maintenance of hand tools and power woodworking equipment. Techniques of selection and estimation of bullding materials. Methods of wood member construction and wood projects; also, quality of concrete, and rural construction.

## 221. Agricultural Mechanics II-Metalwork. (2:1:3)

Basic hand and power tools essential to the modern farm shop. Selection, use, and maintenance of tools; electric arc and oxy-acetylene welding; and the processes used in repairing farm equipment. Pipe fitting, cold metal work, and metal forming.

## 222. Agricultural Surveying and Land Conservation. (2:1:3)

Techniques in measuring distances and areas; traversing; determining elevations; mapping; and running grade lines. Laying out and checking terraces, irrigation and drainage ditches, and use of aerial photographic maps.

## 223. Farm and Home Utilities. (2:1:2)

Domestic water supply and its distribution, including plumbing, sewage, refuse, and garbage disposal. Fundamentals of electric farm power; wiring of farm buildings; and electric appliances and equipment. Heating, lighting, ventilating, and cooling of farm structures.

## 232. Plane and Topographic Surveying. (3:2:3)

Prerequisite: Sophomore standing and Math. 135 or 133. Techniques and laboratory practice in measuring distances and areas; determining elevations and profiles; plotting sections; traversing; using planimeters; running grade lines. Includes laying out terraces, irrigation and drainage ditches; topographic mapping, and use of aerial photographs.

[^8]
## 333. Farm Power and Machinery. (3:2:2)

Development of farm mechanization. Construction, operation, adjustment, and servicing of farm tractors and power units. Adaptation, selection, economical utilization, construction, operation, and adjustment of the principal tillage, planting, cultivating, harvesting, and feed-processing machines.

## 335. Irrigation and Erosion Control. (3:2:2)

Prerequisite: Ag. Engr. 222 or 232; or C.E. 231. Principles and practices of irrigation and water erosion control. Water control methods; land preparation; movement and storage of water in soils; quality of water; salinity control; use of water by plants. Irrigation of specific crops, water rights, elements of pumping, and pumping costs.

## 336. Principles of Agricultural Machinery Design. (3:2:3)

Prerequisite: M. E. 237 and junior standing in engineering. Mechanical design and materials used for farm machinery construction. Selection of materials and principles of design by type, capacity, maintenance, and economical use. Includes power transmission, measurement and efficient use by farm machines.

## FOR UNDERGRADUATES AND GRADUATES

## 411. Agricultural Engineering Seminar. (1:1:0)

Prerequisite: Senior standing and approval of Department Head. Assigned readings, oral and written reports, and discussions relating to agricultural engineering. Lectures by visiting professional representatives, and field trips. May be repeated for additional credit.

## 430. Agricultural Engineering Problems. (3)

Prerequisite: Senior standing and approval of Department Head. Work may be individual study or joint investigation on design problems of a technical nature. For agricultural engineering or engineering students. May be repeated for additional credit.
433. Elements of Farm Tractor Design. (3:2:3)

Prerequisite: C.E. 332, and M.E. 3321. Kinematics and dynamics of tractor power application; drawbar, power take-off, and traction mechanisms; thermodynamic principles and construction of the internal combustion engine, including carburetion and ignition; fuels and lubricants.

## 434. Farm Electrification Systems. (3:2:3)

Prerequisite: 玉.E. 232. Application of electric power to farm processes. Farm electric distribution systems; wiring, controls, motor application; refrigeration, heating, lighting; and ventilation. Special farm applications, and economical use of electric power.

## 435. Farm Mechanics Problems. (3)

Prerequisite: Senior standing and approval of Department Head. Individual study of an advanced phase of some agricultural engineering application such as the development of techniques on teaching farm shop work or a special construction project. Open to students in the School of Agriculture. May be repeated for additional credit.

## 436. Processing and Cotton Gin Engineering. (3:2:3)

Prerequisite: Senior standing in engineering, or approval of instructor. Englneering principles in agricultural processing systems. Basic principles of cleaning, heat and moisture control, product forming, conditioning, conveying, and packaging of agricultural products. Cotton ginning, fiber quality control, and gin management.
437. Design of Farm Irrigation Systems. (3:2:3)

Prerequisite: C. E. 3351. Principles of design of gravity and sprinkler irrigation systems for the farm. Drilling, development, and hydraulics of wells. Pumping units, water conveyance structures, and efficiency determinations of irrigation systems.
438. Structural Design of Farm Buildings. (3:2:3)

Prerequisite: C. E. 3311. Structural design of farm buildings involving economic aspects and estimation of contruction costs. Includes load estimation and stress analysis, design, axial loading, columns, beams, connections, foundations, roofs, and floors.

## 439. Functional Design of Farm Buildings. (3:2:3)

Prerequisite: M.E. 3321. Functional design of farm and ranch structures. Building requirements as they relate to crop storage and animal shelters. Design function for heating, cooling, moisture and ventilation control; and the planning of layouts for the efficient processing of farm products.

## 442. Engineering for Soil and Water Conservation. (4:3:3)

Prerequisite: C. E. 3351. The engineering aspects and design of soil and water conservations structures, including terraces, diversion ditches, outlet channels, dropstructures, chutes, and small dams. Runoff determination and design of drainage systems.

## AGRONOMY AND RANGE MANAGEMENT CURRICULUM $\infty_{\infty}^{\infty}$ <br> Bachelor of Science <br> CROPS MAJOR <br> For Uniform Freshman Year See Page 77

| SOPHOMORE YEAR |  | SEMESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: |
| Ag. Eco. 235 | Fund. of Ag. Eco. |  | 3 |  |
| Agron. 241 | Solls |  | 4 |  |
| Bact. 231 | Bacteriology |  | 3 |  |
| Chem. 142 | Gen. Chem. |  | 4 |  |
| Govt. 231 | Amer. Govt., Org. |  | 3 |  |
| P.E., Band, or Basic | ROTC |  | 1-2 |  |
| Chem. 341 | Intro. Org. Chem. |  |  |  |
| Eng. $\quad 233$ | Tech. Writlng |  |  | 3 |
| Ento. ${ }^{\text {E31 }}$ | Intro. Ento. |  |  | 3 |
| ${ }_{-}^{\text {Govt. }}$ Other courses ${ }^{232}$ | Amer. Govt., Func. |  |  | 3 3 |
| P.E., Band, or Basic | ROTC |  |  | 1-2 |
|  | Total credit hours |  | 18-19 | 17-18 |




* In addition to the above courses, the student choosing to emor SCIENCE EMPHASIS
 tives approved by the department.


## CROP PRODUCTION EMPHASIS

 4311, at least 12 hours from Agron. 332, 342, 425, 433, 435, 436, 439, 4314, and 24 hours of other electives approved by the department.
4311. Advanced Agricultural Mechanics. (3:2:2)

Prerequisite: Senior standing and Ag. Engr. 220 and 221 or equivalent. Organization, equipment and management of vocational agricultural shops. Advanced techniques and procedures in design and construction of agricultural shop projects. Emphasis on such items as welding and other construction techniques.

## FOR GRADUATES

531. Investigations in Advanced Agricultural Mechanics. (3)

Prerequisite: Graduate or senior standing with previous work in agricultural mechanics, an individual study or investigation of an advanced phase of agricultural mechanics. Includes case studies as well as development of techniques and skills in the selection, operation, maintenance, and repair of equipment applied to agricultural production or processing. Emphasis is placed on advanced mechanization technology.

# Department of Agronomy and Range Management 

Arthur Wesley Young, Head of the Department<br>Office: Pl. Sci. 261

Professors:
Ayers, Harvey, G. W. Thomas, A. W. Young

Associate Professors:
B. L. Allen, Box

Assistant Professors:
Hunter, Jaynes, Kilian, Schuster, Wendt ${ }^{*}$

* On leave, 1963-1964.

The Department of Agronomy and Range Management, as indicated by the name, includes two distinct areas of agricultural science. Both are of prime importance in producing agricultural income from our greatest natural resource, the soil.

The 160 -acre agronomy farm provides opportunity for field studies and demonstrations of both dryland and irrigation farming and serves as a research facility for graduate students and faculty. An extensive grass and legume nursery is maintained, and several nearby ranches cooperate with the College, thus adding to the available laboratory facilities.

Graduate courses leading to a master's degree are available in crops, soils, or range management for those individuals with a good science background in chemistry, botany, and soils.

## Agronomy

Agronomy is a science which deals with the technology of plant growth and development, treating both the scientific and economic phases of producing agricultural income from soil and water through growth of useful crops.

Courses and curricula are offered to prepare students for service in the areas of crops, crop science and soil science. Depending upon the

# AGRONOMY AND RANGE MANAGEMENT CURRICULUM <br> Bachelor of Science <br> SOILS MAJOR <br> For Uniform Freshman Year See Page 77 

| SOPHOMORE YEAR |  | SEMESTER 1st | 2nd |
| :---: | :---: | :---: | :---: |
| Agron. 241 | Solls | 4 |  |
| Chem. 142 | Gen. Chem. | 4 |  |
| Geol. 143 | Phys. Geol. | 4 |  |
| Math. 131 | Trigonometry | 3 |  |
| P.E., Band, or Basic ROTC 1-2 |  |  |  |
| Bact. 231 | Bacteriology |  | 3 |
| Chem. 341 | Intro. Org. Chem. |  | 4 |
| *Geol. 144 | Hist. Geol. |  | 4 |
| Math. 132 | Anal. Geom. |  | 3 |
| Ag. Eco. 235 | Fund. of Ag. Eco. |  | 3 |
| P.E., Band, or Basic | ROTC |  | 1-2 |
|  | Total credit hours | 16-17 | 18-19 |


(All electives must be approved by the Head of the Department.)
Hours required for graduation exclusive of P.E., Band. or Basic ROTC-140.

* Biol. 333, Bio-ecology, may be taken in place of Geol. 144.
* Two agronomy courses from the following group must be elected:

| Agron. 331-For. \& Past. Crops | 3 | Agron. 342-Crop Ident., Grad., \& Analysis |  |
| :--- | :--- | :--- | :--- |
| Agron. 332-Grain Crops | 3 | Agron. 431-Fund. Prin. of Plant Breed. | 4 |
| Agron. 333-Range Plants | 3 | Agron. 433-Cotton Prod. | 3 |
| 3 |  |  |  |

One agronomy course from the following must be elected: Agron. 434-Soil Conserv. \& Land Use Plan.
major selected and the areas of emphasis chosen, students are prepared upon graduation to work in fields such as crop production, seed production and control, soil conservation, land appraisal, farm advisory and managerial work, teaching, extension work, research, or graduate study. The curricula are sufficiently flexible to permit a student, by counseling with staff members, to develop a program that will prepare him for one of the many areas of agribusiness so important in today's agricultural production. Courses in business, marketing, management, statistics, mathematics and other subjects of value to a planned career may be elected by a student majoring in this field.

The crop production emphasis is designed to provide a broad agronomic background where the student by careful selection of electives can secure basic agronomic training in both crops and soils courses with emphasis on either.

The crop science emphasis is designed to provide a technical background in crops and prepare the student for graduate study or employment in a research position.

The soils major is designed to prepare the student for graduate study, research employment or a technical soil science position.

## Range Management

Range management is the science and art of obtaining maximum sustained use of native lands and vegetation for production of domestic and wild animals.

Courses and curricula are designed to give the student adequate training in production of range forage, animal husbandry, and economics of wild land use. Graduates may choose to work for private ranches, livestock companies, federal range administration agencies, soil conservation services, wildlife refuges, banks, land appraising agencies, or in other areas of animal production and wild land management.

Three areas of emphasis are included in the range curriculum: general range management for the rancher or land administrator; range-wildlife management for those choosing to emphasis wildife production and recreation; and range economics for those who will go into the business phase of range management.

Pre-Wildlife Curriculum-For those students who wish to make wildlife management a career, Tech offers counseling and guidance in selecting courses that will transfer to schools offering degrees in wildlife management. Generally a student can take two full years' work at Texas Tech and transfer to another school without serious loss of credit. Those interested in pre-wildlife should inquire about the curriculum through a range management staff member.

Pre-Forestry-No school in Texas offers an accredited, 4-year program in forestry. However, many courses taken at Tech will apply toward a degree at other institutions. The range management faculty keeps a file of requirements for degrees at various institutions and counseling service is offered for those interested in forestry as a career.

# Courses in Agronomy 

FOR UNDERGRADUATES
131. The Fundamentals of Agronomy. (3:2:2)

A survey course. Crops, their classification, adaptation, identification, production, and use. Elementary solls.

## 241. Soils. (4:3:2)

Prerequisite: Chem. 141, sophomore standing in agriculture. Origin, formation, classification of soils; physical, chemical, and biological requirements; maintenance of soil fertility. Laboratory study of soil forming materials, soil texture classification, identlfication, and mapping.

## 331. Forage and Pasture Crops. (3:2:2)

Prerequisite: Agron. 131, 241, and junior standing in agriculture. The production and utilization of forage and pasture crops. Fundamental principles of grassiand agriculture are emphasized.

## 341. Fundamental Principles of Genetics. (4:3:2)

Prerequisite: Junior standing in agriculture. Heredity and variation in plants and animals. History. The chromosome theory in plants, higher animals, poultry, and insects. Biometry as applied to genetic data.

## 342. Identification, Grading, and Analysis of Field Crops. (4:0:8)

Prerequisite: Agronomy major or approval of instructor. Identification of field crops, important diseases which attack them, weed seeds, practice in judging quality and values of seeds and crop products, commercial grain grading.

## 410. Seminar. (1)

Prerequisite: Senior standing and approval of instructor. Assigned readings, current advances. Informal discussions, oral reports and papers. May be repeated.

## 4312. Crop Production. (3:2:3)

Prerequisite: Agron. 131, 241, and junior standing in agriculture. Not open to agronomy majors. A modified course composed of applied production of fiber, grain and forage crops applicable to Texas. Problems in seed and feed production. Special emphasis on needs of vocational agriculture teachers, county agents, etc.

## FOR UNDERGRADUATES AND GRADUATES

## 425. Seed Technology. (2:1:2)

Prerequisite: Agron. 342. Analysis of planting seed, identification, germination and purity. Methods of producing, processing, storing, and marketing pure seed with special emphasis on registered and certifled seed; study of state and federal seed laws.

## 430. Agronomy Problems. (3)

Prerequisite: Open to all students having satisfactory scholastic records. An Investigation of an assigned problem and individual instruction in the field of special interest to the individual student. May be repeated for credit with approval of Head of Department.
431. Fundamental Principles of Plant Breeding. (3:3:0)

Prerequisite: Agron. 341. Practical application of genetics in the breeding and improvement of plants.

## 433. Cotton Production and Improvement. (3:3:0)

Prerequisite: Junior standing in agronomy or approval of instructor. Culture, improvement, and classification of cotton. Diseases and insect pests of cotton.

## 434. Soil Conservation and Land Use Planning. (3:2:3)

Prerequisite: Agron. 241, 331. Junior standing. Types of erosion causes and controls. Inspection trips in soil conservation. Land use planning and conservation management.

## 435. Soil Classification. (3:2:3)

Prerequisite: Agron. 241 and approval of instructor. A comprehensive study of the basis for soil classification. Systems of classification with emphasis on that developed in the U.S. and the relationships of world soils to the system. Laboratory work will consist of mapping a designated area using approved methods and field trips to study natural relationships of solls.

## 436. Soil Chemistry. (3:2:3)

Prerequisite: Agron. 241, 12 hours of chemistry, advanced standing in agriculture. Chemistry of the soil as affected by cultivation, crop rotation, fertilizers, and moisture relationships.
439. Soil Microbiology. (3:2:3)

Prerequisite: Agron. 241, Bact. 231, 12 hours of chemistry, advanced standing in agriculture. Micro-organisms in the soil with emphasis upon the functions of the soll bacteria and their influence upon decomposition of organic matter and soil fertility in general.

## 4311. Soil Fertility. (3:2:3)

Prerequisite: Agron. 241, 331, or 333, senior standing in agriculture. The nature and sources of plant nutrients, their liberation, conservation and utilization. Use of supplements and fertilizers. Irrigation and drainage, inspection trips.

## 4313. Weeds and Weed Control. (3:2:2)

Prerequisite: Chem. 341 and junior standing in agriculture or approval of instructor. This course is concerned primarily with (1) the importance, distribution, reproduction and dissemination of weeds and (2) mechanical, biological and chemical methods of controlling them.

## 4314. Soil Physics. (3:2:3)

Prerequisite: Junior standing, Agron. 241, 6 hours each of physics and mathematics or consent of instructor. Fundamental principles of the physical properties of the soil. A study of the mechanical behavior of the soil mass.

## FOR GRADUATES

511. Seminar. (1:1:0)

Prerequisite: Approval of instructor. Current literature in the field. May be repeated for credit on approval of major professor.

## 532. Experimental Design and Analysis. (3:2:2)

Prerequisite: Graduate or senior standing and approval of instructor. Definition, description, and evaluation of the principal experimental designs and methods of analysis.

## 533. Pedology. (3:3:0)

Prerequisite: Senior or graduate standing and at least 6 hours of chemistry and 3 hours of geology or equivalent; consent of instructor. Fundamental principles and processes of rock weathering with associated soll formation. Genesis of the various clay minerals. Soil forming factors and their interrelationships.

## 534. Research. (3)

Prerequisite: Approval of major professsor. A specific problem in line with the major interest of the student. May be repeated for credit upon approval of major professor.

## 536. Soil and Plant Relationships. (3:3:0)

Prerequisite: Graduate or senior standing and approval of instructor. The theoretical and fundamental bases of soil fertility as related to the physical, chemical and biological functions within the soil. Cause and effect, management and control of factors influencing plant growth in the soil.

## 537. Methods in Plant Breeding. (3:3:0)

Prerequisite: Agron. 341 or equivalent and graduate standing or qualified undergraduates with approval of instructor. Methods applicable to improving self- and cross-pollinated plants, the effects of inbreeding, selection, hybridization, heterosis, quantitative inheritance, induced mutation and ploidy.
631. Master's Thesis. (3)

Enrollment required at least twice.

# Courses in Range Management FOR UNDERGRADUATES 

## 231. Introductory Wildlife. (3:3:0)

Prerequisite: Sophomore standing. An introduction to the ecology and life historles of wild animals. Importance of wild animals to the human population the role of environment in occurrence and distribution of animals, habitat requirements, population dynamics of wild animals. Ecological principles of community, ecosystem, and population dynamics are stressed.

## AGRONOMY AND RANGE MANAGEMENT CURRICULUM <br> Bachelor of Science <br> RANGE MANAGEMENT MAJOR <br> For Uniform Freshman Year See Page 7y

| SOPHOMORE YEAR |  | SEMESTER | $18 t$ | 2nd |
| :---: | :---: | :---: | :---: | :---: |
| Ag. Eco. 235 | Fund. of Ag. Eco. |  | 3 |  |
| Agron. 241 | Solls |  | 4 |  |
| Math. 131 | Trigonometry |  | 3 |  |
| Chem. 142 | Gen. Chem. |  | 4 |  |
| Ento. 231 | Intro. Ento. |  | 3 |  |
| P.B., Band, or Basic | ROTC |  | 1-2 |  |
| Ag. Eco. 236 | Mkt. Ag. Prod. |  |  | 3 |
| Ag. Engr. 222 | Ag. Surv. \& Land Map. |  |  | 2 |
| Range Mgt. 333 | Range Plants |  |  | 3 |
| Bot. 232 | Taxonomy |  |  | 3 |
| Eng. 233 | Tech. Writing |  |  | 3 |
| Chem. 341 | Intro. Org. Chem. |  |  | 4 |
| P.E., Band, or Basic | ROTC |  |  | 1-2 |
|  | Total credit hours |  | 18-19 | 19-20 |


| JUNIOR YEAR |  |  | SEMESTER | 1st | 2nd | SENIOR YE |  |  | SEMCESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Agron. | 331 | For. \& Past. Crops |  | 3 |  | Ag. Eco. | 438 | Range \& Ranch Eco. |  | 3 |  |
| Agron. | 435 | Soil Classification |  | 3 |  | A.H. | 431 | Beef Cattle Prod. |  | 3 |  |
| A.H. | 331 | Anim. Nutr. |  | 3 |  | Govt. | 232 | Amer. Govt., Func. |  | 3 |  |
| Biol. | 333 | Bio-ecology |  | 3 |  | Hist. | 231 | Hist. of U.S. to 1865 |  | 3 |  |
| Govt. <br> *electives | 231 | Amer. Govt., Org. |  | 3 3 |  | Range Mgt. <br> - Electives | 437 | Range Mgt. |  | 3 3 |  |
| Bot. | 331 | Fund. Prin. of Genetics |  |  | 4 | Range Mgt. | 438 | Adv. Range Mgt. |  |  | 3 |
| Range Mgt. | 332 | Plant Physioi. |  |  | 3 | A. H. | 441 | Sheep Prod. |  |  | 4 |
| Agron. | 341 | Intro. Wildlife |  |  | 3 | Hist. | 232 | Hist. of U.S. since 1865 |  |  | 3 |
| Range Mgt. <br> *Electives | 231 | Range Ecology |  |  | 3 5 | Range Mgt. <br> *Electives | 431 | Game Mgt. |  |  | 3 6 |
|  |  | Total credit hours |  | 18 | 18 |  |  | Total credit hours |  | 18 | 19 |



* Students are expected to choose one or more advanced soils courses from Agron. 434, 436, 439, 4311, or 4314.

Note: All range management majors are expected to take Range Mgt. 432, Range Problems, during the summer following the junior year.

## 332. Range Ecology. (3:2:3)

Prerequisite: Bot. 232, Agron. 241, and Range Mgt. 333 or approval of the instructor. Principles of ecology and their application to rangelands. Effects of environmental factors on evaluation, adaptation and success of range plants. Concepts of succession, energy transfer and climax applied to the range site. Manipulation of environment to reach and maintain sustained production from range sites. Field study of the ecology of the High Plains and literature review of other major vegetation types.

## 333. Range Plants. (3:1:4)

Prerequisite: Sophomore standing in agriculture and approval of instructor. The economic value of the range grasses, non-grass forage plants and poisonous plants. Identification, habitat. palatability, and regions of growth.

## FOR UNDERGRADUATES AND GRADUATES

## 431. Game Management. (3:2:3)

Prerequisite: Basic zoology, introductory wildlife, 3 hours of range management. Ecological principles of manipulating game populations. Methods and techniques of evaluating and manipulating the habitat. Ecological requirements of the major game animals in the United States. Problems involved in producing, maintaining, and harvesting populations of game animals.

## 432. Range Management Problems.

Prerequisite: Bot. 232, Biol. 333 and Range Mgt. 333. Open to all junior and senior students with satisfactory scholastic records. An investigation of an assigned problem of individual instruction in the science of range management or supervised field study of range surveying procedures, range experimentation, or ranch planning.

## 437. Range Management. (3:2:3)

Prerequisite: Range Mgt. 333 or approval of the instructor. History of the range industry, importance of range livestock, applications of plant physiology and ecology to rangeland management. Economics of range use, obtaining maximum forage and livestock yield. Plant-soil-animal relationships are stressed.

## 438. Advanced Range Management. (3:2:3)

Prerequisite: Range Mgt. 333 or 331,437 and advanced standing in agriculture. Advanced problems of native grassland management involving technical methods, range research, economic factors of utilization, and systems of range grassland management.

## FOR GRADUATES

523. Range Research Methods. (2)

Prerequisite: Graduate standing and the approval of the instructor. An organized discussion of methods and techniques for investigation on an original problem using both deductive and inductive reasoning. Methods of vegetational analysis, measurement of range yield, and presenting final data will be discussed.

## 531. Comparative Synecology. (3:3:0)

Prerequisite: Approval of instructor. An advanced study of the range ecosystem, causes and patterns of community development; coactions of plants and animals. Dynamics of succession and community change. Plant and animal indicators of seral expressions. Application of ecological concepts to management.

## 532. Vegetation Influences. (3:3:0)

Prerequisite: Approval of the instructor. Study of the "reaction" phase of ecology. Detailed investigation into the effects of plants on their organic and inorganic environment; influence of forest and range vegetation on soil properties, microclimate, erosion and water yield, effects of change of vegetation types on soil, watershed management and forage production.

## 534. Range Research. (3)

Prerequisite: Approval of major professor. A specific problem in line with the major interest of the student. May be repeated for credit upon approval of major professor.

## ANIMAL HUSBANDRY CURRICULUM <br> Bachelor of Science ANIMAL BUSINESS MAJOR

For Uniform Freshman Year See Page 77



 from the following courses: Ag. Engr. 221, 222, 233; A. H. 430, 437.

# Department of Animal Husbandry 

Ralph Marion Durham, Head of the Department Office: Vet. Sci. 152-A

Professors:<br>Baumgardner, Durham, Harbaugh<br>Associate Professors:<br>Ellis*, Hudson, Turner, Zinn<br>Assistant Professors:<br>Curl, O'Brien

* Also manager of the Texas Technological College Research Farm at Pantex, Texas.

The animal husbandry curriculum provides for instruction and research in breeding, feeding, management, production, and processing for market of farm animal products and poultry. Animal husbandry today is a composite of several fields of specialization, each of which is constantly undergoing changes due to new concepts or improved techniques. For this reason, the curricula for the animal husbandry student have been revised to provide for current and anticipated needs.

A program of study is developed through individual counseling according to particular needs within the areas of animal production, ani-mal-business, or animal science. The graduate contemplating return to a ranch or farm might consider animal production or animal-business emphasis. Today, the majority of animal husbandry students find their place in allied industries such as feed research, feed management, manufacturing and sales, meats merchandising, and banking. The ani-mal-business major is recommended for these students. The animal science major is recommended for those who anticipate entering graduate school training in specialized areas.

Whatever their interest, animal husbandry students will find the curriculum, laboratories, and college farm well suited to their needs.

## Courses in Animal Husbandry

## FOR UNDERGRADUATES

## 131. General Animal Husbandry. (3:2:2)

An introductory course designed to orient the student in the modern field of animal agriculture. Emphasis on problems of breeding, feeding, management, and market ing. Live animals are appraised for merit and then slaughtered for carcass evaluation.
232. Meat and Meat Products. (3:2:3)

An introductory course designed to orient the student in slaughtering, processing, and preservation techniques; anatomy and nomenclature; the meat packing industry; sanitation practices; and grading of meat and meat products. City of Lubbock health certificate required.
321. Livestock and Meat Evaluation. (2:0:6)

Prerequisite: A.H. 131, A.H. 232. Comparative evaluation of breeding and market animals; carcass evaluation, selection and grading. Field trips to herds, plants, shows, and contests.
331. Principles of Feeding. (3:3:0)

[^9]
## ANIMAL HUSBANDRY CURRICULUM <br> Bachelor of Science <br> ANIMAL PRODUCTION MAJOR

For Uniform Freshman Year See Page 7\%

| SOPHOMORE YEAR |  | SEMESTER | $1 s t$ | 2nd |
| :---: | :---: | :---: | :---: | :---: |
| Ag. Eco. 235 | Fund. of Ag. Eco. |  | 3 |  |
| Chem. 142 | Gen. Chem. |  | 4 |  |
| Eng. 233 | Tech. Writing |  | 3 |  |
| P. H. 231 | Intro. Poult. Husb. |  | 3 |  |
| Spch. 338 | Bus. \& Prof Spch. |  | 3 |  |
| P.E., Band, or Basic | ROTC |  | 1-2 |  |
| Ag. Eco. 236 | Prin. Mkt. Agric. Prod. |  |  | 3 |
| Agron. 241 | Soils |  |  | 4 |
| A. H. 232 | Meat \& Meat Prod. |  |  | 3 |
| Bact. 231 | Bacteriology |  |  | 3 |
| Vet. 331 | Anat. of Farm Anim. |  |  | 3 |
| P.E., Band, or Basic | ROTC |  |  | 1-2 |
|  |  |  | 17-18 | 17-18 |



 in A. H. courses at the

## 335. Artificial Insemination. (3:2:3)

The collection, evaluation, and storage of semen. Insemination techniques in cattle, sheep, swine, and poultry.
338. Meat Processing and Merchandising. (3:2:3)

Prerequisite: A.H. 232, Chem. 341, Bact. 231. The processing and manufacturing of meat food items, sausages, loaves, etc. Merchandising practices and techniques as they affect carcass value. Sanitation control. Field trips to packing plants and retail stores. Clty of Lubbock health certificate required.

## 411. Animal Husbandry Seminar. (1:1:0)

Assigned subjects. Review of recent investigations. Reports and discussion. May be repeated once for credit.

## 421. Advanced Livestock and Meat Evaluation. (2:0:6)

Prerequisite: A.H. 321. Detailed analysis of live animal-carcass evaluation. Seleetion for quality and quantity characteristics, market classification and grading. Field trips to herds, plants, shows, and contests.
430. Special Problems in Animal Husbandry. (3)

Prerequisite: Approval of Department Head. Individual investigation. May be repeated for credit.

## FOR UNDERGRADUATES AND GRADUATES

427. Swine Production. (2:2:0)

Prerequisite: A.H. 331. The swine industry. Breeding, feeding, housing, and marketing. Herd records. Diseases, parasites, and sanitation. Laboratory practice with farm animals and equipment is done as assigned problems.
431. Beef Cattle Production. (3:3:0)

Prerequisite: A.H. 331. The beef cattle industry. Production and marketing of beef cattle. Analysis of ranch and feedlot systems. Coordination of breeding, feeding, management, and marketing. Inspection trips to ranches and feedlots.
432. Animal Breeding. (3:3:0)

Prerequisite: Agron. 341. Genetics applied to the improvement of farm animals. Systems of breeding and selection. Systems of mating, such as inbreeding, outcrossing, and crossbreeding.
434. Horse Production. (3:3:0)

Prerequisite: Approval of instructor. Breeding, feeding, breaking, training, stabling, and shoeing. Gaits. Care of stallion, brood mares, and foals. Parasites and diseases.
435. Dairy Cattle Production. (3:3:0)

Prerequisite: A.H. 331. The dairy industry. Feeding for growth, maintenance, and milk production. Handling and marketing milk and animals. Dairy barn construction and sanitation. Advanced registry and herd records. Laboratory practice with farm animals and equipment is done as assigned problems.
436. Animal Nutrition. (3:3:0)

Prerequisite: A.H. 331. The role of nutrients in the metabolism of farm animals. Nutrient utilization and energy efficiency in production.

## 437. Livestock Record Systems. (3:3:0)

Prerequisite: A.H. 432 or parallel enrollment. Acquaints the student with the principles of performance testing and with records involved in such testing. Analysis and interpretation of actual records is a major part of the work.
439. Endocrinology. (3:3:0)

Prerequisite: Vet. 331. Secretions of the endocrine glands, with special reference to their influence upon milk secretion, egg production, growth, reproduction, and fattening.
441. Sheep, Wool, and Mohair Production. (4:3:2)

The sheep and mohair industry. Range and farm sheep. Angora goats. Breeding, feeding, disease and parasite control. Wool and mohair production, grading, sorting and marketing. Tour of wool warehouses and laboratories.

## FOR GRADUATES

511. Seminar. (1:1:0)

Analysis of current and significant past research. Oral presentations and discussions. Enrollment in each semester while in graduate school.

# ANIMAL HUSBANDRY CURRICULUM <br> Bachelor of Science <br> ANIMAL SCIENCE MAJOR <br> For Uniform Freshman Year See Page 7y 

| SOPHOMORE YEAR |  | SEMESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: |
| Ag. Eco. 235 | Fund. of Ag. Eco. |  | 3 |  |
| Chem. 142 | Gen. Chem. |  | 4 |  |
| Eng. 233 | Tech. Writing |  | 3 |  |
| Math 131 | Trigonometry |  | 3 |  |
| Spch. 338 | Bus. \& Prof Speh. |  | 3 |  |
| P.E., Band, or Basic | ROTC |  | 1-2 |  |
| Agron. 241 | Soils |  |  | 4 |
| A. H. 232 | Meat \& Meat Prod. |  |  | 3 |
| Math. 132 | Anal. Geom. |  |  | 3 |
| Vet. 331 | Anat. of Farm Anim. |  |  | 3 |
| Other* ${ }^{\text {* }}$ ( ${ }^{\text {a }}$ |  |  |  | $\begin{array}{r}3 \\ \hline\end{array}$ |
| P.E., Band, or Basic | ROTC |  |  | 1-2 |
|  |  |  | 17-18 | 17-18 |


| JUNIOR YEAR |  | SEMCESTER | 1st | 2nd | SENIOR XEAR |  |  | SEMEESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Agron. | 341 | Fund. Prin. of Genetics | 4 |  |  |  |  |  |  |
| Govt. | 231 | Amer. Govt., Org. | 3 |  | A. ${ }_{\text {H. }}$. | $\begin{aligned} & 411 \\ & 429 \end{aligned}$ |  | Anim. Husb. Sem. |  | 1 |  |
| Hist. | 231 | Hist. of U.S.to 1865 | 3 |  | A. H. | 432 | Anim. Breeding |  | r 3 |  |
| Vet. | 332 | Physiol. of Farm Anim. | 3 |  | Other* |  |  |  |  |  |
| Chem. Other* | 341 | Intro. Org. Chem. | $\begin{aligned} & 4 \\ & 2 \end{aligned}$ |  |  |  |  |  |  |  |
| A. H. | 331 | Prin. of Feeding |  | 3 | A. H. | 436 | Anim. Nutr. |  |  | 3 |
| Chem. | 342 | Intro. Physiol. Chem. |  | 4 | Other* |  |  |  |  | 15 |
| Govt. | 232 | Amer. Govt., Func. 1865 |  | 3 |  |  |  |  |  |  |
| Hist. | 232 | Hist. of U.S. since 1865 |  | 3 |  |  |  |  |  |  |
| Vet. Other* | 334 | Anim. San. \& Disease Cont. |  | 3 3 |  |  |  |  |  |  |
|  |  |  | 19 | 19 |  |  |  |  | 18 | 18 |


 lists, depending upon whether his area of interest is animal breeding, animal nutrition, or meats: A. H. 321, 427, 431, 435, 437, 439, 441; Math 231, 232; Bact. 331, 332; Phys. 141, 142; and Zool. 231-232.

## 533. Techniques in Animal Research. (3)

Techniques currently employed in animal research. In-service training in the use and application of these techniques.
534. Research in Animal Science.

In-service research work in breeding, nutrition, or meats. Problems are done on a semi-independent basis. Design and carrying out of actual experiments, including publication of results. May be repeated for credit.
536. Biometry. (3:2:2)

Analysis of experimental procedures and designs for agricultural research. Analysis of variance, and least-squares analysis. Component of variance partitioning. Regression and correlation techniques as used in agricultural research.

## 537. Advanced Animal Breeding. (3:3:0)

Prerequisite: A.H. 432. Population parameters. Heritability and heterosis. Geneticenvironmental interactions. Methods for deriving population statistics. Genetic bases for performance testing programs.

## 538. Advanced Animal Nutrition. (3:3:0)

Prerequisite: A.H. 436. Analysis of nutrition theory. Studies of vitamin and mineral metabolism. Analysis of growth, fattening, and milk production as they are related to nutrition.
539. Physiology of Reproduction. (3:2:2)

Male and female reproductive system. Breeding efficiency of livestock. Effect of nutritional, genetic, and physiological factors on reproduction. Pregnancy tests.
541. The Science of Meat and Meat Products. (4:3:3)

Prerequisite: Chem. 436, Zool. 331, Bact. 334 or parallel enrollment. The application of various scientific disciplines in the study of meat and meat products. Histological, chemical, and biological properties of meat. Palatability characteristics, nutritive value and quality factors. Preservation and packaging. Methods of analysis. City of Lubbock health certificate required.
631. Master's Thesis. (3)

Enrollment required at least twice.

## Courses in Poultry Husbandry

## FOR UNDERGRADUATES

## 231. Introductory Poultry Husbandry. (3:2:2)

Introduction to the poultry industry. Application of those factors concerned with economic production. Performance tests. Laboratory demonstration in selecting, culling, housing, grading, and caponizing.

## 331. Pullet Brooding and Production. (3:2:3)

Prerequisite: P.H. 231. Selection of egg strains. Factors influencing fertility and hatchability of eggs. Practical chick embryology. Brooding requirements of egg-type chicks. Costs of production and methods of marketing. Laboratory includes the successful brooding of baby chicks.

## 332. Broiler Production. (3:2:3)

Prerequisite: P.H. 231. Detalled study of broller production. Influence of strains, environment, feed conversion, and mortality upon production costs. Meat production tests. Includes the raising and marketing of finished broilers.

## FOR UNDERGRADUATES AND GRADUATES

## 431. Poultry Production. (3:3:0)

Prerequisite: P.H. 231. Breeding, feeding, management, and marketing of poultry and poultry products. Housing types as influenced by biological and engineering requirements. Egg and meat performance tests. Disease control and sanitation. Field trips to nearby poultry enterprises.

## 432. Turkey Production. (3:3:0)

Prerequisite: P.H. 231. The turkey industry. Breeds, breeding, incubation, rearing, housing, feeding, management, and marketing. Turkey meat production tests Disease control and sanitation. Field trips to nearby turkey farms.
433. Caged Egg Production. (3:3:0)

Prerequisite: P.H. 231, or approval of instructor. A detailed introduction to the

[^10]
## ANIMAL HUSBANDRY CURRICULUM PRE-VETERINARY MEDICINE

This curriculum is designed to quallfy students for entrance to schools of veterinary medicine. Texas Technological College offers only the two-year
 one of the four-year curricula in the School of Agriculture.

| FRESHMAN | YEAR |  | SEMCESTER | 1st | 2nd | SOPHOMORE YEAR |  | SEMCESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ag. Ed. | 111 | The Agri. Indust. |  | 1 |  | Chem. 353 | Org. Chem. |  | 5 |  |
| A.H. | 131 | Gen. Anim. Husb. |  | 3 |  | Eng. 233 | Tech. Writing |  | 3 |  |
| Biol. | 141 | Botany |  | 4 |  | Phys. 141 | Gen. Phys. |  | 4 |  |
| Chem. | 141 | Gen. Chem. |  | 4 |  | P.E., Band, or Basic | ROTC |  | 1-2 |  |
| Eng. | 131 | Col. Rhet. |  | 3 |  |  |  |  |  |  |
| Math. | 135 | Intro. Col. Math. or |  |  |  |  |  |  |  |  |
| Math. | 133 | Col. Alg. |  | 3 |  |  |  |  |  |  |
| P.E., Band, | or Basic | ROTC |  | 1 |  |  |  |  |  |  |
| Biol. | 142 | Zoology |  |  | 4 | Chem. 354 | Org. Chem. |  |  | 5 |
| Chem. | 142 | Gen. Chem. |  |  | 4 | Eng. 231 | Mast. of Lit. |  |  | 3 |
| D.I. | 131 | Prin. of Dairying |  |  | 3 | P.H. 231 | Intro. Poult. Husb. |  |  | 3 |
| Eng. | $132$ | Col. Rhet. |  |  | 3 | Phys. 142 | Gen. Phys. |  |  | 4 |
| Math. <br> P.E., Band, | 131 or Basic | Trigonometry ROTC |  |  | [ 3 | P.E., Band, or Basic | ROTC |  |  | 1-2 |
| P.E., Band, | or Basic | ROTC |  |  | 1-2 |  |  |  |  |  |
|  |  | Total credit hours |  | 19 | 18-19 |  | Total credit hours |  | 13-14 | 16-17 |

 completion of this curriculum, exclusive of P.E., Band, or Basic ROTC-74.
management upon production. Summary and analysis of records. Field trips to nearby cage production areas.

FOR GRADUATES
(See A.H. 533)

## Courses in Veterinary Science <br> FOR UNDERGRADUATES

331. Anatomy of Farm Animals. (3:3:0)

Introduction to comparative anatomy of domestic animals.
332. Physiology of Farm Animals. (3:3:0)

Prerequisite: Vet. Sci. 331. Introduction to physiology of domestic animals.
334. Animal Sanitation and Disease Control. (3:3:0)

Prerequisite: Vot. Sci. 332. Diseases of farm animals, both infectious and non-infectious, parasites, parasitic diseases, and the establishment of immunity through the use of biological products.

# Department of Dairy Industry 

Juddie Johnson Willingham, Head of the Department Office: Ag. $215-\mathrm{B}$

Professor:<br>Willingham<br>Associate Professor:<br>Peeples<br>Instructor:<br>R. M. Miller

The curriculum of the Department of Dairy Industry emphasizes courses in the scientific and business aspects of the dairy industry. Graduates are prepared for careers in college teaching, research work with experiment stations and other agencies, and positions in various aspects of the dairy industry, such as office management, salesmanship, advertising, quality control and laboratory supervision, and public health work with governmental organizations on the local, state, and national level. Through free electives the student may receive training in closely allied fields.

The department maintains a dairy plant with modern equipment for laboratory instruction in all phases of the dairy industry and for bacteriological and chemical analyses of dairy products.

## Courses in Dairy Industry

## FOR UNDERGRADUATES

131. Principles of the Dairy and Food Industries. (3:3:0)

A general survey of the dairy and food industries, food production, spoilage, preservation and processing.

## DAIRY INDUSTRY CURRICULUM <br> Bachelor of Science

| SORHOMORE YEAR |  | SEMESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: |
| Ag. Eco. 235 | Fund. of Ag. Eco. |  | 3 |  |
| Bact. 231 | Bacteriology |  | 3 |  |
| Chem. 142 | Gen. Chem. |  | 4 |  |
| D.I. 241 | Market Milk |  | 4 |  |
| P.E., Band, or Basic | ROTC |  | 1-2 |  |
| Electives |  |  | 3 |  |
| Ag. Eco. 236 | Mkt. Ag. Prod. |  |  | 3 |
| Chem. 341 | Intro. Org. Chem. |  |  | 4 |
| D.I. 231 | Testing Dairy Prod. |  |  | 3 |
| Eng. 233 | Tech. Writing |  |  | 3 |
| P.E., Band, or Basic | ROTC |  |  | 1-2 |
| Electives |  |  |  | 4 |
|  | Total credit hours |  | 18-19 | 18-19 |



[^11]
## 231. Testing Dairy Products. (3:1:4)

Prerequisite: D.I. 131, Chem. 142. Chemical and physical tests used in processing of dairy products; laboratory control methods for the dairy plant.
241. Market Milk. (4:3:3)

Prerequisite: D.I. 131. The fluid milk industry; milk and public health; city, state, and federal regulations and ordinances; production, transportation, handling, retailing, wholesaling of milk; cost studies; processing; field trips.

## 313. Dairy Products Judging. (1:0:3)

Prerequisite: Consent of instructor. Commercial grades and classification of dairy products; practice in judging milk, butter, cheese, and ice cream; student contests.

## 314. Advanced Dairy Products Judging. (1:0:3)

Prerequisite: Consent of instructor. Commercial grades and classification of dairy products; practices in judging milk, butter, cheese, and ice cream; student contests.
322. Marketing Dairy Products. (2:2:0)

Prerequisite: D.I. 131 or approval of instructor. Federal marketing orders, byproducts markets, pricing formula; brokerage policies.
334. Fundamentals of Dairy Science. (3:2:3)

Prerequisice: D.I. 131, Chem. 142. Chemical and physical principles of basic importance in the processing of dairy products.

## 335. Dairy Bacteriology. (3:2:3)

Prerequisite: D.I. 131, Bact. 231. Study of organisms in milk and dairy products; methods of control.
337. Dairy Plant Equipment. (3:2:3)

Prerequisite: D.I. 131. Application of the physical principles of heat and power to operation of dairy plant equipment; dairy refrigeration; water problems; steam and water fittings; plumbing; sewage disposal; steam boilers.
338. Dairy Plant Equipment. (3:2:2)

Prerequisite: D.I. 337. Principles involved in the selection, installation, and care of dairy equipment.

## FOR UNDERGRADUATES AND GRADUATES

## 411. Dairy Seminar. ( $1: 1: 0$ )

Prerequisite: Senior standing in the department. Review of scientific literature; papers and reports; class discussion. Graduate students may repeat for credit.

## 430. Dairy Industry Problems. (3)

Prerequisite: Twenty-one hours in the department and consent of the instructor. Investigation of special problems in the field of dairy industry in which the student has a special interest. May be repeated for credit.
433. Ice Cream and Concentrated Milk. (3:2:3)

Prerequisite: D.I. 131. Problems of the ice cream and concentrated milk industry; ingredlents, standardization and calculation of mixes; cost studies; field trips.
435. Dairy and Food Inspection. (3:2:3)

Prerequisite: D.I. 131. Municipal, state, and federal dairy and food regulations; inspection methods used in the field; laboratory analysis of dairy and food products; required field trip.

## 437. Creamery Management and Merchandising. (3:3:0)

Prerequisite: D.I. 337. Organization and control of dairy plants; duties of plant manager; plant plans and construction; ethics and methods of merchandising; required field trip.

## 441. Butter and Cheese Making. (4:2:4)

Prerequisite: D.I. 131. Bact. 231. Problems in the manufacture of butter and cheese.

## FOR GRADUATES

## 531. Dairy Industry Research. (3)

Prerequisite: Consent of major professor. Scientific research problems in the field of dairy industry. May be repeated for credit.

# PARK ADMINISTRATION, HORTICULTURE, AND ENTOMOLOGY 

Bachelor of Science
PARK ADMINISTRATION MAJOR
For Uniform Freshman Year See Page 7\%


Hours required for graduation exclusive of P.Fi., Band, or Basic ROTC-140.

535. Dairy Bacteriology Research. (3)<br>Prerequisite: Consent of major professor. Scientific research problems in the field of dairy bacteriology. May be repeated for credit.

631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Park Administration, Horticulture, and Entomology 

Elo Joe Urbanovsky, Head of the Department<br>Office: Pl. Sci. 150-B<br>Professors:<br>Ashdown,* Elle, R. W. Strandtmann,* Urbanovsky<br>Associate Professor:<br>Zukauckas<br>Assistant Professors:<br>Gosdin, Huddleston,* Reed<br>Instructor:<br>D. J. Johnson<br>* Entomology faculty, jointly with the Department of Biology.

The curriculum of the Department of Park Administration, Horticulture, and Entomology offers major programs in park administration, horticulture, and entomology. Students are thoroughly grounded in theoretical aspects of their field and through laboratory work and an in-service summer training program are given training in practical adaptation of principles. Graduates of any major have splendid opportunities in fields of teaching and research. Excellent laboratory and library facilities are available, and the nature of the region provides unusual opportunities for field studies.

The park administration major offers the student many opportunities in the relatively new field of landscape design and urban planning. Students may choose to specialize in any one of a wide variety of fields leading to stimulating and creative careers and enabling them to locate in one of many areas of the country.

The horticulture major allows the student to concentrate his work in this specialized plant science dealing with various problems related to the production of plants for economic and aesthetic use. Graduates in horticulture may choose careers with state and federal government agencies, with commercial firms in the field of plant production, in teaching; or they may go on to advanced study or research.

The entomology major enables students to specialize in the science dealing with insects and their relationship to other animals, man, and agriculture. The curriculum is designed to prepare students for careers in research, teaching, or insect control. Opportunities are available in
such fields as state and federal experiment station work, public health services, plant quarantine, insecticide sales and development, state and federal extension work, pest control, and agricultural consultation. There are many opportunities for remunerative summer employment, and such work is considered an integral part of the entomology program.

A student may obtain a degree in the entomology program with a major in entomology by following the agricultural curriculum, or may specialize in entomology with a zoology major in the School of Arts and Sciences by taking 24 hours of entomology courses.

## Courses in Park Administration FOR UNDERGRADUATES

339. Landscape Construction. (3:3:0)

Prerequisite: Junior classification. Design and construction of landscape structures. Consideration is given to ethics, professional practices, specification, quantity surveys, and construction materials. Working drawings and specifications of various landscape structures required.
3311. Intermediate Design. (3:1:6)

Prerequisite: Hort. 232, Arch. 151. An introductory course to landscape design with problems in the design of private, semi-private, and public areas and maintenance of same.

## 3312. Basic Park Design. (3:1:4)

Prerequisite: Junior standing. Theory of park planning from an investigation standpoint in actual planning. Practical application by making the design of small parks of various categories correlating climate, people, land, water, vegetation, and recreational needs into a plan.
3313. Basic Park Administration. (3:3:0)

Prerequisite: Junior classification. A study of administration, operation, management, and history of city, county, state, and national parks.

## FOR UNDERGRADUATES AND GRADUATES

## 422. Park Administration. (2:2:0)

Prerequisite: Upperclass standing with consent of instructor. The function and operation of park departments as related to other agencies of the city, county, state, and federal governments.

## 430. Park Administration Problems. (3)

Prerequisite: Open to all advanced student having satisfactory scholastic records. An investigation of a problem in the field of special interest to the individual student concerned. Repeated for credit with approval of Head of Department.

## 441. Park Planning. (4:1:8)

Prerequisite: Park Admin. 3311 and 3312 , senior standing or special permission from Head of Department. Investigation and planning of city, metropolitan and reglonal parks and park systems. Relationships of parks to the other governmental functions, such as zoning, traffic. expansion, school sites, shopping centers, industrial parks, and other related land use problems. Area cities are used as practical problems in these studies.

## 442. Park Planning. (4:1:8)

Prerequisite: Park Admin. 441. A continuation of Park Admin. 441 in the investigation and planning of city, metropolitan, and regional parks and park systems.

## FOR GRADUATES

## 531. Park Administration Research.

Prerequisite: Consent of major professor. An outline of a specific problem of specialized study not included in regular course work. May be repeated for credit with approval of major professor.

## 540. Advanced Park Administration. (4:3:2)

Essential to the development of advanced park administration concepts is the ablity to ferret out fundamental facts, to analyze this data and make critical accurate judgments for sound decisions and subsequent action. The aims and topics included within the syllabus outline are geared to achieve these ends.
541. Advanced Park Planning and Design. (4:1:8)

The advanced student through analysis and interpretation develops comprehensive long-range plans for area, regional, state, and nationl park systems. Recreational needs, tourism, conservation, recreational economics, policies, and legislation are incorporated into this research and planning.
542. Advanced Park Planning and Design. (4:1:8)

Prerequisite: Park Admin. 541. A continuation of Park Admin. 541 where the advanced student through analysis and interpretation develops comprehensive long-range plans for area, regional, state, and national park systems.
631. Master's Thesis. (3)

Enrollment required at least twice.

## Courses in Horticulture

## FOR UNDERGRADUATES

131. Principles of Horticulture. (3:2:2)

Fundamental principles and practices of growth, maintenance, and use of horticultural plants, and landscape of small homes.
231. Vegetable Crops. (3:2:3)

Prerequisite: Hort. 131. Principles of market gardening and truck farming.
232. Trees and Shrubs. (3:2:2)

Prerequisite: Sophomore standing. Identification, characteristics, and use of deciduois and evergreen trees and shrubs.
233. Annuals and Perennials. (3:2:2)

Prerequisite: Sophomore standing. Identification, characteristics, culture, and use of annuals, biennials, perennials, bulb crops, and outdoor roses.

## 234. Commercial Propagation. (3:2:3)

Prerequisite: Hort. 131, Chem. 141. Propagation techniques of commercial nurseries and greenhouse ranges; study of the physiological reaction of cutting material.

## 333. Fruit Culture. (3:2:3)

Prerequisite: Hort. 131, junior standing in agriculture. Principles of fruit production; partícularly the home orchard. Tree fruits, grapes, and small fruits. Climate, soil, and water requirements. Varieties and cultural practices. Offered alternate years.

## 334. Principles of Floriculture. (3:2:3)

Prerequisite: Hort. 233, 234. Agron. 241, junior standing. Greenhouse construction, heating, fundamental soil treatment, and the basic principles of flower production and floriculture marketing. Offered alternate years.

## 338. Turfgrass Management. (3:3:0)

Principles and practices of turfgrass management for specialized areas such as athletic fields, playground areas, golf courses, home lawns, etc.

## 3314. Fundamentals of Home Landscape Design. (3:2:2)

Prerequisite: Hort. 131. Aimed at providing sufficient background for the student to plan and analyze the home landscape setting and to design suitable solutions for this problem.
410. Seminar. (1:1:0)

Prerequisite: Senior standing in horticulture and park management. Assigned readings, current advances, informal discussions, and oral reports and paper.

## FOR UNDERGRADUATES AND GRADUATES

## 425. Horticulture Problems.

Prerequisite: Open to all advanced students having satisfactory scholastic records. Investigation of a problem in the field of special interest to the individual student concerned.

PARK ADMINISTRATION, HORTICULTURE, AND ENTOMOLOGY
Bachelor of Science
HORTICULTURE MAJOR
For Uniform Freshman Year See Page 77


- Six hours of electives must be taken from Hort. 431, 435, or 436.

Hours required for graduation exclusive of P.E., Band, or Basic ROTC-140.

## 430. Horticulture Problems.

Prerequisite: Open to all advanced students having satisfactory scholastic records. Investigation of problem in the field of special interest to the student. Repeated for credit with approval of Head of Department.

## 431. Pomology. (3:3:0)

Prerequisite: Hort. 333, advanced standing in agriculture. Principles underlying fruit production. Temperature, moisture, irrigation, nutrition, fruit setting of pomological fruit.

## 435. Vegetable Production. (3:3:0)

Prerequisite: Hort. 231, advanced standing in agriculture. Practices and problems in the commercial production and handling of the important vegetable crops for fresh market and processing. Required field trips.
436. Advanced Floricultural Science. (3:2:3)

Prerequisite: Hort. 334, junior standing. Advanced culture and techniques of fertilization, soil maintenance; specific detailed study of greenhouse crops such as chrysanthemums, carnations, stock, and snapdragons. Required field trips. Offered 1963-1964 and alternate years.

## FOR GRADUATES

511. Horticulture Seminar. (1:1:0)

Review and discussion of current literature in the field. May be repeated for credit.
531. Horticulture Research.

Prerequisite: Consent of major professor. An outline of a specific problem of specialized study not included in regular course work. May be repeated for credit with approval of major professor.

## 532. Horticultural Crop Behavior. (3:3:0)

Aimed at giving the graduate a recent approach to the modifications in crop responses and recently developed techniques used to regulate physiological responses of growth and production of horticultural crops.

## 533. Horticultural Plant Evaluation Techniques. (3:3:0)

Aimed at giving the graduate some of the fundamental methods, means, data taking, and analysis to permit a clearer understanding and more thorough analytical technique.
631. Master's Thesis. (3)

Enrollment required at least twice.

## Courses in Entomology

## FOR UNDERGRADUATES

231. Introductory Entomology. (3:2:2)

Prerequisite: Sophomore standing in agriculture and Biol. 142. An introduction to insects and their role in human affairs, particularly agriculture: emphasis on morphology and biology as applied to control of pests species; control materials and methods.
321. Field Crop Insects. (2:1:3)

Prerequisite: Ento. 231. Field crop pests; cotton, rai:ge crop, and small grains insect pests; storage pests. Principally for agronomy majors. Fall semester only.
322. Livestock Pests. (2:1:3)

Prerequisite: Ento. 231. Livestock pests and associated insect problems. Life history and economic control. Spring semester only.
323. Horticulture Pests. ( $2: 1: 3$ )

Prerequisite: Ento. 231. The arthropod pests of ornamental vegetable and fruit crops. Recognition, biology, and control. Spring semester only.

## FOR UNDERGRADUATES AND GRADUATES

431. Agricultural Compounds. (3:3:0)

Prerequisite: An introductory course in entomology and Chem. 341. Nature, mode of action and uses of insecticides, fungicides, herbicides, and fertilizers. Spring and summer terms.

# PARK ADMINISTRATION, HORTICULTURE, AND ENTOMOLOGY <br> Bachelor of Science <br> ENTOMOLOGY MAJOR 

For Uniform Freshman Year See Page 77


| JUNIOR |  | SEMESTER | 1st | 2nd | SENIOR YEAR |  | Insect Ecology SEMESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Govt. | 232 | Amer. Govt., Func. | 3 |  | Ento. | 432 |  | 3 |  |
| Ento. | 321 | Field Crop Insects | 2 |  | Ento. | 4312 | Acarology | 3 |  |
| Hist. | 231 | Hist. of U.S. to 1865 | 3 |  | Ento. | 410 | Ento. Seminar | 1 |  |
| Bot. | 332 | Plant Path. | 3 |  | Ento. | 441 | Insect Toxicol. \& Physiol. | 4 |  |
| Zool. | 336 | Comp. Invert. Zool. | 3 |  | Electives |  |  | 8 |  |
| Agron. | 331 | For. \& Past. Crops or |  |  |  |  |  |  |  |
| Agron. Electives | 433 | Cotton Prod. | $\begin{aligned} & 3 \\ & 2 \end{aligned}$ |  |  |  |  |  |  |
| Ento. | 334 | Insect Morph. |  | 3 | Ento. | 431 | Ag. Compounds |  | 3 |
| Bot. | 331 | Plant Physiol. |  | 3 | Ento. | 4311 | Medical Ento. |  | 3 |
| Ento. | 335 | Insect Taxonomy |  | 3 | Ento. | 421 | Immature Insects |  | 2 |
| Hist. | 232 | Hist. of U.S. since 1865 |  | 3 | Electives |  |  |  | 9 |
| Hort. | 233 | Annuals \& Perennials or |  |  |  |  |  |  |  |
| Hort. | 232 | Trees \& Shrubs or |  |  |  |  |  |  |  |
| Hort. | 338 | Turfgrass Mgt. |  | 3 |  |  |  |  |  |
| Agron. | 341 | Fund. Prin. of Genetics |  | 4 |  |  |  |  |  |
|  |  | Total credit hours | 19 | 19 |  |  | Total credit hours | 19 | 17 |

 either German or French. Courses in physics, statistics, and advanced mathematics are also strongly urged

## 432. Insect Ecology. (3:2:3)

Prerequisite: An introductory course in entomology. The adaptation of the insect to its biological and physical world. Population dynamics, macro- and micro-habltants, and insect responses. Fall semester only.

## 433. Insect Natural History. (3:2:2)

Prerequisite: Junior standing, Biol. 141-142. An introductory course for nonmajors. The resources of the insect as applied to our understanding of life, the animal world, and man's relationship to insects.

## 4311. Medical Entomology. (3:2:3)

Prerequisite: Advanced standing in zoology, pre-med, or agriculture. Insects, mites, and ticks as vectors of human disease and as pests. Spring semesters on even numbered years only.

## 4312. Acarology. (3:2:3)

Prerequisite: Advanced standing in zoology, pre-med, or agriculture. The systematics, life histories, and control of mites affecting man, animals, and plants. Spring semester only.

## FOR GRADUATES

521. Advanced Economic Entomology. (2:2:0)

Prerequisite: Ento. 231, Ento. 321, or graduate standing. Factors influencing insect control with special emphasis on the principles of insect control, resistance, and new control measures, as they relate to specific insect problems.
522. Literature and History of Entomology. (2:2:0)

Prerequisite: A basic entomology course, permission of the instructor, or graduate standing. The background and development of entomology as a science is traced through its historical literature. Concepts of insect life and taxonomy from the ancients down to modern genetic concepts are developed.

## 523. Advanced Insect Taxonomy. (2:0:6)

Prerequisite: Basic entomology and Ento. 334, Ento. 335, or permission of the instructor. Description, keys and literature for determining insects to genus and species. A specialized group will be assigned for detailed study.

## 531. Entomology Research. (3)

Prerequisite: Consent of major professor. An outline of a specific problem of specialized study not included in regular course work. May be repeated for credit with approval of major professor.
631. Master's Thesis. (3)

Enrollment required at least twice.

# School of Arts and Sciences 

S. M. Kennedy, Dean<br>Office: Ad. 206<br>Ivan L. Little, Associate Dean<br>Office: Ad. 206<br>Biology<br>Chemistry<br>Education and Philosophy<br>English<br>Foreign Languages<br>Geosciences<br>Government<br>Health, Physical Education, and Recreation for Men<br>Health, Physical Education, and Recreation for Women<br>History<br>Journalism<br>Mathematics<br>Music<br>Physics<br>Psychology<br>Sociology and Anthropology<br>Speech<br>Biblical Literature*

## Aims of the School

The primary function of the School of Arts and Sciences is to provide a liberal education for its students. Through the programs offered by its 17 departments, the school aims to develop habits of independent and creative thinking which will enrich the lives of its graduates and enable them to become participating members of their community. Through its courses in the liberal arts and the sciences the school also provides the background for further specialization and is of special value to the student who comes to college without a predetermined field of study. Although it is one of the traditions of American education that the student shall have the right to select for himself the areas of study he wishes to follow, experience has demonstrated that certain studies are of fundamental importance, not only in providing a base from which to explore more definitive realms of knowledge, but also in affording lifelong personal satisfaction and enjoyment. These basic studies are to be found among those offered by the School of Arts and Sciences.

[^12]The work offered in this school is most diversified. Herein the student can learn of the society in which he lives and how that society developed through its history, its literature, its art and music. Through political science the student learns how society governs itself; and through the physical and biological sciences he learns the fundamental laws of the universe. The student is enabled to broaden his concepts and by liberal education to attain values which last a lifetime.

The following pages give in detail the programs and courses offered by the School of Arts and Sciences.

## Admission and Registration

Admission to the School of Arts and Sciences, as to the other schools of Texas Technological College, is granted by the Dean of Admissions, to whom all correspondence concerning admission should be addressed. Admissions are discussed earlier in this catalog under the section entitled "General Regulations."

## Course Load

Entering freshmen are expected to follow the program outlined below during their first year in college:

Sem. Hrs.

1. English composition
2. Mathematics, foreign language, science, or history ...... 20-22
3. Electives, if not included under 2 above .................................. 6
4. Physical education, band, or basic ROTC ............................... 2-3

Total for both semesters of freshman year .................... 34-37
The entering freshman develops his program in conference with his academic adviser, to whom he is assigned for his first year in college. The student reports to his adviser for such individual conferences or group meetings as are needed for the purpose of orienting himself to academic regulations and procedures, curricula, and degree requirements in the student's various areas of interest.

Though advice and counsel are always available, the student should learn early in his college life to assume responsibility for his actions and decisions. These should be based upon the following generalizations:

Required freshman courses should be taken during the freshman year and not postponed. During the sophomore year the student should take the second year of English and physical education, band, or basic air or military science, and should remove all unabsolved freshman requirements. No student will be classified as a senior unless he has completed four separate semesters of physical education, basic air or military science, or band. Furthermore, students who postpone taking required freshman subjects until the senior year must still take such subjects, though the credit therefrom will not apply toward the hours required for a degree. For the purpose of this regulation a senior is considered as a student with a minimum of 96 semester hours to his credit.

From 6 to 12 semester-credit hours of advanced ROTC may be counted toward degree requirements as electives, subject to the ap-

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proval of the head of the department in which the student takes his major.

The amount of work normally carried by a student in the School of Arts and Sciences should not exceed 17 hours per semester. Unless specifically prescribed by a particular curriculum, loads exceeding 17 hours or loads of less than 12 hours must have the specific approval of the dean. In calculating the load, the dean will consider all active correspondence courses, grade-point averages, and the student's extracurricular work.

## Curricula

The student should note carefully any particular requirements indicated by a department in which he plans to major or minor. Courses are listed below by departments. Each course offered is listed by name and number, and many include brief descriptions.

An examination of these course descriptions will reveal that many subjects are covered to meet different interests and purposes. Some courses are open to all students, while others are for the specialist in that area. The student thus has an opportunity to take courses which broaden his educational experience or which provide concentration in a particular subject. The wise student will include courses of both kinds.

## Honors Program

For information on objectives, provisions, and requirements which the School of Arts and Sciences shares with other schools that offer honors programs, please see Page 74. In addition to these general statements, the following policies apply specifically to the Honors Program offered by the School of Arts and Sciences:

1. Both freshman and sophomore students are permitted to enroll in this Honors Program. Enrollment is earned competitively: CEEB scores, previous records, and an interview determine whether an entering freshman is to be admitted. A grade-point average of 3.5 or above and an interview determine whether a student is to be admitted during his sophomore year. Both freshmen and sophomores known to have outstanding records are invited to come for interviews. Those who have outstanding records but who have received no invitation are encouraged to make inquiries.
2. To remain in the Honors Program offered by the School of Arts and Sciences, the student who elects a course in which an honors section is available must enroll in the honors section.
3. A student who enters this Honors Program as a freshman shall take at least 40 hours of honors courses before he is graduated; a student who enters the program as a sophomore shall take at least 30 hours of honors courses before he is graduated. Individual departments may require higher minima for graduation within the Honors Program.
4. To remain in this Honors Program, a student must have a minimum of 2.6 overall grade-point average when he has completed 32 semester hours; a minimum of 2.8 when he has completed 64 semester
hours; and a minimum of 3.0 when he has completed 96 semester hours.
5. Each honors student must, during his junior or senior year, take a special thesis course for from 3 to 6 hours' credit.
6. To qualify for graduation in this Honors Program, a student must present a minimum overall grade-point average of 3.0 , and is subject to higher requirements by the department in which he majors.
7. In addition to the requirements for graduation established by the Honors Council of the School of Arts and Sciences, individual departments may ask that other requirements be met by students who pursue degrees in the Honors Program.

The Dean of Arts and Sciences administers the Honors Program through departmental channels, an Honors Council, the Chairman of Honors (Associate Dean), and an Honors Director. The Honors Council consists of faculty representatives from major areas of the School: mathematics, the natural and social sciences, fine arts, and the humanities. Students interested in the program are encouraged to consult with any or all of these personnel.

## Programs of Study

The School of Arts and Sciences offers programs of study leading to the following degrees: Bachelor of Arts, Bachelor of Science, Bachelor of Science in Education, and Bachelor of Music.

Requirements for each of these degrees, together with certain departmental and interdepartmental curricula and area programs appropriate to these degrees, are to be found on the pages immediately following.

## Bachelor of Arts

The curriculum established for the Degree of Bachelor of Arts is designed specifically to provide the foundation of a liberal education through a well-rounded study of the humanities and the physical, biological, and social sciences. It provides also the factual basis and the insights requisite for specialized study and professional work in these fields.

The following requirements for the Degree of Bachelor of Arts also apply to all other degrees offered by the School of Arts and Sciences unless specifically shown to the contrary:

Sem. Hrs.

1. English
2. Foreign language ............................................................................ 12-14*


[^13]4. Government 231-232 ..... 6
5. American history ..... 6
6. Six hours of a social science above the freshman level other than major or minor. (Certain courses in journ- alism and philosophy may be counted in this category. Check dean's office.) ..... 6
7. Laboratory science ..... 8-16*
8. Fine arts ..... 6
9. Major, minor, and electives sufficient with the above-mentioned courses to total a minimum of 123 semesterhours not including physical education, band, or basicROTC.
10. Physical education, band, or basic ROTC ..... 4-6
The student should have selected his major and minor fields by the time he reaches his junior year. For the major subject he will be required to complete 24 semester hours in addition to the minimum degree requirements in that subject, except in English. In the case of a subject offered as a major in which no specific courses are included in the prescribed requirements for the Bachelor of Arts Degree, a minimum of 30 semester hours must be completed in the major subject.
Eighteen hours of the major subject must be in courses of junior and senior rank. For the minor a minimum of 18 semester hours must be completed, at least 6 of which must be of junior or senior rank. All courses in the major and minor subjects must be approved by the head of the department concerned.

- A minimum of 40 semester hours of junior and senior work must be presented for graduation.
Not more than 42 semester hours in one subject may be counted in the requirement for the Bachelor of Arts Degree. Not more than 12 hours in Biblical history and literature may be counted; not more than 8 hours may be counted in applied music and/or music ensemble, except for students offering music as a major or minor. Courses in shorthand and typewriting may not be offered for this degree.
In the majority of cases, students completing the requirements for the Degree of Bachelor of Arts will carry their major and minor work in departments of this school.


# Bachelor of Arts-Interdepartmental Curricula 

## Bilingual Secretarial Program (French, German, Spanish)

This course of study is offered jointly by the Department of Foreign Languages and the Department of Business Education and Secretarial Administration (of the School of Business Administration). It is designed for students who wish to enjoy the benefits of a liberal education and at the same time prepare themselves in an occupational field.

[^14]Students following this course of study receive the Bachelor of Arts Degree by fulfilling the basic requirements for that degree. They major in French, German, or Spanish, and complete a minor in an academic subject.

In addition, they take up to 25 hours in the Department of Business Education and Secretarial Administration from the following courses: Sec. Ad. 121, 122, 131, 132, 235, 321, 322, 331 or 332, and 333. Credit is allowed in typewriting and shorthand only for those completing the course of study and upon demonstration of competence in both fields.

Students interested in this program should consult the Head of the Department of Foreign Languages for information concerning it and future employment opportunities.

## Latin American Area Studies

This course of study is planned to give students a well-rounded liberal education in several interrelated fields, coupled with the training needed for employment in export-import houses, manufacturing concerns, shipping companies, airway systems, banking institutions, government offices; or for journalism, translating, or interpreting. The program also offers students excellent preparation for graduate work in area studies.

Students following this program will take an interdepartmental major in Latin American area studies. The basic preparation for the major is fulfillment of the minimum requirements for the Bachelor of Arts Degree, which total 56 to 62 semester hours, depending on high school preparation. Foreign language study should include completion of Spanish 331-332. Economics 231-232 should be included as a prerequisite for economics courses in the Latin American area.

Required for the major. 30 semester hours from the Latin American content courses listed below:

Government: 3 to 6 hours in 4374, 4375.
Economics: 3 hours in 339.
Anthropology, History, and Sociology: 9 to 15 hours in Anthropology 4314, History 4321, 4322, 4323, 4324, Sociology 336.

Spanish: 6 to 12 hours in 4324, 4325, 4326, 4327, 4328-4329;
or 12 hours of Portuguese or French. (If Portuguese or French is chosen, 36 hours are required in the major.)
Minor. The minor of 18 semester hours may be chosen from any of the fields listed under the major (in which case the same course may not be counted for both the major and the minor), or from any field in the College in which a minor is customarily taken.

Students wishing to major in Latin American area studies should consult the head of the Foreign Languages, History, or Government Department.

## Teacher Education

The standard requirements of the Bachelor of Arts Degree are sufficiently flexible to enable those seeking certification to secure
certificates upon the completion of the appropriate requirements, including preparation in teaching fields and professional education courses. The teacher education program at Texas Tech is described earlier in this catalog in the section entitled "Interdepartmental Programs."

## Recreation

The student who is interested in positions of leadership in recreation, rather than in teaching, should select the Bachelor of Arts Degree. This degree offers a broad liberal background. The completion of a major in recreation prepares the student for positions in city recreation programs, camps, and allied areas.

The general requirements for the Bachelor of Arts Degree will be met. A recreation major must complete work in two areas, sports and dance, and a choice of one of the following: arts and crafts, music, dramatics, or park administration. Programs and requirements for the Degree of Bachelor of Arts with a major in recreation are set forth in detail in the course listings of the Departments of Health, Physical Education, and Recreation for Men, and Health, Physical Education, and Recreation for Women, respectively.

## Preparation for the Study of Law

Schools of law usually do not require specific courses as part of their admission requirements. Instead, they expect students to be intellectually mature and well grounded in the fundamentals of a liberal education. While many schools of law admit students who have completed only three years of preprofessional work, it is to be noted that a high percentage of those students admitted have their baccalaureate degrees. Hence the pre-law student should keep constantly in mind the various requirements for the bachelor's degree.

The following curriculum is suggested for those who contemplate the study of law. Freshman Year: The freshman curriculum outlined above should be followed but should include History 133-134 and Government 231-232. The courses in the freshman year will vary somewhat depending upon whether or not the student intends to complete a degree before going to law school. Sophomore Year: English 231-232, History 231-232, advanced government courses, and Economics 231-232 should be taken. If a foreign language was begun in the freshman year, it should be continued. The student should consult his adviser concerning other courses. Junior and Senior Years: The student should decide upon his major and minor subjects by the beginning of his junior year, and if he expects to earn his Bachelor of Arts Degree, he should work out a degree plan during his junior year. Electives should be chosen chiefly from the social sciences.

## The Degree of Bachelor of Arts for Pre-Law Students

The Bachelor of Arts Degree for pre-law students may be obtained in one of two ways:
A. By completing the degree requirements prescribed in this catalog while in residence at Texas Technological College.
B. By completing three years of work in the School of Arts and Sciences, totaling a minimum of 96 semester hours, by graduation from a three-year standard law school, and subject to the following regulations:

1. Of the three years of preprofessional work, at least the junior year must be completed in residence at this College.
2. The three years' work must satisfy all graduation requirements for the Bachelor of Arts Degree in Texas Technological College with the exception of the requirements in the major field.
3. A minimum of 18 semester hours of pre-law work should be in one social science and a minimum of 18 hours in one or more of the other social sciences.
4. In lieu of the completion of an undergraduate major, the applicant for the Bachelor of Arts Degree must present credentials showing graduation from an approved law school, together with a request for the granting of the Bachelor of Arts Degree from Texas Technological College.
The Head of the Department of Government is the official College adviser for pre-law students, and recommendations to the law schools should be channeled through him. Regardless of their major field of interest, pre-law students should consult him for counseling and guidance in planning their programs.

## Studies Preparatory to Medicine and Dentistry

Colleges of medicine and dentistry require an applicant to present a certificate of graduation from an accredited high school, together with a minimum of two years of college work. Most medical schools require three years of college work, and many require a bachelor's degree. The course of study meets the usual requirements for entrance to medical school. For pre-dentistry students, certain modifications may be advisable.

The pre-medical program is not designed to meet the minimum requirements of any specific medical school, but is planned to fit the student for the successful study of medicine. Each student is charged with the responsibility for knowing any special requirements of the medical school which he plans to attend and should consult a premedical adviser at each registration period. Application for admission to the professional school should be made through the office of the Chairman of the Pre-Medical Advisory Committee. Professional aptitude and admission tests may be taken at Texas Technological College.

## The Degree of Bachelor of Arts for Pre-Medical or Pre-Dental Students

The Degree of Bachelor of Arts for pre-medical or pre-dental students may be obtained in one of two ways.
A. While in residence at Texas Technological College by completing the requirements for a B.A. as outlined above on Page 117.

## PRE-MEDICAL AND PRE-DENTAL CURRICULUM



The major selected depends on the interest of the student. The degree plan will normally include all the courses indicated above in the course of study for pre-medical and pre-dental students, and should be worked out with proper departmental advisers.
B. By completion of three years of work in the School of Arts and Sciences, totaling a minimum of 100 semester hours, and graduation from a Class A medical or dental college. The following regulations apply:

1. Of the three years of preprofessional work, at least the junior year must be completed in residence at this College. This minimum will apply to transfers from other colleges, provided they have satisfactorily completed the work outlined in the freshman and sophomore years or its equivalent.
2. The three years of work must satisfy all graduation requirements for the Bachelor of Arts Degree at this College with the exception of the major requirements. This work will normally include all the courses mentioned in the curriculum for pre-medical students given above.
3. The applicant for a degree under this plan must submit properly approved credentials from a Class A college of medicine or college of dentistry to the effect that the applicant has completed satisfactorily the work leading to a Degree of Doctor of Medicine or Doctor of Dental Surgery. Evidence of the degree will substitute for the degree requirements in a major field.

## Bachelor of Arts with a Major or Minor in Another School

Students wishing to do so may receive the B.A. Degree while completing either a major or minor in departments of other schools. In all such cases the major and minors taken in another school are governed by the same regulations as apply to majors and minors taken in this school. But no more than 24 semester hours in the technical or professional subjects of agriculture, business administration, engineering, and/or home economics may be offered, as electives, for the Degree of Bachelor of Arts.

## Art

Texas Technological College has two strong departments related to art. Allied Arts is associated with Architecture in the School of Engineering, and the Department of Applied Arts is in the School of Home Economics. The earning of a B.A. Degree from the School of Arts and Sciences with a major in either (or both) of these departments will provide the student with an excellent background for the enjoyment of art as well as professional preparation in certain areas. For further information, students should consult the department head concerned.

## Economics

Students in the School of Arts and Sciences may earn the B.A. Degree with either a major or minor in the Department of Economics,
which is in the School of Business Administration. Such a program affords the student an opportunity to receive both a broad liberal education and rigorous training in the tools of scientific economic analysis. The core of required economics courses within the major is small. It includes one year of principles of economics, one year of economic theory, and one year of the development of economic ideas. Considerable latitude thus exists for the student to select additional courses from among such areas as international economics, mathematical economics, comparative economic systems, labor economics, public finance, and business economics. Students complement their major in economics by choosing minors in relevant academic disciplines within the various schools of the College.

The Department of Economics also offers a minor program to those students interested in a less intensive survey of the subject. Minor work in economics will complement majors in the School of Arts and Sciences and other schools of the College.

The Department of Economics cooperates in the Latin American Area Studies program and the Teacher Education program. Students may also wish to consider the sophomore course in principles of economics as an elective. In addition, junior and senior courses can be elected by anyone who has had a year of sophomore principles.

Students interested in discussing a major or minor in economics should confer with the Head of the Department of Economics.

The combination of a liberal arts education and economic science constitutes an increasingly popular and effective road to careers in business, government, and the legal profession. Professional economists with graduate training also find opportunities in teaching and public and private research.

## Engineering

Students desiring a broader approach upon which to base their studies in engineering may receive the Degree of Bachelor of Arts by completing three years' work in a school of arts and sciences with a minimum of 100 semester hours' work, and by completion of the requirements for one of the degrees of Bachelor of Science in Engineering at this College. The three years' work must satisfy all graduation requirements for the Degree of Bachelor of Arts at Texas Technological College with the exception of the major requirements. The Degree of Bachelor of Science will substitute for the major requirements. Students may transfer from other institutions to the School of Arts and Sciences and complete their requirements provided that at least the equivalent of the junior year is taken in this school, but students who have completed more than one year in engineering at this College or elsewhere are not eligible to participate in this program.

## Bachelor of Science

For students primarily interested in the natural sciences and mathematics, the School of Arts and Sciences provides curricula

## BACTERIOLOGY CURRICULUM

## Bachelor of Science



* See chemistry requirement options.


## BOTANY CURRICULUM

## Bachelor of Science

| FRESHMAN AND SOPHOMORE YEARS | SEMLESTER | 1st | 2nd | JUNIOR AND SENIOR YEARS SEMESSTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Biol. 141 Botany |  | 4 |  | Bot. 331 Plant Physiol. | 3 |  |
| *Chem., Geol., or Phys. (beginning course) |  | 8 |  | Bact., Biol., or Bot. (junior or senior) | 6 |  |
| Math. 133 Col. Alg. |  | 3 |  | Biol. 331 Heredity | 3 |  |
| Eng. 131 Col. Rhet. |  | 3 |  | Chem., Geol., or Phys. (beginning course) | 4 |  |
| Eng. 231 Mast. of Lit. |  | 3 |  | Science electives | 6 |  |
| Foreign language |  | 4 |  | Foreign language | 3 |  |
| Bot. 231 Survey Plant Groups |  | 3 |  | Hist. 231 Hist. of U.S. to 1865 | 3 |  |
| Zool. 231 Comp. Vert. Anat. |  | 3 |  | Govt. 231 Amer. Govt., Org. | 3 |  |
| P.E., Band, or Basic ROTC |  | 2-3 |  | Elective | 2 |  |
| Biol. 142 Zoology |  |  | 4 |  |  |  |
| Chem., Geol., or Phys. (beginning course) |  |  | 8 | Bot. 339 Plant Anat. |  | 3 |
| Math. 131 Trigonometry or |  |  |  | Bact., Biol., or Bot. (junior or senior) |  | 3 |
| Math. 136 Elem. of Math. Sys. | . |  | 3 | Chem., Geol., or Phys. (beginning course) |  | 4 |
| Eng. 132 Col. Rhet. |  |  | 3 | Science electives |  | 9 |
| Eng. 232 Mast. of Lit. |  |  | 3 | Foreign language |  | 3 |
| Foreign language |  |  | 4 | Hist. 232 Hist. of U.S. since 1865 |  | 3 |
| Bot. 232 Taxonomy |  |  | 3 | Govt. 232 Amer. Govt., Func. |  | 3 |
| Zool. 232 Comp. Vert. Anat. |  |  | 3 | Biol. 411 Seminar |  | 1 |
| P.E., Band, or Basic ROTC |  |  | 2-3 | Elective |  | 6 |
| Total credit hours |  | 33-34 | 33-34 | Total credit hours | 33 | 35 |

* This curriculum requires the completion of the freshman year in chemistry, geology, and physics.


## ZOOLOGY CURRICULUM

Bachelor of Science


* This curriculum requires the completion of the freshman year in chemistry, geology, and physics.


## CHEMISTRY CURRICULUM

Bachelor of Science

 courses to take in his first year, he must consult with an adviser in the Chemistry Department.
**"Science electives" are Biology 141-142 and Geology 141-142. Physics 143 and 241 are required in this curriculum
$\dagger$ The minor will be chosen in biology, geosciences, mathematics, or physics. If mathematics be chosen, 3 of these hours become free elective.
$\dagger \dagger$ Senior chemistry courses to be chosen from the following list: Chem. 431 or Chem. 432
Chem. 436 or Chem. 437

Chem. 4312

## GEOLOGY CURRICULUM

## Bachelor of Science

| FRESHMAN | YEAR |  | SEMESTTER | 1st | 2nd | SOPHOMORE | YEAR | SEMESTEER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Eng. | 131 | Col. Rhet. |  | 3 |  | Eng. | 231 | Mast. of Lit. | 3 |  |
| Geol. | 141 | Phys. Geol. |  | 4 |  | Phys. | 141 | Gen. Phys. | 4 |  |
| Chem. | 141 | Gen. Chem. |  | 4 |  | Geol. | 241 | Mineralogy \& Petrography | 4 |  |
| Math. | 133 | Col. Alg. |  | 3 |  | Math. | 132 | Anal. Geom. | 3 |  |
| P.E., Band, | or Basic | ROTC |  | 1-2 |  | For. Lang. | 141 |  | 4 |  |
|  |  |  |  |  |  | P.E., Band, or | ROTC |  | 1 |  |
| Eng. | 132 | Col. Rhet. |  |  | 3 | Eng. | 232 | Mast. of Lit. |  | 3 |
| Geol. | 142 | Hist. Geol. |  |  | 4 | Phys. | 142 | Gen. Phys. |  | 4 |
| Chem. | 142 | Gen. Chem. |  |  | 4 | Geol. | 242 . | Mineralogy \& Petrography |  | 4 |
| Math. <br> P.E., Band, |  | Trigonometry |  |  | 3 | Math. | 231 | Calculus I |  | 3 |
|  | or Basic | ROTC |  |  | 1-2 | For. Lang. <br> P.E., Band, o | $\begin{aligned} & 142 \\ & \text { ROTC } \end{aligned}$ |  |  | 4 1 |
|  |  | Total credit hours |  | 15-16 | 15-16 | Total credit hours |  |  | 19 | 19 |
| JUNIOR YEAR |  | Geomorphology Paleontology Amer. Govt., Org. Calculus II | SEMMESTER | 1st | 2nd |  |  |  |  |  |
| Geol. | 331 |  |  | 3 |  | SUMMOER FOLLOWING JUNIOR YEARGeol.G |  |  | 6 |  |
| Geol. | 335 |  |  | 3 |  |  |  |  |  |  |
| Math. | 231 |  |  | 3 3 |  | SENIOR YEAR |  | Sedimentation SEMESTER | 1st | 2nd |
| For. Lang. | 231 |  |  | 3 |  | Geol. | 437 |  | 3 |  |
| Elective |  |  |  | 3 |  | Geol. | 431 | Opt. Mineralogy \& Petrography Hist. of U.S. to 1865 | 3 |  |
|  |  |  |  |  |  | Hist. | 231 |  | 3 |  |
| Geol. | 332 | Struct. Geol. |  |  | 33 | Elective |  | Hist. od U.む. to 1865 | 6 |  |
| Geol. | 336 232 | Paleontology Func. |  |  |  |  |  |  |  |  |
| Govt. | 232 | Amer. Govt., Func. |  |  | 3 3 | Geol. <br> Geol. <br> Hist. <br> Elective | 432 |  | Opt. Min. \& Petr. <br> Prin. of Stratig. <br> Hist. of U.S. since 1865 |  | 3 |
| For. Lang. Elective | 232 |  |  |  | 3 |  | 2314 | 3 3 |  |  |
|  |  |  |  |  |  |  |  | 6 |  |  |
|  |  | Total credit hours |  | 18 | 18 |  |  | Total credit hours | 15 | 15 |

## GEOLOGY MAJOR, PALEONTOLOGY CURRICULUM

Bachelor of Science


## GEOLOGY MAJOR, GROUND WATER CURRICULUM

Bachelor of Science


## GEOCHEMISTRY CURRICULUM

## Bachelor of Science



## GEOPHYSICS CURRICULUM

## Bachelor of Science



## MATHEMATICS CURRICULUM

Bachelor of Science

| FRESHMAN YEAR |  | SEMESTER 1st | 2nd | SOPHOMORE YEAR |  | SEMESTER 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Math. 132 | Anal. Geom. | 3 |  | Math. 331 | Calculus III | 3 |  |
| Math. 231 | Calculus I | 3 |  | Eng. 231 | Mast. of Lit. | 3 |  |
| Eng. 131 | Col. Rhet. | 3 $3-4$ |  | Foreign language |  | 3-4 |  |
| Foreign language |  | $3-4$ 4 |  | Science (for minor) |  | 3-4 |  |
| P.E., Band, or Basic | ROTC | 1 |  | P.E., Band, or Basic | ROTC | 1-2 |  |
| Math. 136 | Elem. of Math. Sys. |  | 3 | Math. 233 | Linear Alg. |  |  |
| Math. 232 | Calculus II |  | , | Eng. 232 | Mast. of Lit. |  | 3 |
| Eng. 132 | Col. Rhet. |  | 3-4 | Foretgn language |  |  | 3 |
| Foreign language |  |  | 3-4 | Science (for minor) Science elective |  |  | 3-4 |
| P.E., Band, or Basic | Rotc |  | 1 | P.E., Band, or Basic | ROTC |  | 1-2 |
|  | Total credit hours | 17-18 | 17-18 |  | Total credit hours | 17-19 | 17-19 |


| JUNIOR AND SEN | $R$ YEARS | SEMCESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: |
| Math. 332 | Diff. Equat. |  | 3 |  |
| Math. 434 | Adv. Calculus |  | 3 |  |
| Govt. 231 | Amer. Govt., Org. |  | 3 |  |
| Hist. 231 | Hist. of U.S. to 1865 |  | 3 |  |
| Science (for minor) |  |  | 6 |  |
| Approved electives |  |  | 12 |  |
| Math. 4321 | Elem. Mod. Alg. |  |  | 3 |
| Govt. 232 | Amer. Govt., Func. |  |  | 3 |
| Hist. 232 | Hist. of U.S. since 1865 |  |  | 3 |
| Math. electives |  |  |  | 9 |
| Science (for minor) |  |  |  | 6 |
| Approved elective |  |  |  | 3 |
|  | Total credit hours |  | 30 | 27 |

The Department of Mathematics section of this bulletin should be consulted regarding admission requirements for Math. 132. If a student is required to take Math. 131 and 133 prior to enrollment in Math. 132, the effect will be an increase of 6 hours of mathematics in his major requirements.
 from German, French, or Russian, unless his language background in such as to warrant the choice of another language.

Science electives must be chosen from courses offered in Biology, Chemistry, Physics, or Geosciences. Courses are required in at least one field outside the rainor.

## PHYSICS CURRICULUM

## Bachelor of Science



Science electives to be chosen from courses offered in Biology, Chemistry, or Geosciences Department.
See approved list of social sciences and humanities electives in the departmental office.
Any deviations from prescribed course requirements must be approved by the Head of the Department.

## ELEMENTARY EDUCATION CURRICULUM

## Bachelor of Science in Education

Students preparing to teach in the elementary school are advised to follow the four-year sequence outlined below:


## SECONDARY EDUCATION CURRICULUM <br> Bachelor of Science in Education

Students preparing to teach in the secondary school are advised to follow the four-year schedule outlined in the following. Special attention should be given to the selection of teaching fields, since completion of most of the work in these fields is required as a prerequisite to student teaching.


* See fields of academic specialization, Page 69.

SECONDARY EDUCATION CURRICULUM, PHYSICAL EDUCATION, MEN
Bachelor of Science in Education


- Department requirement. Must complete work in this course, but one aemester hour credit will not count.
* Required physical education.

Appropriate courne aubatitutions will be made when necesaary.

## SECONDARY EDUCATION CURRICULUM, PHYSICAL EDUCATION, WOMEN* <br> Bachelor of Science in Education



[^15]leading to the Degree of Bachelor of Science. The fundamentals of liberal education as well as the foundation courses necessary for advanced study in the fields of science and mathematics are emphasized in the requirements for this degree. The minimum requirements for this degree, in terms of semester hours, are as follows:

## Sem. Hrs.

1. English .................................................................................................. 12
2. Foreign language ............................................................................ 12-14
3. Mathematics .............................................................................................. 6
4. American history ........................................................................................ 6

5. Additional courses to make a minimum total of 124 semester hours, not including required physical education, band, or basic ROTC.
6. Physical education, band, or basic ROTC ............................ 4-6

Both a major and a minor are required for the Bachelor of Science Degree and each is to be completed within one of the separate subject matter fields of bacteriology, botany, chemistry, geosciences, mathematics, physics, or zoology. The minimum requirements for the major and minor are 36 and 18 semester hours, respectively, including the required amount of advanced work.

Unless indicated to the contrary in a specific curriculum, two semesters of courses are to be taken in at least three of the four fields of science: biology, chemistry, geosciences, and physics.

## Bachelor of Science in Education

The curriculum for the Degree of Bachelor of Science in Education has been designed especially for those who plan to make a career of teaching in the elementary or secondary schools. It also provides the necessary foundation for those who wish to go on to graduate work in order to qualify as school administrators, supervisors, guidance and counseling specialists, curriculum directors, or special school service personnel. In accordance with the choice of the individual student his degree program will satisfy the legal requirements of Texas for a teaching certificate at the appropriate level and in the desired field. Requirements for the teaching certificate must be completed by the time of graduation.

The nature and conduct of the teacher education program has been discussed earlier in this catalog under the section entitled "Interdepartmental Curricula." Below are discussed the specific courses required by students working toward the Bachelor of Science in Education.

At Texas Tech courses in professional education required of each person who receives a certificate to teach in the public schools of Texas are grouped in the junior and senior years. These must be taken in the following sequence in order to avoid conflicts and to insure that semester-hour requirements in the teaching fields and specialization areas are met before student teaching is done.

## FOR ELEMENTARY TEACHERS

## Junior Year

First Semester
Educ. 332-Educ. Psy.
Educ. 3346-Child Devel. \& the Elem. School Curric.

## Second Semester

Educ. 3344-Lang. Arts in the Elem. School Curric.
Educ. 3345-Soc. Stud. in the Elem. School Curric.

## Senior Year

Fall or Spring
Student teaching semester (May be taken spring or fall)
Educ. 461-Stud. Teaching
Educ. 4342-Teaching Reading in the Elem. School
Educ. 4343-Teaching Science in the Elem. School or
Educ. 4341-Teaching Arith. in the Elem. School

## Fall or Spring

Other Senior semester
Educ. 4344-Children's Lit.
Educ. 4343-Teaching Science in the Elem. School
or
Educ. 4341-Teaching Arith. in the Elem. School

FOR SECONDARY TEACHERS

Junior Year
Educ. 332-Educ. Psy. Educ. 330-Found. of Secon. Educ.
Educ. 334-Curric. Devel. in Secon. Educ.

## Senior Year

Educ. 436-Teaching in Secondary Schools.
Educ. 462*-Stud. Teaching in the Secon. School.

## Bachelor of Science in Education-Elementary Level

The minimum requirements for the Degree of Bachelor of Science in Education-elementary level-are as follows:

Sem. Hrs.

1. English ....................................................................................................... 12
2. Mathematics 135 .................................................................................. 3
3. Government 231-232 ..................................................................................... 6
4. American history ...................................................................................... 6
5. Laboratory science .................................................................................................
6. Philosophy 230 ........................................................................................ 3

7. Sociology 230 .................................................................................. 3
8. Economics 237 ............................................................................................ 3
9. Speech 239 ................................................................................................... 3

[^16]11. Academic specialization:
Plan I
a. One of fields listed on Page 69 ..... 18*
b. Music Education 231, 232; Applied Arts 337, 338;
Physical Education 230, 233 ..... 18
or
Plan II
a. One of fields listed on Page 69 ..... 24*
b. Music Education 231 or 232; Applied Arts 337; Physical Education 230, 233 ..... 12
12. Professional education and elementary content courses ..... $30^{* *}$
13. Electives to reach total of 124 hours, not including physical education, band, or basic ROTC
14. Physical education, band, or basic ROTC ..... 4-6
The courses indicated in the following programs, for both elementaryand secondary education, may be used to satisfy requirements forteachers' certificates valid in Texas and other states. Students wishingto qualify for teaching positions in other states may consult the Headof the Department of Education or the Director of Teacher Certifica-tion for assistance in obtaining information about certification require-ments in these other states.
Bachelor of Science in Education-Secondary Level
The minimum requirements for the Degree of Bachelor of Sciencein Education-secondary level-including physical education are asfollows:
Sem. Hrs.

1. English ..... 12
2. Mathematics or foreign languages ..... 6-8
3. Government 231-232 ..... 6
4. American history ..... 6
5. Laboratory science ..... 8
6. At least three of the following courses: Psychology 230, Physical Education 230, Speech 239, Sociology 230, Philosophy 230, fine arts (3 hours) ..... 9
7. Psychology 335 ..... 3
8. Teaching field No. 1 ..... 24***
9. Teaching field No. 2 ..... $24^{* * *}$
10. Professional education ..... $24^{* * * *}$
11. Electives to reach total of 124 semester hours, not including physical education, band, or basic ROTC**12. Physical education, band, or basic ROTC4-6
[^17]
## APPLIED MUSIC CURRICULUM, APPLIED MUSIC MAJOR* <br> Bachelor of Music



* Students majoring in voice are urged to elect additional foreign language.

MUSIC EDUCATION CURRICULUM
(Secondary Certificate; ** Voice, Piano, Orchestra, or Band Instrument)



Note that in the curriculum for secondary education, the student may select and begin work in one of the major teaching fields in the freshman year. With the approval of the deans concerned, teaching majors and minors may also be taken in other schools of the College. Each of the teaching fields calls for completion of a minimum of 24 semester hours. Certain more general teaching majors are available, such as social sciences, general science, and foreign language.

The specific work taken in each of the teaching fields must be planned in consultation with the appropriate department head. (Special requirements are made for music education [vocal and instrumental majorsl and for physical education as outlined elsewhere in this section.)

Persons planning to teach in secondary schools and who elect their broad teaching field in science will take a minimum of 48 semester hours in science. This course work must be distributed in at least three of the science departments, but work taken in the Department of Geosciences should not exceed 8 semester hours. See the course offerings of the Departments of Biology, Chemistry, and Physics for specific courses in their programs in teacher education.

## Bachelor of Science in Medical Technology

The curriculum leading to the degree of Bachelor of Science in Medical Technology requires a minimum enrollment of three academic years and one summer term in the School of Arts and Sciences and 12 months' training in a school of medical technology approved by the American Society of Clinical Pathologists. The specific courses for the degree program are listed on Page 146. Transfer students from another college or from another degree plan will be integrated into the degree program with as little loss of work and time as the requirements permit. A student is required to be in residence at the college for two semesters, during which he must complete 30 semester hours of work; at last 24 of the last 30 hours offered for credit must be completed in residence. An overall C average on work taken at Texas Technological College is required.

## Bachelor of Music

The Department of Music offers the Bachelor of Music Degree with a major in music education (instrumental or vocal); or in applied music. This degree is for the student who expects to teach or direct vocal or instrumental music in the public schools, or for the student who desires concentration in performance and studio teaching.

Minimum requirements for the Degree of Bachelor of Music are as follows:

Sem. Hrs.

2. Government ...................................................................................................................

# MEDICAL TECHNOLOGY CURRICULUM <br> Bachelor of Science 



[^18]3. American history ..... 6
4. Foreign language ..... 6-8(Additional foreign language recommended for voicemajors)
5. Science or mathematics ..... 6-8
6. Academic electives ..... 2-12
7. Professional education and student teaching (for music education majors) ..... 18
8. Applied music, music literature, music education, musictheory, music ensemble, (band, chorus, orchestra, operatheater), and free electives but not including freshmanand sophomore physical education, band, basic air ormilitary science, to total 126 semester hours (appliedmusic majors) or 136-138 semester hours (music educa-tion majors).
9. Band, basic air or military science, or physical educa- tion ..... 4-6

# Department of Biology 

Earl D. Camp, Head of the Department Office: Sci. 221<br>Professors:<br>E. D. Camp, Cross, Landwer, Prior, Proctor, Sealey, R. W. Strandtmann, Tinkle<br>Associate Professor:<br>Bodemann<br>Assistant Professors:<br>Allen, Elliot, Huddleston, Huff, Kuhnley, Lowe, ${ }^{*}$ McBride, Packard, Rowell,** Wu<br>Instructor:<br>Tilton<br>* January, 1964<br>** On leave, 1963-1964

The Department of Biology presently offers courses leading to a Bachelor of Arts Degree or to a Bachelor of Science Degree with a major in bacteriology, botany, entomology, or zoology, or to a Bachelor of Science in Medical Technology Degree. The curricula for the Bachelor of Science Degree with a major in botany or in zoology require the completion of the freshman year in chemistry, geology, and physics. The Department offers courses leading to the Degree of Bachelor of Science in Education with a major in biology. Courses leading to a master's degree with a major in botany and zoology or with a minor in bacteriology, botany, entomology, and zoology are offered.

From the standpoint of research, Texas Technological College is located in an area that has not been as intensely studied in field work

## 148 BIOLOGY

as have areas near older colleges and universities. Much work needs to be done in the taxonomy and the ecology of both plants and animals of the High Plains and adjacent areas. Both bacteriology and entomology offer much to students whose interests are in sanitation, medical technology, and agriculture.

Students majoring in bacteriology, botany, or zoology may minor in any of these fields, provided the major and minor are not in the same field. Students majoring in botany for the bachelor's degree are expected to complete as a minimum the following courses in the Department of Biology: Biology 141-142, 331, 411; Botany 231, 232, 331, 339; Zoology 231-232; and 9 additional hours in courses of junior and senior rank in bacteriology, biology, or botany. Students majoring in zoology for the bachelor's degree are expected to complete as a minimum the following courses in the Department of Biology: Biology 141142, 331, 411; Zoology 231-232; and two of the following five-Zoology 331, 332, 333, 336, 437; Botany 231,* 232*; and 9 additional hours in courses of junior and senior rank in bacteriology, biology, entomology, or zoology.

Students majoring in bacteriology will be expected to complete the following courses: Biology 141-142, 331, 411; Zoology 235-236, or $231-$ 232; Bacteriology 331, 430, 432, 433, plus 6 semester hours of bacteriology of junior and senior rank, or 3 semester hours of junior or senior rank and Zoology 333; and 3 additional semester hours of junior or senior rank offered in the Department of Biology. Dairy Industry 335 may be counted as a course of junior rank in bacteriology.

Chemistry provides an excellent minor for students majoring in bacteriology. Students majoring in bacteriology may minor in chemistry by completing the following courses: Chemistry 141-142, 241, 341, 342. If the student expects to do graduate work in bacteriology, the following courses are recommended: Chemistry 141-142, 241, 353-354. Students majoring in bacteriology who minor in fields other than chemistry are expected to complete a minimum of 12 hours in chemistry, including Organic Chemistry (Chemistry 141-142, 341; or Chemistry 141-142, 241, 341).

The program in entomology has course listings in both this department and the Department of Horticulture and Park Administration. Courses in the Biology Department stress the zoological phases of entomology, and courses in horticulture and park administration stress the applied phases. Students desiring a broad entomology background should take courses in both departments.

Students completing the Bachelor of Arts or the Bachelor of Science Degree, together with the special requirements for teacher certification, will be qualified to teach biology in the public schools of Texas. Chemistry, physics, or mathematics is recommended as a second teaching major.

Those students using biology as a teaching major for the Degree of Bachelor of Science in Education should take the following courses: Biology 141-142, 331, 411; Bacteriology 331; Botany 232; Zoology 137, 336, 437.

[^19]Students may elect a science teaching option. Under this plan a student must complete a minimum of 48 semester hours in the science departments. Eighteen of these hours must be above the sophomore level.

Students following this plan who wish a major concentration of courses in the Department of Biology should complete the following courses: Biology 141-142; Chemistry 141-142; Geology 143, 144; Physics 141-142; Biology 331, 411; Bacteriology 331; Zoology 336, 437; and 5 semester hours of junior or senior rank in biology, chemistry, or physics.

Students following this plan who wish a major concentration of courses in departments other than the Department of Biology may take any of the following combinations of courses in biology:

1. 8 semester hours: Biology 141-142.
2. 12 semester hours: Biology 141-142, 331, 411.
3. 15 semester hours: Biology 141-142, 331, 411; Bacteriology 331.
4. 18 semester hours: Biology 141-142, 331, 411; Bacteriology 331; Zoology 437.
No grade below $C$ will be accepted on the major for the bachelor's degree in the Department of Biology. No grade below $C$ will be accepted on the minor for the bachelor's degree, if the major and minor are both in the Department of Biology.

Students looking forward to a master's degree should add enough courses as electives in their proposed major and minor subjects to meet the entrance requirements of the Graduate School.

At least one course in the field is very strongly recommended for all graduate students majoring in botany or zoology. This work may be taken from this institution or at one of the mountain, seashore, or other biological field stations.

Courses numbered 300 or above in bacteriology or biology may be counted as courses of the same level either in botany or zoology.

For detailed information about requirements for the B.S. degree, see Pages 125-127, 140.

## Courses in Bacteriology FOR UNDERGRADUATES

231. Bacteriology. (3:2:3)

Prerequisite: 3 semester hours in the Biology Department. Morphology, physiology, and activities of bacteria and molds. Primarily for students of agriculture, home economles, and nursing.

## FOR UNDERGRADUATES AND GRADUATES

## 331. General Bacteriology. (3:2:3)

Prerequisite: 12 semester hours in the Department of Biology, Chemistry, Geology or Physics; prerequisite or parallel: 6 semester hours in chemistry. Morphology, physiology, classification of microorganisms and their relation to soils, food, water, disease, and the problems of immunity.
333. Communicable Diseases. (3:3:0)

Prerequisite: 3 semester hours in bacteriology; junior standing. History, prevalence, etiology, sources and modes of infection, laboratory diagnosis, and methods of control of the principal human diseases.

## 150 BIOLOGY

## 430. Advanced General Bacteriology. (3:2:3)

Prerequisite: 12 semester hours in the Department of Biology or Chemistry, and Bact. 231 or Bact. 331; prerequisite or parallel: 6 semester hours in chemistry. Advanced and detalled study of microbial morphology, composition, growth, cultivation, variation, and classification. Preparation for advanced studies in microbiology.
431. Problems in Bacteriology. ( $3: 0: 9$ )

Prerequisite: 6 semester hours of bacteriology. Selected problems in the various fields of bacteriology, according to the needs or interests of the student. May be repeated or taken parallel for full credit in another fleld or with new materials in the same field.

## 432. Immunology and Serology. (3:2:3)

Prerequisite: 6 semester hours of bacteriology; 10 semester hours of chemistry. Theorles of infection and resistance, the production and demonstration of antibodies as well as the action of antigens and the various diagnostic tests.

## 433. Physiology of Bacteria. (3:2:3)

Prerequisite: 6 semester hours of bacteriology; 12 semester hours of chemistry. Chemistry and physiology of bacteria and related microorganisms; the influence of environment on bacterial metabolism, growth and reproduction.

## 434. Pathogenic Bacteriology. (3:2:3)

Prerequisite: Bact. 430 or Bact. 333. Principles of diagnostic microbiology relating to the etiological agents of infectious disease. Laboratory procedures in the isolation, identification, and drug susceptibilities of these agents.

## 531. Research in Microbiology. (3:0:9)

Prerequisite: Bact. 331, 430, graduate standing, and consent of the instructor. Research problems in selected areas in microbiology. May be taken more than once for credit.

## 532. Selected Topics in Microbiology. (3:3:0)

Prerequisite: Bact. 331, 430, graduate standing, and the consent of the instructor. Study of advanced concepts of microbiology. Topics to include genetics, virology, applied microblology, morphology and/or other selected topics of current interest. May be taken more than once for credit.

## Courses in Biology

## FOR UNDERGRADUATES

## 141-142. Botany and Zoology. (4:3:3 each)

Both botany and zoology are offered each semester; either may be taken first, but both, or their equivalents, must be completed before credit is received toward a degree. Biol. 141, botany, emphasizes the important groups of plants. In Biol. 142 a survey of general zoology is given, with emphasis on the vertebrates, protozoa, insects, and certain parasitic forms. In both, general principles and concepts are stressed.

## 312. Experimental Heredity. ( $1: 0: 3$ )

Prerequisite: Biol. 141-142; prerequisite or parallel: Biol. 331. A survey of the techniques of experimental inquiry of the materials, methods, and terminology used in genetics.
334. Honors Research in Biology. (3:0:9)

Prerequisite: Junior standing in biology and participation in the Honors Program. Independent investigation in biology by students in the Honors Program majoring in bacteriology, biology, or zoology. An independent study program under direction of a staff member.

## 411. Biology Seminar. (1:1:0)

Prerequisite: Senior standing in bacteriology, botany, or zoology. Critical reviews of classical and recent literature and reports of original investigations. May be repeated for credit.

## 432. Honors Thesis in Biology. (3:3:0)

Prerequisite: Senior standing in biology and participation in the Honors Program. Preparation of a senior honors thesis by students participating in the Honors Program and majoring in bacteriology, biology, botany, or zoology. An independent study program under the direction of a staff member.

## FOR UNDERGRADUATES AND GRADUATES

## 331. Heredity. (3:3:0)

Prerequisite: 8 semester hours in the Biology Department and junior standing. Principles of heredity with special reference to practical application in human affairs, heredity mechanisms, and problems.

## 333. Bio-Ecology. (3:2:3)

Prerequisite: 12 semester hours in the Blology Department, or junior standing in the School of Agriculture, or Biol. 141-142, and junior standing in the Department of Geology. Introduction to the relationship of organisms to their environment. Field trips to nearby points included at a minimum cost to the student.
431. Biological Techniques. (3:0:9)

Prerequisite: Biol. 141-142, and senior standing or above; or consent of the instructor. Preparation and interpretation of microscopic slldes of plant and animal tissues; research techniques.

## FOR GRADUATES

511. Seminar. ( $1: 1: 0$ )

Prerequisite: Graduate standing in biology. Seminar for graduate students majoring or minoring in biology. Required of all graduate students majoring in biology. May be taken more than once for credit.

## 512. Advanced Experimental Heredity. (1:0:3)

Prerequisite: Biol. 141-142; Biol. 331 or its equivalent; graduate standing. Experimental inquiry of heredity mechanisms; emphasis on Drosophila genetics.

## 532. Population Genetics. (3:2:3)

Prerequisite: Biol. 331 or the equivalent; graduate standing. Genetics of natural populations, basic dynamics, and evolutionary mechanisms responsible for origin of species. Individual problems are conducted in the laboratory.

## Courses in Botany FOR UNDERGRADUATES

## 231. Survey of The Plant Groups. (3:2:3)

Prerequisite: Biol. 141-142. Morphology of plant groups not emphasized in Biol. 141.
232. Taxonomy. (3:2:3)

Prerequisite: Biol. 141-142. Principles and practice in classification of flowering plants.

## FOR UNDERGRADUATES AND GRADUATES

## 331. Plant Physiology. (3:2:3)

Prerequisite: Bot. 231-232; or Biol. 141-142 and 6 semester hours in horticulture or agronomy; prerequisite or parallel, Chem. 141. Physiological processes as applied to the seed plants.

## 332. Plant Pathology. (3:2:3)

Prerequisite: Biol. 141-142 and 6 additional hours in agronomy, botany, or horticulture; prerequisite or parallel: Bact. 231 or equivalent. Principles underlying the cause, identification, and control of plant diseases.
339. Plant Anatomy. (3:2:3)

Prerequisite: Bot. 231-232; or Biol. 141-142 and 6 semester hours in horticulture or agronomy. Studies of the anatomy of the vascular plants.

## 436. Plant Geography. (3:3:0)

Prerequisite: 6 semester hours in botany of junior rank; or Biol. 141-142 and 12 semester hours of zoology, geology, geography, horticulture, or agronomy. Principles of the geography of plants; vegetation types, especially of North America. Field trips to nearby sections of the country are included as feasible at a minimum of cost to the student.

## 438. Morphology of Fungi. (3:2:3)

Prerequisite: Biol. 141-142, and junior standing or above; or consent of the instructor. Morphology and its use as a basis for the classification of the fungi.

## FOR GRADUATES

## 531. Problems In Botany. (3:0:9)

Prerequisite: Graduate standing in botany. Selected problems in morphology, anatomy, ecology, taxonomy, or possibly others. May be repeated for full credit in another field or with new materials in the same field. Offered at intervals.

## 152 ENTOMOLOGY

## 534. Advanced Plant Anatomy. (3:0:9)

Prerequisite: Bot. 339 and graduate standing in botany. Advanced anatomy of vascular plants. Offered at intervals.

## 535. Field Botany. (3:3:0)

Prerequisite: Graduate standing in botany. Readings, reports, and field work on assigned problems. Cost of field trips held to a minimum. May be repeated for credit with new materials. Offered at intervals.

## 536. Taxonomy of Lower Green Plants. (3:2:3)

Prerequisite: Blol. 141-142; Bot. 231, 232, and graduate standing in biology; or permission of the instructor. Classification of the lower plants exclusive of the fungi. Lecture, laboratory, and field study.

53\%. Morphology of The Vascular Plants. (3:2:3)
Prerequisite: Biol. 141-142, Bot. 231, 232, and graduate standing in biology; or permission of the instructor. The form and reproduction of plant groups. Field trips required.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

## Courses in Entomology

 FOR UNDERGRADUATES AND GRADUATES
## 334. Insect Morphology. (3:2:3)

Prerequisite: An introductory course in entomology. A study of form and function of the insect body. Structural adaptation. Spring semester only.

## 335. Insect Taxonomy. (3:2:3)

Prerequisite: An introductory course in entomology. Classification of Insects. The student will be expected to have his own collection. Fall semester only.

## 432. Insect Ecology. (3:2:3)

Prerequisite: An introductory course in entomology. Adaptation of the insect to Its blological and physical world. Population dynamics, macro- and micro- habitats, and Insect responses. Fall semester only.
433. Insect Natural History. (3:2:3)

Prerequisite: Junior standing, Biol. 141-142. An introductory course for nonentomology majors. The resources of the insect as applied to our understanding of life, the animal world, and man's relationship to insects.

## 4311. Medical Entomology. (3:2:3)

Prerequisite: Advanced standing in zoology, pre-med, or agriculture. Insects, mites, and ticks as vectors of human disease and as pests.

## 4312. Acarology. (3:2:3)

Prerequisite: Advanced standing in zoology, pre-med, or agriculture. Systematics, life histories, and control of mites affecting man, animals, and plants. Spring semester only.

## FOR GRADUATES

## 522. Literature and History of Entomology. (2:2:0)

Prerequisite: A basic entomology course, and graduate standing; or permission of the instructor. The background and development of entomology as a science traced through its historical literature. Concepts of insect life from ancient to modern.

## 523. Advanced Insect Taxonomy. (2:0:6)

Prerequisite: A basic entomology course and graduate standing; or permission of the instructor. Description, keys, and literature for the identification of specialized groups of insects to genus and species.

## Courses in Zoology

## FOR UNDERGRADUATES

## 137. Anatomy and Physiology. (3:2:3)

Gross anatomy and physiology of the human body. The digestive and reproduction systems are emphasized. Open only to students of home economics and those with a biology teach!ng major on a B.S. in Education Degree.
231-232. Comparative Vertebrate Anatomy. (3:2:3 each)
Prerequisite: Biol. 141-142. Structure, function, and history of the vertebrates with emphasis on the dogfish shark and the cat.

## 235-236. Anatomy, Physiology, and Hygiene. (3:2:3 each)

Prerequisite: Chem. 133-134 or 141-142 or sophomore standing in biology. Gross anatomy of the mammalian body; the various physiological processes; fundamental principles of hygiene and sanitation; fundamentals of heredity. May not be used as a part of the requirements for a major in zoology, but may be used as part of a major in bacteriology.

## FOR UNDERGRADUATES AND GRADUATES

## 331. Animal Histology. (3:2:4)

Prerequisite: Zool. 231-232. The study of normal animal tissues. Laboratory assignments are to be completed in the laboratory.
332. Comparative Vertebrate Embryology. (3:2:4)

Prerequisite: Zool. 231-232. The embryological development of different vertebrates with emphasis on the chick and the pig. Laboratory assignments are to be completed in the laboratory.

## 333. Parasitology. (3:2:3)

Prerequisite: Zool. 231-232 or Zool. 336. Internal and external parasites, with emphasis on the helminths. Life histories and host relationships.

## 336. Comparative Invertebrate Zoology. (3:2:3)

Prerequisite: Geol. 335-336 or junior standing in biology. Open also to pre-veterinary medicine students and to agriculture students majoring in entomology. Structure, life history, and evolution of the invertebrates. Field trips and assigned readings are an integral part of the course.
435. Cytology. (3:2:3)

Prerequisite: Biol. 331 or Zool. 331 or Zool. 332, or junior standing in botany. The cell in evolution and hereditv.
43\%. Natural History of The Vertebrates. (3:2:3)
Prerequisite: Biol. 141-142, senior standing or above; or consent of the instructor. Intended to acquaint the student with the fish, amphibians, reptiles, birds, and mammals with emphasis upon their habits, life history, and ecology; emphasis on the local fauna with which the student will be expected to become familiar. Local and overnight field trips.

## 438. Cellular Physiology. (3:2:3)

Prerequisite: Six semester hours of chemistry and 6 semester hours of biology; or consent of instructor. The basic physiological phenomena common to all living organisms and a more detailed study, at the cellular level, of the principal functions (nutrition, metabolism, movement, and neural integration) of animals.

## 439. Comparative Animal Physiology. (3:2:3)

Prerequisite: Zool. 231-232; Chem. 141-142; senior standing in zoology or chemistry; or consent of instructor. A comparison of physiological mechanisms in various animal groups and a consideration of how they have evolved. Stress will be placed upon major physiological mechanisms such as excretion, digestion, hormonal control, and how these have been modified in various animal groups to fit their adaptive needs.

## FOR GRADUATES

## 531. Problems In Zoology. (3:0:9)

Prerequisite: Graduate standing in zoology. Selected problems in morphology, anatomy, ecology, taxonomy, or possibly others. May be repeated for full credit in another field or with new materials in the same field. An acceptable written report of the semester's work required.
532. Principles and Methods of Systematic Zoology. (3:2:3)

Prerequisite: Graduate standing and consent of instructor. Aspects of biology related to an understanding of animal relationships. Stress will be placed on procedures useful in taxonomic and ecological studies of natural populations.


#### Abstract

533. Herpetology. (3:2:3)

Prerequisite: Graduate standing in zoology. The course will be concerned with the blology of amphiblans and reptiles. Stress will be placed on classification, evolution, ecology, and anatomy of the various groups. Emphasis will be on the utlization of amphiblians and reptiles to approach major biological problems. Field work will be an essential part of the course and will substitute for some laboratory periods.


535. Field Zoology. (3:3:0)

Prerequisite: Graduate standing in zoology. Readings, reports, and field work on assigned problems. Miay be repeated for full credit with new materials. An acceptable written report of the semester's work required.
536. Mammalogy. (3:2:3)

Prerequisite: Biol. 141-142, Zool. 231-232, 437, and graduate standing; or consent of the instructor. Classification, distribution, Hfe history, evolution, and identification of mammals. Field work will be stressed.
630. Master's Report.
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Chemistry 

Joe Dennis, Head of the Department<br>Office: Chem. 213

Professors:<br>Dennis, Lee, Shine, Stubbs, Wendlandt<br>Associate Professors:<br>Adamcik, Draper, R. G. Rekers, Stuart<br>Assistant Professors:<br>J. A. Anderson, Hecht, McPherson, R. J. Thompson, Trusell, Wilde<br>Instructor:<br>C. E. Wilson

The Department of Chemistry offers curricula leading to two bachelors' degrees. For those who desire a maximum of flexibility in their choice of courses, the Bachelor of Arts Degree is recommended. Those who are preparing for professional work in medicine or in the teaching of science may find this curriculum preferable. The curriculum leading to the Bachelor of Science Degree (Page 128) is designed to give the student fundamental work in the various fields of chemistry with supporting work in mathematics and other sciences. This curriculum may be preferred by those who wish to enter industry as chemists. Both curricula are designed to fit the student for graduate work as well as the professional pursuits mentioned above.

It is highly desirable that the student's accomplishment be of the best quality. Grades of $D$ will not be accepted in more than 20 percent of the hours counted in a major in this department. Not more than one D will be accepted in any one course.

The Department offers the Degrees of Master of Science in Chemistry and Doctor of Philosophy in Chemistry. The requirements for these degrees are outlined in the Graduate Bulletin.

PROFICIENCY SECTION: A Proficiency Section of Chemistry 142 is provided for those entering freshmen who pass an advanced standing examination in chemistry. Successful completion of this course will permit the granting of credit for Chemistry 141 in addition to that for Chemistry 142. In this Proficiency Section, previous background in chemistry is recognized and utilized so that the fundamental principles covered in the regular Chemistry 141-142 may be considered more rapidly and in greater depth, and so that the research approach to laboratory work may be developed. Thus the goal of achieving a more thorough grasp of the basic nature and structure of chemistry may be realized in one semester.

HONORS: The Honors Section of Chemistry 141-142 seeks to accomplish much the same goal as the Proficiency Section of Chemistry 142 but must do this in two semesters, since previous experience in chemistry cannot be presumed. In this way there is provided a greater challenge, both to the thinking and the effort of the serious student, than is possible in the regular Chemistry 141-142; thereby, the student is stimulated to understand and use more effectively the scientific approach, as exemplified in the study of chemistry. Honors students may also qualify for the Proficiency Section described above and may elect to take this section; if so, they will receive Honors credit for Chemistry 141-142 upon its completion.

TEACHING MAJORS IN CHEMISTRY: Students seeking a provisional certificate with chemistry as a teaching field may satisfy the requirement in chemistry through any one of four degree plans. The courses needed for a B.A. or B.S. major in chemistry provide much more than the minimum of 24 semester hours with at least 12 hours at the advanced level. However, for the B.A. with a major other than chemistry, and for the B.S. in Education either of the following sequences of courses will be adequate to meet this requirement, since training in four fields of chemistry and 12-14 advanced hours in a total of $24-26$ semester hours are provided:

Chemistry 141-142, 241, 341, and 347-348
or
Chemistry 141-142, 241, 343, and 353-354.
In both sequences, calculus and 8 hours of physics are prerequisite to the physical chemistry courses. Additional requirements for the teaching certificate will be found on Pages 68-72.

## Courses in Chemistry

## FOR UNDERGRADUATES

## 133-134. Elementary Chemistry. (3:2:3 each)

[^20]141-142. General Chemistry. (4:3:3 each)
in chemistry. Available for all other courses in chemistry except 133-134. A general course in chemistry. Available to all students of the College.

## 241-242. Analytical Chemistry. (4:2:6 each)

Prerequisite: Chem. 141-142. Basic course in the theories and techniques of analytical chemical methods. The qualitative separation, detection, and confirmation of selected cations and anions. The quantitative gravimetric and volumetric methods are considered. Instrumental methods of analysis are introduced. Prerequisite for all higher numbered courses in analytical chemistry.

## 341. Introductory Organic Chemistry. (4:3:3)

Prerequisite: Chem. 141-142. A brief study of the compounds of carbon for students in agriculture, home economics, and other fields who require an introduction to the subject. Not open to majors in chemistry for credit.
*342. Physiological Chemistry. (4:3:3)
Prerequisite: Chem. 341. An elementary course in physiological chemistry. Not open to majors in chemistry for credit.
*343. Introductory Physical Chemistry. (4:3:3)
Prerequisite: Chem. 141-142, 8 hours of physics and Math. 231-232. A selection of general fundamentals in physical chemistry, for all students who require an introduction to the subject. Not open to majors in chemistry and chemical engineering for credit.
*347-348. Physical Chemistry. (4:3:3 each)
Prerequislte: Chem. 141-142, Phys. 143, 241, and Math. 231-232. A thorough foundation course in physical chemistry, for chemistry majors and other students. Prerequisite for all higher numbered courses in physical and inorganic chemistry.

## *353-354. Organic Chemistry. (5:3:6 each)

Prerequisite: Chem. 141-142. A thorough foundation course in organic chemistry for chemical engineering majors, chemistry majors, pre-medical and other students. Prerequisite for all higher numbered courses in organic chemistry.

## FOR UNDERGRADUATES AND GRADUATES**

420. Chemical Literature. (2:2:0)

Prerequisite: Senior standing. Chemical literature, the methods of using it, and the study of and reports on specific literature topics.
431. Qualitative Organic Analysis. (3:1:6)

Prerequisite: Chem. 353-354. Identification of unknowns and the separation and identification of the components of mixtures of organic substances.

## 432. Advanced Organic Chemistry. (3:3:0)

Prerequisite: Chem. 353-354. Organic chemistry at an advanced level. Emphasis on developments in theoretical organic chemistry.

## 435. Inorganic Chemistry. (3:3:0)

Prerequisite: Chem. 347-348. A survey of modern topics in inorganic chemistry including coordination compounds, non-aqueous solvents and the chemistry of the transition elements.

## 436. Biological Chemistry I. (3:2:3)

Prerequisite: Chem. 241-242; 353-354. Chemistry of carbohydrates, proteins, lipids, enzymes, and other constituents of living systems.
437. Biological Chemistry II. (3:2:3)

Prerequisite: Chem. 241-242: 353-354. Blochemical processes and thelr regulation.

## 4312. Instrumental Analytical Methods. (3:2:3)

Prerequisite: Chem. 241-242, and senior standing in chemistry. Theories and applications of instrumental methods of chemical analysis. The major instruments of the research and industrial laboratory are considered.

## FOR GRADUATES

## 511-512. Seminar. (1:1:0 each)

Prerequisite: Graduate standing in chemistry. Seminar for graduate students and staff members. Required of all graduate students majoring in this department. May be taken more than once for credit.

[^21]511\%. Selected Topics in Analytical Chemistry. (1:1:0)
Prerequisite: Consent of instructor. Variable credit is achieved by multiple registrations. May be repeated for additional credit.
531-532. Individual Research Problems. (3 each)
May be repeated for additional credit.
5301. Advanced Inorganic Chemistry I. (3:3:0)

Prerequisite: Chem. 435. Principles of coordination chemistry. Structure, bonding, properties, and reactions of complex compounds.
5302. Advanced Inorganic Chemistry II. (3:3:0)

Prerequisite: Chem. 5301. Reaction mechanisms of inorganic compounds.
5314. Advanced Analytical Chemistry.

Prerequisite: Chem. 241-242. General principles and special methods of analytical chemistry.
5316. Spectrographic Analysis II. Absorption Spectra. (3:2:3)

Prerequisite: Chem. 5315. Identification of compounds and analysis of mixtures by means of their absorption spectra.
5321. Advanced Organic Chemistry I. (3:3:0)

Prerequisite: Chem. 353-354. Principles and reactions of organic chemistry with emphasis on the most recent developments from the current literature.
5322. Advanced Organic Chemistry II. (3:3:0)

Prerequisite: Chem. 5321. Continuation of Chem. 5321.
5334. Selected Topies in Biological Chemistry. (3:3:0)

May be repeated for additional credit.
5335. Physical Biochemistry. (3:3:0)

Prerequisites: Chem. 347-348, 436, 437. Application of the principles of physical chemistry to membrane permeabllities, membrane potentials, energy metabolism, properties of large molecules and other such problems.

## 5342. Advanced Physical Chemistry. (3:3:0)

Prerequisite: Chem. 347-348. Modern physical chemistry, primarily from the molecular approach, with numerical problems.

## 5343. Quantum Chemistry. (3:3:0)

Prerequisite: Chem. 5342. The application of non-relativistic wave mechanics to problems of chemical structure and reactivity.

## 5346. Statistical Mechanics for Chemists. (3:3:0)

Prerequisite: Chem. 5342. Statistical mechanics in chemistry applied to both closed and open systems including thermodynamics, lattices, surfaces and non-equilibrum conditions.
5347. Chemical Thermodynamics. (3:3:0)

Prerequisite: Chem. $347-348$. Equilibrium thermostatics in chemical systems influenced by various physical variables, with an introduction to irreversible thermodynamics.
5348. Selected Topics in Physical Chemistry. (3:3:0)

Prerequisite: Chem. 347-348. May be repeated for additional credit.
631. Master's Thesis. (3)

Enrollment required at least twice.
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

# Department of Education and Philosophy 

Morris S. Wallace, Head of the Department Office: Ad. 259<br>Professors:<br>Barnett,* Cooper, Davidson, Fallon, Garlin, Little, T. B. Livingston, Mecham, Sifert,** M. S. Wallace<br>Associate Professors:<br>F. D. Boze,* Gammill, Hafner, Nagle, Southall, Tidrow, Waters, H. A. Webb, Wheeler<br>Assistant Professors:<br>Bettencourt, Cowan, Filgo, Snell,* Van Hoove,* Faruki Instructors:<br>Everton, Fare, Hardwick***<br>* Part-time<br>**Visiting<br>*** On leave of absence

The primary mission of the Department of Education and Philosophy is to provide professional education courses for those planning teaching or administrative careers in the public schools of Texas. It also offers courses in philosophy for those wishing to major or minor in that subject while working toward the B.A. Degree.

In keeping with the continuing emphasis on competent, well-rounded teachers with a solid academic background, the department aims at five major goals: (1) to provide each prospective teacher a comprehensive and balanced experience in general education as a foundation for classroom teaching and citizenship; (2) to develop the teacher as a personality through a well rounded program including free electives; (3) to provide the teacher with a thorough subject matter preparation through extensive work in the content and teaching fields; (4) to develop an understanding of the learner and the learning process; (5) to develop the understandings, attitudes, and skills essential for effective teaching.

The Head of the Department of Education and Philosophy coordinates the College's program of teacher preparation in which most academic departments participate. Guidance and information for those seeking careers in teaching and in related activities in the elementary and secondary schools, instruction in professional education courses, and the supervision of student teaching are functions of the department.

Regulations covering the teacher certification program are discussed in detail under the heading of Teacher Education in the section of this catalog entitled "Interdepartmental Programs." Requirements for the Bachelor of Science in Education are discussed above in the section immediately preceding the description of courses for the School of Arts and Sciences.

## Courses in Education

## FOR UNDERGRADUATES

330. Foundations of Secondary Education. (3:3:0)

Prerequisite: Junior classification. Introduction to secondary education; basic principles underlying the secondary school program.

## 332. Educational Psychology. (3:3:0)

Prerequisite: Junior classification. Educational and psychological principles as basic knowledge in professional education and in teaching. Observation required.
334. Curriculum Development in Secondary Education. (3:3:0)

Prerequisite: Junior classification, Educ. 332 and 330 , or equivalents. Foundations of curriculum development, patterns of organization, principles and procedures, curriculum resource units, and issues in curriculm development. Observation required.
3344. Language Arts in the Elementary School Curriculum, (3:3:0)

Prerequisite: Junior classification; Educ. 332 and 3346 or equivalents. Bases for programs, methods, and materials.
3345. Social Studies in the Elementary Curriculum. (3:3:0)

Prerequisite: Junior classification; Educ. 332 and 3346 or equivalents. Bases for programs, methods, and materials. Observation required.

## 3346. Child Development and the Elementary School Curriculum.

 (3:3:0)Prerequisite: Junior classification. Principles of child deveiopment as they apply to the elementary school curriculum.
431. Student Observation and Teaching in the Elementary School.

Prerequisite: Attainment of admission standards of student teaching; completion of approximately 90 hours of work, Educ. $332,3345,3346$, or equivalents, plus a major portion of the work in the content courses.
432. Student Observation and Teaching in the Secondary School. (3)

Prerequisite: Attainment of admission standards to student teaching; completion of approximately 90 hours of work, 15 hours of education including Educ. 330, 332, and 334, plus a major portion of the course work in each of the teaching fields.
436. Teaching in Secondary Schools. (3:3:0)

Prerequisites: Senior classification. Educ. 330, 332, 334 or equivalents. Foundations of teaching, methods and techniques, evaluation, management problems related to teaching.
461. Student Teaching in the Elementary School. (6)

Prerequisite: Attainment of admission standards to student teaching; completion of approximately 90 hours of work, Educ. $332,3344,3345,3346$, or equivalent, plus a major portion of the work in the academic specialization courses.
462. Student Teaching in the Secondary School.

Prerequisite: Attainment of admission standards to student teaching; completion of approximately 90 hours of work, 9 hours of education including Educ. 330, 332, and 334 plus 18 hours of the course work in each of the teaching fields.
4341. Teaching Arithmetic in the Elementary School. (3:3:0)

Prerequisite: Senior classification; Educ. 3344 and 3345 , or equivalents. Bases for programs, methods, and materials.
4342. Teaching Reading in the Elementary School. (3:3:0)

Prerequisite: Senior classification; Educ. 3344 and 3345 or equivalents; enrollment in , or completion of, Educ. 461. Bases for programs, methods, and materials.
4343. Teaching Science in the Elementary School (3:3:0)

Prerequisite: Senior classification; Educ. 3344 and 3345 , or equivalent. Bases for programs, methods, and materials.

## FOR UNDERGRADUATES AND GRADUATES

430. History and Philosophy of Education. ( $3: 3: 0$ )

Prerequisite: Senior classification and 9 hours of education. Influences of historical developments and philosophical concepts upon education as the foundation of our American democracy.

## 438. Educational Measurement and Evaluation. (3:3:0)

Prerequisite: Senior classification and 9 hours in education. A foundation course In problems of measurement and evaluation by the classroom teacher in the public schools.

## 4315. Audio-Visual Education. (3:3:1)

Prerequisite: Senior classification and 9 hours of education. A general course with emphasis on operation and care of equipment; methods and techniques in using communicative materials in teaching-learning; and adaptation of equipment and materials to elementary and secondary teaching levels. $\$ 3$ service fee. Lab one hour per week required.

## 4331. Foundations of Educational Sociology. (3:3:0)

Prerequisite: Senior classification and 9 hours in education. Principles of educational sociology essential to an understanding of the social, economic, civic, and cultural functions of education in our democratic society.

## 4338. Foundations of Special Education. (3:3:0)

Prerequisite: Senior classification, 12 hours in education, and Psy. 331. Education for exceptional children including major developments in special education.

## 4339. Teaching the Exceptional Child. (3:3:0)

Prerequisite: Senior classification, 12 hours in education, including educational psychology, and Psy. 331. Curriculum, materials, and methods of teaching the exceptional child-deaf, orthopedic, educable and trainable mentally retarded.
4344. Children's Literature. (3:3:0)

Prerequisite: Senior classification. Prose and poetry for children under 12 , including standards for judging and criteria for selecting children's books.

## FOR GRADUATES

## 5139. Advanced Education Workshops in Teaching and Administration.

Prerequisite: 18 hours in education and educational psychology, and experience as a teacher or administrator. Workshops on guidance, budgeting, school business services, audio-visual education, curriculum, special education, etc.
530. Advanced Educational Psychology. (3:3:0)

Prerequisite: 18 hours of education and educational psychology. Emphasis on the application of educational psychological principles to teaching at all levels.
532. Philosophy of Education. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Major social philosophies and their application to the field of education in the United States.

## 533. General Public School Administration. (3:3:0)

Prerequisite: 18 hours of education and educational psychology. Principles and problems involved in the organization and administration of the public schools.
534. Advanced Educational Sociology. (3:3:0)

Prerequisite: 18 hours in education including 3 hours in educational sociology. Soclological principles as basic knowledge in professional education.
536. Elementary School Administration. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Elementary school organization, personnel, curriculum development, details of modern administration and supervision.
537. Secondary School Administration. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Curriculum function of administration, developing the master schedule, personnel guidance, finance, and related aspects of organization.

## 538. Administration of Audio-Visual Services. (3:3:0)

Prerequisite: 18 hours in education, including Educ. 4315 or 5311 or equivalent. State, regional, and local audio-visual programs; procedures in budgeting, selection, procurement, accounting, distribution, and care of audio-visual materials and equipment, preparation of personnel, and facilities for audio-visual centers.
539. Administration of School Business Services. (3:3:0)

Prerequisite: 18 hours in education and educational psychology, including Educ. 533, or equivalent. Internal business management of schools, including activity funds, teacher welfare, special services, lunchroom, transportation, and purchasing and accounting of supplies and materials.

## 5311. Audio-Visual Education. (3:3:1)

A general course with emphasis on methods and materials of educational technology. Laboratory, one hour per week required. Not acceptable for credit in addition to Educ. 4315.
5312. Supervision in the Elementary School. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Supervision in the elementary school with emphasis on problems and procedures.
5313. Supervision in the Secondary School. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Problems and procedures of supervision in the secondary school.

## 5316. The Junior College. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. The junior college in terms of terminal education and senior college preparation. Development of junior college programs.
5317. The Junior High School. (3:3:0)

Prerequisite: 18 hours of education and educational psychology. The philosophy, organization, program, special problems, and emerging role of the junior high school.

## 5318. Selection and Evaluation of Audio-Visual Materials. (3:3:0)

Prerequisite: 18 hours in education, including Educ. 4315 or 5311 or equivalent. Commercially prepared audio-visual materials for use in teaching the various subject areas. Special emphasis given to selection, classfication of educational motion picture film and filmstrip, and to preparation of study guides.

## 5319. Audio-Visual Production. (3:3:0)

Prerequisite: 18 hours in education, including Educ. 4315 or 5311 or equivalent. Production, application, and integration of photographic, graphic, three-dimensional, and recorded materials in school programs.
5321. Individual Study in Education. (3:3:0)

Prerequisite: Advanced graduate classification, educational psychology, and approval of advisory committee. Individual study on special aspects of professional education. May be repeated once for credit.

## 5322. Foundations of Educational Research. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Methods of educational research; methods of obtalning, processing, interpreting, and utilizing significant educational data.

## 5323. Advanced Educational Statistics. (3:3:0)

Prerequisite: 3 hours in educational statistics. Application of statistical analysis to educational data; use of certain statistical procedures to interpret the values of research, and the numerical and pictographic presentation of attributes and variables.
5325. Legal Bases of Education. (3:3:0)

Prerequisite: 18 hours in education and educational psychology, and Educ. 533. Legal structure of education in America with emphasis on school laws in Texas.
5326. Reading Development in the Elementary School. (3:3:0)

Prerequisite: Graduate classification in education. Nature of the reading process; methods and materials for developing this process.

## 5331. Human Development in Education. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Biological, social, and psychological interrelationships and implications for classroom teaching and learning at all levels.

## 5334. Teaching Reading in the Secondary School. (3:3:0)

Prerequisite: 12 hours in education and educational psychology. The reading process, methods of teaching reading; emphasis on the development of reading skills in content fields, and implementation and evaluation of a reading program.

## 5341. Developing Arithmetic Programs in Elementary Education. (3:3:0)

Prerequisite: Eligibility for provisional certificate with elementary endorsement (or Educ. 3345 and 3346 or equivalents). The development of arithmetic and its educative function in the elementary school curriculum.
5342. Developing Reading Programs in Elementary Education. (3:3:0)

Prerequisite: Eligibility for provisional certificate with elementary endorsement and a course in the teaching of reading. Psychological and research bases for developing reading programs in the elementary school.

## 5343. Developing Natural and Physical Environment Concepts in Elementary Education. (3:3:0)

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## 5344. Developing Language Arts Programs in Elementary Education. (3:3:0)

Prerequisite: 12 hours of English and/or speech Including 6 hours of English composition. Eligibility for provisional certificate with elementary endorsement (or Educ. 3345 and 3346 or equivalents). Practical applications of research findings and modern theory as related to teaching and organizing the language arts in the elementary school.

## 5345. Developing Social Studies Programs in Elementary Education. (3:3:0)

Prerequisite: Eligibility for provisional certificate with elementary endorsement (or Educ. 3345 and 3346 or equivalents). Objectives, pattern, and principles of organization of social studies in the elementary schools including teaching materials and procedures.

## 5346. Advanced Curriculum Development. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Fundamental bases for curriculum development growing out of the knowledge of human growth and development, nature of the learning process, school-community relationships, and current social and economic problems.

## 5349. Organizing and Administering the Instructional Improvement

 Program. (3:3:0)Prerequisite: 18 hours in education and educational psychology, and Educ. 5346, or equivalent. Principles and procedures of organizing programs of system-wide curriculum and instructional improvement.
5351. General Education Seminar. (3:3:0)

Prerequisite: 24 hours of education, and approval of admissions committee of the Department of Education. Survey of the whole field of professional education. Basic course required on the advanced graduate program in education.
5353. Comparative Education. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Educational systems of the major countries in recent and current times; individual attention to problems of special concern.

## 5354. Seminar in Educational Sociology. (3:3:0)

Prerequisite: 24 hours in education and educational psychology. Educational sociology; current sociological problems as related to the field of professional education.
5355. Seminar in Elementary Education. (3:3:0)

Prerequisite: Advanced graduate classification, 24 hours in education and educational psychology, and consent of advisory committee. Trends in modern elementary education.
5356. Seminar in Secondary Education. (3:3:0)

Prerequisite: 24 hours in education and educational psychology. Trends in modern secondary education.

535\%. The Administration of the Junior College. (3:3:0)
Prerequisite: 18 hours in education and educational psychology, including 3 hours in educational administration or supervision. Major principles, organizations, problems, techniques, and trends in the administration of the junior college.
5359. Seminar in Supervision. (3:3:0)

Prerequisite: 24 hours in education including supervision. Principles and current practices in the field of supervision.

## 5363. Problems in Audio-Visual Education. (3:3:0)

Prerequisite: 24 hours in education, including Educ. 4315 and two advanced courses in audio-visual education. Practical problems in planning audio-visual education programs for a variety of school systems and intermediate service agencies; research in the field of audio-visual education.

## 5364. Seminar in Educational Psychology. (3:3:0)

Prerequisite: Graduate classification, 24 hours of education, including advanced educational psychology, and consent of instructor. An intensive study, research analysis and synthesis in the field of educational psychology.
5366. The Administration of School Staff Personnel. (3:3:0)

Prerequisite: 18 hours in education and educational psychology, including Educ. 533. Principles and procedures in selection, organization, and administration of school personnel; evaluation of teaching efficiency, merit rating, and in-service education.

## 5367. School Finance. (3:3:0)

Prerequisite: 18 hours in education and educational psychology, including Educ. 533, 539, or equivalent. Basic theories, principles, and problems in school finance as applied to taxation, budgeting, school construction, operation, and maintenance.

## 5368. School Housing. (3:3:0)

Prerequisite: Limited to majors in educational administration, completion of at least 15 hours of advanced education, including Educ. 533, 536 and 537, and consent of the instructor. Determination of school building needs based upon the school program and nature of the community; essential educational and architectural services; evaluation of existing school facilities; developing the school building master plan; the financial plan; contracting and construction; utilization; operation and maintenance.
5369. School Public Relations. (3:3:0)

Prerequisite: 18 hours of education, including Educ. 533. Cooperative development of school-community relationships and mutual understanding of the school's purposes, functions, achievements, and needs; emphasis on problems of organization, use of media, processes, citizen advisory committees, and evaluation.

## 5371. General Supervision. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Principles, planning, organizations, and processes of supervision in both elementary and secondary schools.

## 5372. Developing the School Guidance Program. (3:3:0)

Prerequisite: 12 hours in education and educational psychology. Designed to acquaint the classroom teacher, principal, and counselor with the understanding and knowledge needed in organizing a school guidance program to serve the needs of students for both the elementary and secondary levels.

## 5373. Educational Evaluation. (3:3:0)

Prerequisite: 18 hours in education and educational psychology. Bases and techniques of appraisal, tests, polls, measurement, data treatment, and interpretation. Utillzation of individual and group processes and actio: in continuing programs of educational evaluation.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.
661. Internship in Educational Administration. (6)
662. Internship in Educational Administration. (6)

731-732. Research. (3 each)
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

## Courses in Philosophy

Students may major or minor in philosophy. By special permission, the following courses in other fields may be applied on the major in philosophy: Govt. 4331 and 4334; Educ. 430 and 532.

## FOR UNDERGRADUATES

230. Introduction to Philosophy. (3:3:0)
Prerequisite: Sophomore classification. Problems in interpretation of the nature of knowledge, reality, and value.
231. Introduction to Logic. (3:3:0)

Prerequisite: Sophomore classification. Introduction to deductive and inductive methods, including a supplementation of Aristotelian principles with Boolean techniques and the rudiments of the propositional and functional calcull.
238. Ethics. (3:3:0)

Prerequisite: Sophomore classification. Problems of individual and social conduct.

## FOR UNDERGRADUATES AND GRADUATES

## 331. History of Ancient and Medieval Philosophy. (3:3:0)

Prerequisite: Junior classification. Philosophical thought from Thales to the Scholastics with emphasis upon Plato, Aristotle, Augustine, and Aquinas.
332. History of Modern Philosophy. (3:3:0)

Prerequisite: Junior classification. Philosophical thought from Descartes through Hegel. Continental rationalism, British empiricism, and German idealism examined carefully.

## 333. Development of American Philosophy. (3:3:0) <br> Prerequisite: Junior classification. American philosophy from colonial times to the present.

335. Oriental Philosophies. (3:3:0)

Prerequisite: Junior classification. Views of important phllosophic thinkers of the Orient; emphasis upon those of China and India.
336. Philosophy of Science. (3:3:0)

Prerequisite: Junior classification. Investigation of selected concepts of the natural sciences and of their relations to empirical observation and confirmation.
431. Aesthetics. (3:3:0)

Prerequisite: Senfor classification or consent of instructor. The nature of beauty; analysis of the aesthetic experience.

## 432. Philosophy of Value. ( $\mathbf{3 : 3 : 0}$ )

Prerequisite: Senior classification or consent of instructor. The nature and validity of values; exploration of the possibility of an integrated value system.
436. Philosophy of Religion. (3:3:0)

Prerequisite: Senior classification or consent of instructor. Historical and contemporary religious movements.
438. Seminar in Philosophical Problems. (3:3:0)

Prerequisite: Senior classification and major or minor in philosophy. Readings on selected topics, reports, and conferences.

## FOR GRADUATES

535. Basic Issues in Contemporary Philosophy. (3:3:0)

Prerequisite: Consent of instructor. Certain paired topics around which philosophical controversies continually emerge: rational knowledge and empirical knowledge; science and value; individual freedom and social control; secular belief and religious faith; and others; each controversy is studied historically. Designed for graduate education students (elementary education, supervision, and administration), but open to others.

# Department of English 

John C. Guilds, Head of the Department Office: C \& O 125

Professors:
J. G. Allen, Bowling, T. W. Camp, W. B. Gates, Gillis, Guilds, Gunn, McCullen, Nall, Reuning,* Roy, A. L. Strout Associate Professors:

Brooks, Carlock, L. B. Green, Pendexter Assistant Professors:

Brewer, K. W. Davis, Eldlemann, Lewis, Miles, J. G. Rushing,** Russell, M. E. Strout, R. D. Tracy, Wellborn
Instructors:
M. E. Aker, N. S. Boze, Brian, Godfrey,
C. A. Hilton, McNeill, O'Neal, ${ }^{* * *}$ E. C.

Reeves, M. R. Roberts, J. A. Rushing, S. P. Smith, Terrell,**** Tunnell, G. A. Young

* Visiting, 1963-1964
** Visiting, effective Oct. 7, 1963
*** Resigned, Oct. S, 1963
**** On leave, 1963-1964

The Department of English offers a major program for those seeking the Degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy. (Information concerning the Degrees of Master of Arts and of Doctor of Philosophy in English will be found in the Graduate Bulletin.) In addition, the department offers a program leading to teacher certification in English under the Degree of Bachelor of Science in Education as well as under the Degree of Bachelor of Arts.

English majors should report to the Department Head or director of undergraduate studies in English to be assigned a major professor for academic advisement. English 131-132 or 133-134 (or see "Special Provisions for Entering Freshmen," Pages 26-29) and 231, 232, are prerequisite for all English major or minor programs for the B. A. Degree. Majors must offer for graduation a minimum of 21 hours in English above the freshman-sophomore level. The program will include:
A. At least one course from each of the following:
I. English literature before 1700: 330, 333, or 3314
II. English literature after 1700: 338, 339, 3315, or 3322
III. American literature: 3323 or 3324
B. A concentration in one of the divisions above, or in language, as follows: I ( 9 hours); II ( 9 hours); III ( 9 hours); or language ( 6 hours).
C. At least one course from the following: language, literary criticism, or comparative literature.
English minors must offer 18 hours, including at least 6 hours of advanced work. Students who elect English as a teaching field should
report to the director of undergraduate studies in English for guidance and counseling prior to filing degree plans.

For electives students who have completed their degree requirements in English may select any 300- or 400 -level.

To receive credit toward graduation, a student who is an English major or minor or who has chosen English as his teaching field must receive at least a C on all advanced courses.

Special Provisions for Entering Freshmen: Six hours of freshman English (131-132 or 133-134) are prerequisite for all sophomore courses ( $231,232,233$ ) except under the following conditions: An entering freshman who scores 650 or above on the verbal portion of the College Entrance Examination Board Scholastic Aptitude Test and who submits a writing sample to the satisfaction of the department may elect to enroll in special proficiency sections of English 231, 232 and complete his degree requirements in English by taking advanced work.

Exemption from English 131 (with credit but no grade) may be earned in either of two ways: by scoring 700 or above on the verbal portion of SAT and writing an essay to the satisfaction of the department; or by making an unusually high grade on the CEEB Advanced Placement Examination in English. Early in his senior year of high high school a student planning to take the Advanced Placement Examination should make arrangements with the College Board Advanced Placement Examinations, Box 592, Princeton, New Jersey. A student who receives credit for first-semester-freshman English may enroll directly in English 132 or 134.

An entering freshman who scores 575 or above on the verbal portion of SAT will be eligible for the special course, English 133, Advanced Composition and Literature. If a student receives a C or better in English 133, he may continue in English 134. Those who receive an A in English 131 will also be eligible for English 134.

Honors Work in English: The Department of English fully participates in the Honors Program in the School of Arts and Sciences and offers, in addition to English 133-134, special Honors sections of English 231 and 232; English 336H, 337H (Junior Honors Seminar); and English 431H, 432H (Senior Honors Seminar), which includes an oral comprehensive examination and the writing of an Honor thesis.

## Courses in English

## FOR UNDERGRADUATES

## 131-132. College Rhetoric. (3:3:0 each) <br> Training in correct and effective writing and in efficient, accurate reading.

> 133-134. Advanced Composition and Literature for Freshmen. (3:3:0 each)
> An honors-level course designed for those who demonstrate competence in English composition as measured by the College Board Examination.

231, 232. Masterpieces of Literature. (3:3:0 each)
231: Representative works of Greek dramatists, Chaucer, Shakespeare, and Milton. 232: Six or eight masterpieces selected from the works of writers of the eighteenth, nineteenth, and twentieth centuries.
233. Technical Writing. (3:3:0)

Preparation of oral and written reports in scientific and technical fields.
330. Early English Literature: "Beowulf" through Malory. (3:3:0)
331. Short Story. (3:3:0)
The shori story as a literary form.
332. Introduction to Literary Criticism. (3:3:0)Theorles and traditions of ilterary criticism.
333. English Literature of the Seventeenth Century. ..... (3:3:0)
English poetry and prose of the seventeenth century, excluding Milton.
334. Creative and Professional Writing. (3:3:0)Prerequisite: B or better in freshman English.
335. Shakespeare. (3:3:0)Offered each semester of long session. The content in the second semester willin no way duphicate that of the first. May be repeated once for credit with the per-mission of department.
336H. Junior Honors Seminar. (3:3:0)Honors studies in English literature.
337H. Junior Honors Seminar. (3:3:0)Honors studies in American literature.
*338. English Literature of the Eighteenth Century ..... (3:3:0)
339. English Romanticism ..... (3:3:0)
3314. Literature of the English Renaissance. ..... (3:3:0)Poetry and prose from 1500 to 1603.
3315. The Victorians. (3:3:0)English poetry and prose of the Victorian era.
3322. British Literature of the Twentieth Century. ..... (3:3:0)
3323. American Literature and its Backgrounds. ..... (3:3:0)American literature from its beginnings through Whitman.
3324. American Literature and its Backgrounds. ..... (3:3:0)American literature from the advent of realism to the present.
3325. American Novel. ..... (3:3:0)Representative works of major American novelists.
3327. English Novel. (3:3:0)Representative works of major English novelists.
3329. Major American Poets. (3:3:0)Introduction to American poetic traditions through a study of representative worksof major American poets.
3337. Advanced Gramar. (3:3:0)

431H, 432H. Senior Honors Seminar. (3:3:0 each)

## FOR UNDERGRADUATES AND GRADUATES*

433. Chaucer. (3:3:0)

Chaucer's works and career, with emphasis upon "The Canterbury Tales," "Troilus and Criseyde," and selected minor poems.
434. Milton and His Age. (3:3:0)

Milton's poetry and prose.
438. History of the English Language. (3:3:0)

An historical and descriptive survey of the English language, in the context of the cultural development of the English-speaking peoples.

[^23]439. American English. (3:3:0)

History, characteristics, and dialects of the English language in America.
4331. Pre-Shakespearean Drama. (3:3:0)

From the beginnings of English drama through Marlowe.
4333. Philosophical Ideas in Literature. (3:3:0)

The evolution of philosophical ideas in English and American ilterature. May be repeated once for credit with permission of department.
4336. Teaching of English in Secondary Schools. (3:3:0)

433\%. English Literary History: A Synthesis. (3:3:0)
A comprehensive view of English ilterature from its beginnings to the present.
4341. Regional Literature of the United States. (3:3:0)

Topics: Southwestern, Southern, and other regional literatures of the United States. Unless otherwise announced, topic will be Southwestern literature.
4343. Modern American and European Drama. (3:3:0)

Representative modern plays. Topics: continental and British drama from Ibsen, Wilde, and Shaw to the present; American drama of the twentieth century. May be repeated once for credit with permission of department as topics vary.
4349. Ancient and Medieval Literature. (3:3:0)

Representative literature, ancient and medieval, in English translations.
4355. Modern Continental Literature. (3:3:0)

Representative literature of continental Europe from the fourteenth through the twentieth centuries, in English translations.

## FOR GRADUATES*

530. Studies in Medieval Literature. (3:3:0)
531. Studies in Comparative Literature. (3:3:0)
532. Teaching of College English. (3:3:0)
533. Studies in Renaissance Literature. (3:3:0)
534. Old English. (3:3:0)
535. Studies in Early Victorian Literature. (3:3:0)
536. Studies in Early English Romantics. (3:3:0)
537. Studies in the Neo-Classical Age. (3:3:0)
538. Studies in Seventeenth Century Literature. (3:3:0)
539. Studies in Drama. (3:3:0)
540. Studies in Literary Criticism. (3:3:0)
541. Studies in Shakespeare. (3:3:0)
542. Studies in Modern British Literature. (3:3:0)
543. American Literature to $\mathbf{1 8 6 5}$. (3:3:0)
544. American Literature since 1865. (3:3:0)
545. American Novel to 1900. (3:3:0)
546. American Novel since 1900. (3:3:0)
547. Studies in Modern Poetry. (3:3:0)
548. Principles of Language. (3:3:0)

533\%. Studies in Linguistics. (3:3:0)
5351. Studies in Later Victorian Literature. (3:3:0)
5381. Studies in Later English Romantics. (3:3:0)

[^24]5391. Studies in the Age of Johnson. (3:3:0)
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.
636. Seminar in Nineteenth Century American Literature. (3:3:0)
637. Seminar in Twentieth Century American Literature. (3:3:0)

731, 732. Research. (3 each)
831. Doctor's Dissertation. (8)

Enrollment required at least four times.

# Department of Foreign Languages 

Harley D. Oberhelman, Head of the Department Office: Ad. 212

Professors:<br>E. J. Gates, T. E. Hamilton, Strehli Associate Professors:<br>T. W. Alexander, Bumpass, Hardee,<br>A. P. Hull, Maxwell, Oberhelman, Planel, ${ }^{*}$ Simpson, S. M. Tucker Assistant Professors:<br>B. W. Alexander, Christiansen, Jardine, Jirgensons, Klock, Patterson, Zyla Instructor:<br>Anderl<br>* Visiting, 1963-1964

The Department of Foreign Languages offers instruction in French, German, Greek, Latin, Portuguese, Russian, and Spanish.

Courses numbered 131 or 141 suppose no previous study of the language. For students who have had previous study in a language, placement tests are offered at the beginning of each semester to aid students and counselors in determining the level at which study should be continued. Normally students who have had two years (i.e. two units) of one language in high school, and who wish to continue the same language, should enroll for the 231 course. Those who have had three or four years of one language in high school and who wish to continue the same language should enroll for the 331 course.

Students must complete 12-14 semester hours in the same language. If a student offers two or more years of high school study of a foreign language, he must take a placement examination in that language if he wishes to continue its study in college. A student who has studied a foreign language in high school for only one year may take the placement examination if he wishes to qualify for a course above the beginning level. In no case will a student who has taken three or four years of a language in high school receive credit for courses in the same

## 170 FOREIGN LANGUAGES

language below the 200 level. A foreign student who graduated from a secondary school in his native country may not receive credit for a course in his native language which is numbered below 400 .

Major. Sufficient work is offered for a major in French, German, Latin, or Spanish. Either 36 hours in the major language or 24 hours in the major and 12 hours in another language approved by the department are required. A minimum of 12 hours in 400 courses in the major language is required.

Minor. A minor may be obtained in French, German, Latin, or Spanish. A minimum of 18 hours in one language is required, including at least 3 hours at the 400 level.

Twelve-Hour Minor. Students who present three or four units of a single foreign language from high school may enter courses in the same language numbered 331-332. They may complete a minor for the Bachelor of Arts Degree by offering 6 hours of work in 300 courses and 6 hours in 400 courses. Completion of this minor also fulfill the foreign language requirement for the Bachelor of Arts Degree.

Teaching Fields. For purposes of certification, teaching fields are offered in French, German, Latin, and Spanish. The minimum standard program requires courses numbered $231-232$ or $233-234,331-332$, 9 semester hours in the language at the 400 level, and Methods 4311. An alternate program for students who begin their college language work at the 300 level requires 15 semester hours of 400 courses and Methods 4311. A second alternate program in modern languages is offered to students possessing native or near-native proficiency in the language; it requires 21 semester hours of 400 courses and Methods 4311.

Grade Requirements for Majors and Minors. At least a C average in all language courses is required of both majors and minors. For majors, a grade of at least $C$ in courses numbered 400 or above is required.

Students who wish to major or minor in a foreign language should consult the Head of the Department.

Bilingual Secretarial Program. For the description of this progrom see Page 118.

Latin American Area Studies. For the language courses required for a major in Latin American Area Studies see Page 119.

Graduate Courses. Courses for graduate students are offered in French, German, Latin, Spanish, and Methods. For further information see the Bulletin of the Graduate School.

Methods of Instruction. To help students obtain a functional acquaintance with the language studied, the department seeks to employ the most effective techniques and materials available for classroom instruction. In addition to the usual textbooks, extensive use is made of a variety of audio-visual resources. These include mounted pictures, charts, maps, film strips, slides, records, tape recordings, and puppets. In courses in the modern languages, the language studied is used in the classroom as much as possible.

Language Laboratories. The department provides two. Laboratory A, located in the east basement of the Administration Building, is for
outside study and is open at published hours. All language students are urged to make regular use of this laboratory. It is designed and equipped to give them an opportunity for individual practice which will insure satisfactory progress in their ability to understand and speak the language being studied. Laboratory $B$, located in the Administration Building, Room 218, is a classroom laboratory where certain classes are scheduled to meet regularly.

## Courses in Foreign Languages <br> *FOR UNDERGRADUATES FRENCH

141-142. A Beginning Course in French. (4:3:2 each)
Oral practice, elementary reading, and grammar.
231-232. A Second Course in French. (3:3:0 each)
Prerequisite: Fren. 141-142, or two units of high school French. Reading, cultural background, conversation, and composition.
331-332. Introduction to French Life and Literature. (3:3:0 each)
Prerequisite: Fren. 231-232, or the equivalent. A survey of French literature and culture. Conversation, composition, and grammar review. Conducted in French.

## GERMAN

## 141-142. A Beginning Course in German. (4:3:2 each) <br> Oral practice, elementary reading, and grammar.

## 231-232. A Second Course in German. (3:3:0 each)

Prerequisite: Ger. 141-142, or two units of high school German. Reading, cultural background, conversation, and composition. Ger. 231-232 and 233-234 may not both be counted toward a degree.

233-234. Scientific German. (3:3:0 each)
Prerequisite: Ger. 141-142, or two units of high school German. Reading of specially prepared scientific texts with grammar review to assist in the interpretations. For pre-medical and science students. Ger. 231-232 and 233-234 may not both be counted toward a degree.

## 331-332. Introduction to German Life, Literature, and Science. (3:3:0 each)

Prerequisite: Ger. 231-232 or 233-234, or equivalent. Representative short storles, novels, dramas, and lyrics. Composition and conversazion based on readings. Conducted in German.

## GREEK

## 131-132. A Beginning Course in Greek. (3:3:0 each)

Essentials of grammar, reading of easy prose (including selections from the New Testament), Greek mythology and civilization, and bullding of English vocabulary derived from Greek.

## 231-232. A Second Course In Greek. (3:3:0 each)

Prerequisite: Greek 131-132, or the equivalent. One dialogue of Plato and selections from the Illad or the Odyssey. This course begins with a review of Greek grammar.

## LATIN

131-132. A Beginning Course in Latin. (3:3:0 each)
The fundamentals of grammar, easy reading, cultural background, and bullding of English vocabulary derived from Latin.
133. Latin and Greek Terminology. (3:3:0)
Minimum essentials of Latin and Greek grammar. Analysis of English words
by study of Latin and Greek roots, prefixes, and suffixes. Word lists, charts, and myths

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## 172 FOREIGN LANGUAGES

relating to special subjects. No previous courses in Latin or Greek required. May not be counted in meeting foreign language requirements.

231-232. A Second Course in Latin. (3:3:0 each)
Prerequisite: Lat. 131-132, or two units of high school Latin. Prose selections and Vergil. Begins with a review of Latin grammar.
331-332. Introduction to Latin Life and Literature. (3:3:0 each)
Prerequisite: Lat. 231-232, or three or four units of high school Latin. Readings in Cicero and Ovid or Vergil. Some elementary prose composition.

## PORTUGUESE

131-132. A Beginning Course in Portuguese. (3:3:0 each)
Oral practice, elementary reading, and grammar.
231-232. A Second Course in Portuguese. (3:3:0 each)
Prerequisite: Port. 131-132, or the equivalent. Reading, cultural background, conversation, and composition.

## RUSSIAN

141-142. A Beginning Course in Russian. (4:3:2 each)
Oral practice, elementary reading, and grammar.
233-234. A Second Course in Russian. (3:3:0 each)
Prerequisite: Russ. 141-142, or two units of high school Russian. Continued study of grammar, oral practice, composition, and reading,

## SPANISH

141-142. A Beginning Course in Spanish. (4:3:2 each)
Oral practice, elementary reading, and grammar.
231-232. A Second Course in Spanish. (3:3:0 each)
Prerequisite: Span. 141-142, or two units of high school Spanish. Reading, cultural background, conversation and composition.

331-332. Masterpieces of the Hispanic World. (3:3:0 each)
History, geography, literary masterpieces, and customs of Spain and Spanish America. Grammar review, composition, and conversation based on readings. Conducted in Spanish.

## FOR UNDERGRADUATES AND GRADUATES FRENCH

430. Advanced Grammar, Composition, and Conversation. (3:3:0)

Prerequisite: Fren. 331-332, or the equivalent, or taken concurrently with 332 . A review of important grammatical constructions and idioms with both oral and written practice. Required of French majors and minors. Conducted in French.
435. Readings in French Language and Literature I. (3:3:0)

Prerequisite: Fren. 331-332, or the equivalent. Readings in sixteenth century French literature exclusive of poetry. Conducted in French.
436. Readings in French Language and Literature II. (3:3:0)

Prerequisite: Fren. 331-332, or the equivalent. Readings in French Poetry beginning with the Pleiade but concentrating on nineteenth and twentieth century works. Conducted in French.
4311. The Classical Theater. (3:3:0)

Prerequisite: Fren. $331-332$, or the equivalent. A study of the drama from 1636 to 1700. Conducted in French.
4312. Eighteenth Century Literature. (3:3:0)

Prerequisite: Fren. 331-332, or the equivalent. A survey of eighteenth century French literature, especially the works of Montesquieu, Diderot, Voltaire, and Rousseau. Conducted in French.

## GERMAN

## 433. Nineteenth Century Drama. (3:3:0)

Prerequisite: Ger. 331-332, or the equivalent. Readings in the drama of the nineteenth century from Romanticism through Realism to Impressionism. Conducted in German.
434. Nineteenth Century Prose and Poetry. (3:3:0)

Prerequisite: Ger. 331-332, or the equivalent. Readings in the poetry and prose of the nineteenth century from Romanticism through Realism to Impressionism. Conducted in German.

## LATIN

431. Advanced Composition and Grammar Review. (3:3:0)

Prerequisite: Lat. 331-332, or the equivalent. Practice in Latin prose composition. Application of the principles of idiom and advanced grammar.
435. Readings in Latin Literature I. (3:3:0)

Prerequisite: Lat. $331-332$, or the equivalent. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Major works of selected Latin historians will be read and their importance discussed. Sight translation.

## 436. Readings in Latin Literature II. (3:3:0)

Prerequisite: Lat. 331-332, or the equivalent. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Major works of selected Latin dramatists and poets will be read and their importance discussed. Sight translation.

## SPANISH

433. Modern Drama and Poetry. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The romantic and social drama, some of the poetry of Garcia Gutierrez, Duque de Rivas, and Zorrilla. Conducted in Spanish.

## 434. Modern Drama and Poetry. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The Realistic Movement in the drama from Benavente to World War I. Conducted in Spanish.

## 436. Advanced Composition and Conversation. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. A practice course emphasizing the idiomatic, everyday use of the language, and practical phonetics. Review of important grammatical constructions. Recommended for prospective teachers and travelers. Conducted in Spanish.
437. Advanced Grammar and Composition. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. Oral and written Spanish with special attention to accurate and idiomatic expression. Some time is devoted to a study of commercial correspondence. Recommended for prospective teachers. Conducted in Spanish.
4312. The Prose of the Golden Age. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The important prose writers from 1499 to 1650. Conducted in Spanish.
4313. The Prose of the Golden Age. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. Cervantes and his "Don Quixote." Conducted in Spanish.

## 4316. A Survey of Spanish Literature. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The history of Spanish literature In the Middle Ages and Renaissance. Recommended for majors in Spanish. Required for graduate majors. Conducted in Spanish.

## 4317. A Survey of Spanish Literature. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The history of Spanish literature in the Golden Age and the eighteenth century. Recommended for majors in Spanish. Required for graduate majors. Conducted in Spanish.

## 4318. Readings in Contemporary Spanish Literature. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. A survey of the literary scene in Spain from 1898 to the present. Reading of representative dramatists and poets. Conducted in Spanish.

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## 4319. Readings in Contemporary Spanish Literature. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. A survey of the literary scene in Spain from 1898 to the present. Reading of representative prose writers and poets. Conducted in Spanish.

## 4324. Readings in Spanish American Literature and Civilization. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The content of this course will vary to meet the needs of the students. Conducted in Spanish.

## 4325. Readings in Spanish American Literature and Civilization. (3:3:0)

Prerequisite: Span. 331-332, or the equivalent. The content of this course will vary to meet the needs of the students. Conducted in Spanish.

## METHODS

## 4311. Teachers' Course in Methods of Teaching Foreign Languages. (3:3:0)

Prerequisite: Fren., Ger., Lat., or Span. 331-332 or 333-334, and 6 semester hours of education. Instruction in linguistic analysis as related to the teaching of foreign languages with as much practice work as possible. Required of majors and minors seeking teacher certification.

## FOR GRADUATES

5311. Laboratory Techniques in Foreign Language Teaching.

Prerequisite: Consent of the Head of the Department. Study of language laboratory drill materials. Linguistic analysis and preparation of drills based on current texts.

## SPANISH

5312. Studies in Spanish and Spanish American Literature. (3:3:0)

Prerequisite: Consent of the Head of the Department. The nature and content of this course will vary to meet the needs of individual students. Credit given as often as course is repeated.
5313. Studies in Spanish and Spanish American Literature. (3:3:0)

Prerequisite: Consent of the Head of the Department. The nature and content of this course will vary to meet the needs of individual students. Credit given as often as course is repeated.
5335. Spanish in the Elementary School. (3:3:0)

Prerequisite: As a part of the composite minor or for credit in education, no prerequisites are necessary; a student who wishes to apply this course toward a major or minor in Spanish must have completed Span. 331-332 or the equivalent. Spanish language and culture for elementary school children. Songs, games, dances, and children's literature.

541-542. Summer Language Institute. (4:21:25 each)
Prerequisite: Graduate standing, permission of the director, and selection on a competitive basis. Advanced study of the area, civilization, language, and culture. Applied linguistics and methodology. Investigations, field work, reports.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Geosciences 

F. A. Wade, Head of the Department<br>Office: Sci. 10

## Professors:

Arper, Brand, Mattox, Shurbet, Wade
Associate Professor:
Harris
Assistant Professors:
Bridge, Jacka, W. D. Miller, Parry, C. C. Reeves
Instructors:
Kopp, Yeats

Six programs of study are offered those students who desire to major in the field of geoscience. The program leading to the Degree of Bachelor of Arts is designed for those who wish to obtain a broad liberal arts background and basic training in the fundamentals of geology. The Bachelor of Science Degree program is recommended to those who wish more specialized training in the geosciences.

The department requires that Geology 141-142, 241, 242, 331, 332, 363, and Chemistry 141-142 be included in the program for the Bachelor of Arts. Either German or French is recommended for the fulfillment of the foreign language requirement.

The curricula on Pages 129-133 illustrate the five possible approaches to the Degree of Bachelor of Science in geoscience. The degree may be obtained in geology. Three separate programs are offered: (1) general geology; (2) geology (paleontology option); and (3) geology (ground water option). Separate programs are available in geochemistry and geophysics.

Minors are required in all degree programs. The B.A. Degree program permits minors in a wide variety of subjects; the minor in the B.S. Degree program must be in biology, chemistry, mathematics, or physics.

Students desiring to minor in the geosciences should consult with the Head of the Department. Courses will be prescribed to fit the individual needs and interests of each student.

Grades below $C$ in courses included within the major and minor requirements of a geosciences major are not accepted by this department in fulfillment of a student's degree requirements. Grades below C in geosciences courses will not be accepted in fulfillment of a minor within this department.

The department also offers the Degrees of Master of Science in Geoscience and Doctor of Philosophy in Geoscience. The Graduate School Bulletin should be consulted for detailed information on these advanced curricula.

## Courses in Geology

## FOR UNDERGRADUATES

141-142. General Geology. (4:3:3 each)
Physical and historical geology. A foundation course for all advanced work in geology. Required of all students majoring in geology.
143. Physical Geology. (4:3:2)

An introductory study of geologic features and processes. For non-geology majors.
144. Historical Geology. (4:3:2)

Prerequisite: Geol. 143 or 141. An introductory study of geological history. For non-geology majors.
145. Physical Geoscience. (4:3:3)

Prerequisite: Geol. 141 or 143. The physical aspects of geology and geophysics are considered in detail.
233. General Geology for Engineers. (3:2:3)

Similar to Geol. 141-142, but a shorter course adapted to the needs of engineering students other than petroleum engineers.
241. Mineralogy and Petrography I. (4:2:6)

Prerequisites: Geol. 141-142 or 143-144 and Chem. 141-142. Geometric and chemical crystallography; introduction to mineral identification.

## 242. Mineralogy and Petrography II. (4:2:6)

Prerequisite: Geol. 241. Classification and identification of minerals by chemical and physical properties; introduction to petrography.

## 331. Geomorphology. (3:2:3)

Prerequisite: Geol. 141-142, and approval of instructor. Origin and characteristics of land forms based on a consideration of geologic processes, stages of development, and geological structures.
332. Structural Geology. (3:2:3)

Prerequisite: Geol. 141-142, and approval of instructor. Systematic analysis of the feforming processes and resultant structures in the earth's crust. Graduate credit for minors only.
335-336. General Paleontology. (3:2:3 each)
Prerequisite: Geol. 141-142 and approval of the instructor. The detailed structures, classification and geologic history of the various groups of invertebrates. An introduction to ecology. Graduate credit for minors only.
337. Ground Water. (3:3:0)

Prerequisite: Geol. 241-242, 331 and approval of instructor. Principles of the occurrence, recharge, movements, and discharge of sub-surface water. Graduate credit with approval of Department Head and Graduate Dean.

## 363. Field Geology. (6)

Prerequisite: Geol. 141-142, 241-242, 331-332, 335-336, and approval of instructor. Field application of principles of stratigraphy, structural geology, and methods of geological surveying. Required of all majors in the Department of Geosciences. Graduate credit for minors only. Summer sessions only.

## FOR UNDERGRADUATES AND GRADUATES

## 431-432. Optical Mineralogy and Petrology. (3:1:6 each)

Prerequisite: Geol. 241-242 and approval of the instructor. Identification of minerals with the petrographic microscope; description, classification, origin and history of igneous, metamorphic and sedimentary rocks.

## 433. Petroleum Geology. (3:3:0)

Prerequisite: Geol. 332, Phys. 141-142 or 235-236, and approval of the instructor. Origin, migration and accumulation of oil and gas; petroliferous provinces.
434. Petroleum Geology. (3:2:3)

Prerequisite: Geol. 433, and approval of the instructor. Sub-surface methods; advanced principles.

## 435. Stratigraphic Paleontology. (3:2:3)

Prerequisite: Geol. $335-336,4314$, and approval of the instructor. Detailed taxonomic and paleoecologic studies of selected elements of fauna from the various geologic systems.
436. Micropaleontology. (3:1:5)

Prerequisite: Geol. 335-336, and approval of the instructor. Morphology, classification and distribution of foraminifera, ostracods, conodonts, etc., methods of collection and preparation.
437. Sedimentation. (3:2:3)

Prerequisite: Geol. 241-242 or 234, 331, 332, and approval of the instructor. Sedimentary processes and environments.
439. Vertebrate Paleontology. (3:2:3)

Prerequisites: Advanced standing in a natural science and approval of instructor. $\Lambda$ general survey of the history and development of the vertebrata with special emphasis on the fossil record. Basic principles of paleontologic methods, including techniques of collecting, preservation, identification and interpretation.
4314. Principles of Stratigraphy. (3:3:0)

Prerequisite: Geol. 241-242, 335-336, and approval of the instructor. Stratigraphic methods, nomenclature, maps; geochronology; paleoecology; correlation methods; sedimentary facies and tectonics.

## 4315. Paleozoic, Mesozoic, Cenozoic Stratigraphy. (3:3:0)

Prerequisite: Geol 4314, senior or graduate standing, and approval of the instructor. Advanced historical geology of North America with emphasis on the application of stratigraphic principles, paleogeography, source areas, sedimentary facies.
4316. Aerial Photo Interpretation. (3:3:0)

Prerequisite: Geol. 331-332, and approval of the instructor. Geomorphic and geologic interpretations. Use of stereoscopes and vertical control instruments. Aerial photographs converted to maps.

## FOR GRADUATES

511. Seminar. (1:1:0)

Required of all graduate students majoring in this department.
521. Clay Mineralogy. (2:1:3)

Prerequisite: Consent of the instructor. Classification, origin, and occurrences of clay minerals. Identification of clay minerals by means of differential thermal analysis and X-ray analysis.

531-532. Advanced Physical and Historical Geology. (3:3:0 each)
Prerequisite: Graduate standing in geology. A fleld trip of several days' duration will be taken each semester as part of the course.
533. Petrology of Igneous Rocks. (3:3:0)

Prerequisite: Geol. 431-432, a minimum of two years of chemistry.
534. Petrology of Metamorphic Rocks. (3:3:0)

Prerequisite: Geol. 431-432, 533, a minimum of two years of chemistry.

## 535-536. Advanced Work in Specific Fields. (3 each)

Prerequisite: Consent of Head of Department. Subject matter depends upon needs and interests of students.
5311. Stratigraphic Micropaleontology. (3:3:0)

Prerequisite: Geol. 436. Foraminifera, bryozoa, conodonts, and ostracods; emphasis on morphology and stratigraphic range.
5312. Economic Geology. (3:2:3)

Prerequisite: Geol. 431-432, and consent of instructor. Origin, occurrence, and economic aspects of metallic minerals and non-metallic minerals exclusive of of and gas.
5324. Advanced Sedimentation. (3:2:3)

Prerequisite: Geol. 437. Advanced principles of sedimentary petrography and petrology.

## 5327. Problems in Paleontology. (3:2:3) <br> Prerequisite: Geol. 335-336, 4314.

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## 541. X-Ray Diffraction and Analysis. (4:3:4)

Prerequisite: Advanced standing in a physical science or engineering. Fundamental principles of X-ray crystallography. The powder method of analysis. Single crystal determinations.
542. X-Ray Crystallography. (4:3:4) $\quad$ Prerequisite: Geol. 541. Continuation of Geol. 541.
563. Advanced Field Geology. (6)

Prerequisite: Elementary field geology. Solution of advanced field problems requiring application of geologic principles, mapping, and aerial photo interpretation. Written report required.
631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Research. (3 each)
Required of students working on the doctor's dissertation.
831. Doctor's Dissertation.

Enrollment required at least four times.

## Courses in Geochemistry

 FOR UNDERGRADUATES AND GRADUATES4331. Geochemistry I. (3:3:0)

Prerequisite: Geol. 241-242, Chem. 347-348. Distribution of the elements in the earth. Principles of geochemistry.
4332. Geochemistry II. (3:3:0)

Prerequisite: Geochem. I. Specific topics will be considered, depending upon student's interest.

## FOR GRADUATES

533. Selected Topics in Geochemistry. (3:3:0)

Prerequisites: Geochem. 4331, 4332. Topics will be selected by the instructor based upon requirements and interests of the students. May be repeated for credit.
534. Advanced Problems in Geochemistry. (3:1:6)

Prerequisites: Geochem. 4331, 4332. Individual research on selected topics. A formal scientific report is required. May be repeated for credit.

## Courses in Geophysics

## FOR UNDERGRADUATES

3321. Geophysical Methods, Gravity and Magnetic. (3:3:0)

Prerequisite: Geol. 141-142, 332; Math. 231-232; Phys. 141-142; and approval of instructor.
3322. Geophysical Methods, Seismic and Electrical. (3:3:0)

Prerequisite: Geol. 141-142, 332; Math. 231-232; Phys. 141-142; and approval of instructor.

## FOR UNDERGRADUATES AND GRADUATES

4321. Earthquake Seismology. (3:2:3)

Prerequisite: Geophys. 3322. Observatory functions. Interpretation of earth structures from earthquake seismological data.
4322. The Earth's Gravity Field. (3:3:0)

Prerequisite: Consent of instructor. Study of the earth's gravity field in relation to Isostasy, geology, and earth structure.
4323. Applications in Geophysics. (3:1:6)

Prerequisite: Consent of instructor. Geophysical methods applied to the solution of selected field problems.

## FOR GRADUATES

531. Wave Propagation in Layered Media. (3:3:0)

Prerequisites: Working knowledge of advanced calculus and consent of the instructor. Study of wave propagation in the atmosphere, the ocean, and the solid earth.
533. Selected Topics in Geophysics. (3:3:0)

Prerequisite: Consent of the instructor. Topics will be selected by instructor based upon students' requirements and interests. May be repeated for credit.
534. Advanced Problems in Geophysics. (3:1:6)

Prerequisite: Consent of the instructor. Individual research into selected geophysical problems. A formal scientific report will be required. May be repeated for credit.

## Courses in Geography

FOR UNDERGRADUATES


#### Abstract

231, 232. Principles of Geography. (3:3:0 each) Geographic factors including relief, climate, industries, communications, and economic resources.


## FOR UNDERGRADUATES AND GRADUATES

331. General Meteorology. (3:2:3)

Prerequisite: One year of geology or physics or geography. Descriptive and theoretical meteorology and analysis of terrestrial, hydrospheric, and atmospheric factors of weather and climate.
332. Practical Meteorology. (3:2:3)

Prerequisite: Geog. 331. Care and use of meteorological instruments and interpretation of charts and maps. Methods of observing and recording weather.

# Department of Government 

J. William Davis, Head of the Department<br>Office: S. Sc. 201

Professors:
J. W. Davis, S. H. Fuller, Jackson, S. M. Kennedy
Associate Professor:
Oden
Assistant Professors:
Kyre, Lawrence, Mack, Nimmo, Stephens, Welborn
Instructors:
Aruri, Baker,* Blissett, Cowart, Dyer, Masson, Mullen, Sutton
Part-time Instructors:
Bowman, M. H. Garner, Griffith, Sowder

* On leave, Fall Semester, 1963

The Department of Government offers courses leading to degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy. In these courses the Department of Government endeavors to prepare the student for a basic understanding of the governmental processes and to transmit to the students the basic tools of analysis and research and knowledge relating to organization and distribution of power, office,
and the rewards in governing man. Programs are available for those who desire to major or minor in this study.

The major in the Department of Government is based on principles of a liberal education with attention to the social studies as well as to an emphasis on the theory and practice of governments. The departmental requirement for a major is 30 hours of government, including the basic required undergraduate courses of Government 231 and 232. Students majoring in government should take certain basic courses in all fields of government. Generally, at the beginning of the junior year several alternative fields of emphasis are offered from which the student may choose. These fields are:

American Government and Politics (National, State, and Local)
Comparative Government (British, Russian, Latin American, and Far Eastern)
International Relations (Organization, Politics, and Law)
Public Administration (Organization, Procedure, and Administrative Law)
Political Theory (European, American, and Modern)
Public Law (Constitutional, Administrative, and International)
A government major or minor can be shaped to serve as vocational preparation in any of at least seven different fields:

1. Careers in public administration on the national, state, or local level.
2. Preparation for entry into law school.
3. Training for the foreign service.
4. The teaching of government or social science.
5. Journalistic, radio, or television careers in collecting, evaluating, reporting, or commenting upon news of a political nature.
6. Research in public affairs for private industrial or commercial firms, labor unions, or endowed research institutes.
7. Preparation for a political career.

The Department of Government serves in an advisory capacity for pre-law students. Each student having such interest is guided carefully toward fulfilling the entrance requirements for law school and is given the best possible preparatory background for his future work. (See Page 120.)

Students interested in preparing for government service may take advanced courses in all levels of American government with emphasis upon the field of their special interest.

The Department of Government also cooperates in the Latin American Area Studies program. (See Page 119.)

The Department of Government participates in the teacher education program of the College. Students seeking certification to teach in the secondary or elementary schools of Texas may qualify for such certification in the course of completing requirements for either the Bachelor of Arts or the Bachelor of Science in Education Degree.

The student of government may qualify for teacher certification under a variety of plans. Students wishing to teach in the secondary schools may offer government as a teaching field. Such students must have completed at least 24 hours in government, including Government 231 and 232 and other courses broadly divided into fields of American

Government and Politics, International Relations, Comparative Government, and Political Theory. Those students seeking certification to teach in secondary schools in the related fields of social sciences may qualify by completing 12 hours of government, including Government 231 and 232, 3 hours of government from the field of American Government and Politics, and 3 hours from the field of International Relations and Comparative Government. There is an additional requirement providing for courses in economics, sociology, and history. (See the discussion of teacher education in the section of this catalog entitled "Interdepartmental Programs.")

Students preparing to teach in the elementary schools may offer government as an area of academic specialization. There are two plans of academic specialization open to the prospective elementary school teacher. Under one of these plans the student must complete 18 hours of government, including Government 231 and 232, and courses in the field of American Government and Politics, and International Relations and Comparative Government. Under the second plan, the student must complete 24 hours in government, including Government 231 and 232, and courses in the fields of American Government and Politics, International Relations and Comparative Government, and Political Theory. For details on either of these plans or degree programs, the student should consult the Head of the Department of Government.

The Department of Government offers a special major on the graduate level for students interested in city manager training or work in municipal government. The course work is of an interdepartmental nature and includes courses with special emphasis on problems of municipal government. After graduation, a student may be placed as an intern in some Texas city.

Graduate offerings of the Department of Government are covered in the Graduate Bulletin.

In cooperation with many departments, the Department of Government offers a program in which the student may minor in the study of government. The departmental requirement is 18 hours of government including the basic required undergraduate courses, Government 231 and 232.

Students interested in a major or minor in government are invited to visit the office of the Department of Government to examine sample curricula. Such curricula are intended as guides and a great deal of flexibility is permitted so that each student may take courses in line with his own particular interests.

## Courses in Government

## FOR UNDERGRADUATES

## 231. American Government, Organization. (3:3:0)

232. American Government, Functions. (3:3:0)
for Government 231 and 232 or the equivalent thereof are required of all candidates for a degree and are prerequisites to all advanced courses.
233. The Administrative Process. (3:3:0)
234. International Politics. (3:3:0)
235. Comparative Government. (3:3:0)

FOR UNDERGRADUATES AND GRADUATES
4321. Local Government. (3:3:0)
4322. State Government. (3:3:0)
4323. Legislation. (3:3:0)
4324. Government and the Economy. (3:3:0)
4325. Political Parties. (3:3:0)
4331. Ancient and Medieval Political Theory. (3:3:0)
4332. Modern Political Theory. (3:3:0)
4334. American Political Theory. (3:3:0)
4341. Fiscal Administration. (3:3:0)
4343. Local Administration. (3:3:0)
4345. Administrative Organization and Management. (3:3:0)
4351. Constitutional Law, Powers. (3:3:0)
4352. Constitutional Law, Limitations. (3:3:0)
4353. Administrative Law and Regulation. (3:3:0)
4354. Jurisprudence. (3:3:0)
4361. United States Foreign Policy. (3:3:0)
4362. Political Geography. (3:3:0)
4363. International Organization. (3:3:0)
4364. International Law. (3:3:0)
4372. Government of the Union of Soviet Socialist Republics. (3:3:0)
4374. Government of Mexico. (3:3:0)
4375. Major South American Governments. (3:3:0)
4376. Major Governments of Asia. (3:3:0)

437\%. African Government and Politics. (3:3:0)
43\%9. British Government. (3:3:0)
4381. Teaching Social Sciences in the High School. (3:3:0)

## FOR GRADUATES

531. Readings and Research-Individual Study. (3:3:0) May be repeated for credit.
532. Seminar in American Government. (3:3:0)
533. Seminar in Political Theory. (3:3:0)
534. Seminar in Public Administration. (3:3:0)
535. Seminar in Public Law. (3:3:0)
536. Seminar in International Relations. (3:3:0)
537. Seminar in Comparative Government. (3:3:0)
538. Seminar in Parties and Politics. (3:3:0)
539. Master's Thesis. (3)

Enrollment required at least twice.
731, 732. Doctoral Research. (3 each)
831. Doctoral Dissertation. (3)

Enrollment required at least four times.

# Department of Health, Physical Education, and Recreation for Men 

R. W. Kireilis, Head of the Department<br>Office: P.E. 190 and 205-A

Professors:<br>Jennings,* Kireilis, Philbrick<br>Associate Professors:<br>Cobb, Robison, ** Segrest<br>Assistant Professors:<br>Berger, Buchanan**<br>Instructors:<br>McNally, Sparks**<br>* Retired and one-third time<br>** Part-time

This department offers programs leading to the following degrees: Bachelor of Science in Education with a major in physical education, Bachelor of Arts with a major in physical education, and Bachelor of Arts with a major in recreation. Students desiring to become coaches or physical educators should choose the physical education major; students desiring to work in a city recreation program, camps, and related fields should select a recreation major. Further information regarding these degrees may be secured from the Department Head.

During the first year, students majoring or minoring in the department must file a physical examination report in the department head's office. The form for this examination should be secured from this department.

## Required Physical Training Program

All male students who are required to complete four semesters of work in physical education activities for graduation will complete work in P.E. 1111, Introduction to Physical Education Activities, during the first semester of their freshman year. Transfer students taking work in physical education will also be required to complete work in P.E. 1111 during their first semester if they have transferred less than 2 semester hours of credit in physical education. After a student has satisfactorily completed work in P.E. 1111, a three-semester program of physical education activities will be recommended to him. It is the purpose of the Department of Health, Physical Education, and Recreation for Men to give each student the opportunity to develop physically, socially, and mentally by providing a wide variety of physical education activities in which students may participate.

## Courses in Required Physical Training Program

The basic course is 1111 , taken by all men students required to have four semesters in the physical education program. Based on the
needs and interests of the individual students, the department will recommend courses for the three additional semesters required.
1111. Introduction to Physical Education Activities. (1:1:1)

Basic course, taken by men students in the program of required physical education. Physical conditioning, standardized physical efficiency tests and medical reports; lectures, class observations, and expert demonstrations introduce the student to activities offered by the department.
1112. Adapted Physical Activities. (1:0:2)
1113. Individual Activities. ( $1: 0: 2$ )
1114. Dual Activities. ( $1: 0: 2$ )
1115. Team Activities. (1:0:2)

Students who pass any course may not repeat the same course for additional credit. These are all laboratory courses involving individual instruction.

## Bachelor of Science in Education-Major in Physical Education

The student who desires to teach physical education should elect this degree. The curriculum is designed specifically to meet the legal requirements for certification in Texas. The earning of this degree qualifies the student to teach physical education on either the elementary or the secondary level, or to earn an all-level certificate as indicated below. The student should follow the curriculum outlined on Page 138, and should become familiar with the teacher education program as discussed earlier in this catalog in the section entitled "Interdepartmental Programs."

The student who wishes to obtain a provisional certificate to teach at the elementary level may take either of the sequences of courses listed below, depending on his interests, in partially satisfying the requirement for 36 hours of academic specialization courses:

Sequence A*: 133, 230, 233, 332, 437, 438.
Sequence B*: 131, 133, 230, 233, 332, 436, 437, 438.

## All-Level Provisional Certificate

The physical education major who plans to teach in the public schools can also secure an All-Level Provisional Certificate by earning a bachelor's degree and completing work in the following programs:

Physical Education: 133, 230, 233, 323, 332, 3311, 422, 423, 431, 433, 436, 437, 438.

Required Physical Education: 221, 222, 321, and 322.

## Bachelor of Arts-Major in Physical Education

Students working toward a B.A. Degree with a major in physical education will meet all the general requirements for a B.A. Degree. Academic specialization courses for students seeking an All-Level Pro-

[^26]visional Certificate are: 131, 133, 221*, 222*, 230, 233, 321*, 322*, 323, 332, 3311, 422, 423, 431, 433, 434, 436, 437, and 438. Academic specialization courses for students seeking a Provisional Certificate-Secondary are: Physical Education 133, 230, 323, 332, 3311, 422, 423, 431, 433, 436, 437, 221*, 222*, 321* , and 322**
B.A. students with a major in physical education who wish to earn a teaching certificate must also complete work in an acceptable second teaching field. Some recommended fields are listed below, but specific courses must be approved by the head of the department concerned:

Biology, English, foreign language (including two 400 -level courses), government, history, or mathematics. The student must complete 24 semester hours in whichever of these fields he chooses.

A 2.25 average must be maintained in the major.

## Minor in Physical Education

Students seeking a minor in the department will complete work in one of the following programs:

Physical Education: 131, 133, 230, 323, 332, 3311, 422, 423, 431, 433, 436,437 and 438 ( 18 semester hours from the courses listed).

The required physical education courses are: 221, 222, 321, and 322.
Health Education: Physical Education 133, 230, 433, 436, 332, 431, and 437 ( 18 semester hours from the courses listed).

Recreation: 331, 332, 439, 4323, 433, and 3 hours elective. The required physical education courses are: Physical Education 221, 222, 321, and 322.

Students who are interested in recreation and follow the recreation minor program will not receive a teaching certificate but will be qualified for positions in the various types of recreation programs offered by many institutions.

## Bachelor of Arts-Major in Recreation

The Department of Health, Physical Education, and Recreation for Men offers students a program leading to the B.A. Degree with a major in recreation, which qualifies them for positions in the various types of recreation programs offered by numerous groups and agencies. The general requirements for the Bachelor of Arts Degree will be met. All students majoring in recreation take a core program consisting of the following courses: Physical Education 133, 331, 439, 332; Speech 133 or 235; Education 330; Psychology 230 and 332.

At the present time the following areas of emphasis are available to students majoring in recreation: sports, arts and crafts, music, dramatics, and park administration. All recreation majors must complete the following courses in the sports area: Physical Education 131, $221,222,321,322,323,422$, and 433 or 4323 with field experience. In addition, the student must select one area from the following: arts and crafts, music, dramatics, or park administration. He must also take an introductory course in each area in which he does not minor. A student desiring further information concerning the recreation major should

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consult the Head of the Department of Health, Physical Education, and Recreation for Men.

Required courses in the arts and crafts area are: Applied Arts 131, 133, 232; also 12 semester hours of the following: Applied Arts 336, 332, 337, 338, 3311, 431, 432, 434, 435, 436, or 439; Allied Arts 238, 239.

Required courses in the music area are: Music Literature 131, 132; Applied Music 1113, 1114, 1123, 1124; Music Education 327; also 6 hours of electives.

Required courses in the drama area are: Speech 319 (may be taken three times), 231, 232, 333, 334, 431, and 4311.

Required courses in the park administration area are: Horticulture 131, 232, 233, 338; Park Administration 3311, 339, 422, and 423.

When necessary the Department Head will make appropriate substitutions for courses listed in the above programs.

Physical education majors are allowed to take elective work in physical education. Physical education courses recommended as electives are: 131, 437, 434, or 438.

The department also offers work in the major or minor for those working toward the master's degree. For details see the Bulletin of the Graduate School.

## Courses in Health, Physical Education, and Recreation for Men <br> FOR UNDERGRADUATES

133. Personal and Community Health. (3:3:0)

Fundamentals of health and personal hyglene; community health problems, causes and prevention of disease in the family as related to individual and community health.
221. Theory and Practice of Individual Sports. (2:2:2)

Designed to prepare students as physical educators in junior and senior high schools, colleges, and as community recreation leaders; rules and fundamentals of tennis, handball, and badminton.
222. Theory and Practice of Team Sports. (2:2:2)

Continuation of P.E. 221. Fundamentals of volleyball, softball, speedball, and soccer.
230. Methods of Teaching Health in the Elementary and Secondary School. (3:3:0)
Basic principles and procedures of health education and their application to the total school health program.
321. Theory and Fundamentals of Gymnastics and Wrestling. (2:2:2)

Practice in fundamental gymnastic and wrestling skills; theory, rules, and history of gymnastics and wrestling.
*322. Elementary Aquatics. (2:2:2)
Swimming fundamentals from beginner's swimming through lifesaving; principles, methods of teaching, leading to water safety instructor's certificate; principles of pool management, theory of coaching swimming, and introduction to synchronized swimming.
323. Sports Officiating. (2:2:2)

Prerequisite: Consent of instructor. Designed to prepare qualified teachers as officials of interscholastic sports; covers the ethics, rules, and mechanics involved.
331. Recreational Methods. (3:3:0)

Material appropriate for small and large groups, different age levels, and various sltuations; philosophy and method; practice in planning and leading recreation.

[^28]332. First Aid; Care and Prevention of Athletic Injuries. (3:3:2)

American Red Cross First Aid Course leading to a standard first aid certificate, including athletic training and common athletic injuries, their care and prevention.
3311. Methods of Teaching Physical Education in High School. (3:3:0) Aims and methods of teaching physical education in junior and senior high school.
422. Theory and Fundamentals of Baseball and Basketball. (2:2:2)

Offensive and defensive fundamentals of baseball and basketball; offensive and defensive systems, strategies, scouting methods, public relations, and professional ethics. Approximately two-fifths of the semester will be devoted to baseball and three-fifths to basketball.
423. Theory and Fundamentals of Football and Track. (2:2:2)

Individuai offensive and defensive fundamentals in football and individual skills in track and field events. Offensive and defensive systems and strategies, scouting methods, public relations, and professional ethics in football. Approximately three-fifths of the semester will be devoted to football and two-fifths to track.
433. Administration of Health, Physical Education, and Recreation Programs. (3:3:0)

## FOR UNDERGRADUATES AND GRADUATES

431. Kinesiology. (3:3:0)

Principles of human motion. Anatomical and mechanical analysis of everyday and physical education activities for promoting normal physical development and improvement of performance.
432. Physiology of Exercise. (3:3:0)

Effect of muscular activity on body processes.
436. Physical Examinations and Corrective Physical Education. (3:3:0)
Practice in administering screening tests with interpretation of findings; organizaion of programs in physical education for the physically handicapped.
437. Measurements in Physical Education. (3:3:0)

Techniques in physical education; survey of tests used in physical education and methods of administering tests and using data.
438. Curriculum Development in Physical Education. (3:3:0)
439. Organization and Administration of Recreational Programs. (3:3:0)
Community recreation, its significance, leadership, facillties, and organization of programs; special consideration of the contribution of physical education.
4321. Methods and Techniques of Driver Instruction. (3:3:2)

Preparation of high school teachers in driver education; classroom and behind-the-wheel techniques. All prospective teachers will have the opportunity to teach beginners.
4326. Safety Education. (3:3:2)

Prevention of accidents in home, industry, and recreation. Includes American Red Cross standard, advanced, and instructor's safety courses.

## FOR GRADUATES

531. Administration of Physical Education. (3:3:0)

Principles, problems, and procedures for administering physical education programs; for school administrators, athletic directors, physical education directors, and city recreation directors.
532. Supervision of Physical Education. (3:3:0)

Principles, problems, relationships, and procedures in the supervision of elementary and high school physical education programs.
533. Facilities for Physical Education. (3:3:0)

Principles, terminology, and standards for planning, construction, use, and maintenance of facilities.

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534. Administration of the School Health Program. (3:3:0)

For teachers, coaches, and school administrators who desire an understanding of a well-balanced health program.
535. Techniques of Research in Health, Physical Education, and Recreation. (3:3:0)
Research methods, research design, treatment and interpretation of data.
536. Problems in Health, Physical Education, and Recreation. (3:3:0) Individual study of problems relating to health, physical education, and recreation. May be repeated three times for credit.

# 5322. Organization and Administration of Interscholastic and Intercollegiate Athletic Programs. (3:3:0) 

Methods in organizing and administering the interscholastic and intercollegiate athletic programs. Study of: staff, program, budget, health and safety, facilities, publicity, history, duties of an athletic director, and national, state, and local controls.
5324. Organization and Administration of Intramural Sports. (3:3:0) Administrative procedures connected with organization, records, equipment, program, and staff duties; intramural sports officiating: ethics, rules, mechanies, and practice.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Health, Physical Education, and Recreation for Women 

Mary B. Dabney, Head of the Department Office: Women's Gym 121<br>Professor:<br>Dabney<br>Associate Professors:<br>Hoyle, Rainey, Scahill<br>Assistant Professors:<br>M. A. Cobb, Williams<br>Instructors:<br>S. D. Aker, A. C. Miller, Purdy

The Department of Health, Physical Education, and Recreation for Women offers a required nonprofessional program and a professional program.

## Required Nonprofessional Program

With a few exceptions (band and age limit), physical education activity is required of all freshman and sophomore women, and four semesters of physical education constitute part of the requirements for all degrees.

The main purpose of the nonprofessional program is to give opportunity for all students to develop and maintain physical, mental, and social fitness during college years as well as to acquire the skills, habits
and knowledge which will enable them to maintain total fitness throughout life.

In order to achieve these purposes, each entering freshman woman is required to take P.E. 111. This course is designed to give the student appreciation of and practice in the skills of body control and effective movement. Emphasis is placed on conditioning exercises and posture.

The remaining three semesters she may select from P.E. 112, 113, 114, or 115. These courses are designed to give the studnt opportunity to continue the practice and understanding of good body mechanics and total fitness through a variety of physical activities.

To fulfill the all-college physical education requirement of four semesters of physical education, students who are majoring or minoring in physical education enroll for P.E. 123, 124, 125, 126 in the place of the above courses. See the curriculum for majors outlined on Page 139.

## Courses in Nonprofessional Program

111. Body Conditioning. (1:0:2)
112. Aquatics. (1:0:2)
113. Rhythmic Activities. (1:0:2)
114. Individual and Dual Activities. (1:0:2)
115. Team Activities. ( $1: 0: 2$ )

## Professional Programs

The department offers programs leading to the following degrees: Bachelor of Science in Education with a major in physical education; Bachelor of Arts with a major in physical education; and a Bachelor of Arts with a major in recreation.

Each student who plans to major or minor in physical education (or recreation), or minor in health, must present annually from her family physician a report of a complete physical examination. Forms for this examination should be secured from the Department of Health, Physical Education, and Recreation for Women.

## Bachelor of Science in Education-Major in Physical Education

The student who desires to teach physical education should elect this degree. The curriculum is designed specifically to meet the legal requirements for certification in Texas. The earning of this degree qualifies the student to teach physical education on the secondary level or to qualify for an all-level certificate. The student should follow the curriculum outlined on Page 139, and should become familiar with the teacher education program as discussed earlier in this catalog in the section entitled "Interdepartmental Programs."

## Bachelor of Arts Degree-Major in Physical Education

The general requirements for the Bachelor of Arts Degree will be met. The courses in physical education required for the major in the

Bachelor of Arts Degree are the same as those listed for the major in the Bachelor of Science in Education (Page 139). If the student desires to be certified for teaching in the State of Texas, she must complete 18 hours of education as prescribed by the Department of Education.

## Bachelor of Arts-Major in Recreation

The student who is interested in positions of leadership in recreation, rather than in teaching, should select this degree. This degree offers a broad liberal background. The completion of the major in recreation prepares the student for positions in city recreation programs, camps, and allied areas.

The general requirements for the Bachelor of Arts Degree will be met. For details see the Head of the Department.

## Master's Degree

The department offers a major and minor for the master's degree. For details, see the Bulletin of the Graduate School.

## Courses in Health, Physical Education, and Recreation for Women <br> FOR UNDERGRADUATES

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123. Individual Sports. (2:0:4)
Skills, tactics, and rules in tennis and badminton.
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124. Individual Sports. (2:0:4)
skills, tactics, and rules in archery and golf.
125. Team Sports. (2:0:4)
skills, tactics, and rules in hockey, speedball, and soccer.
126. Team Sports. (2:0:4)

Skills, tactics, and rules in volleyball, basketball, and softball.
131. Introduction to Physical Education. (2:2:0)

Phllosophy. aims, objectives, principles, and potential values of physical education.
133. Personal and Community Health. (2:2:0)

Fundamentals of health and personal hygiene; community health problems; causes and prevention of disease in the family as related to individual and community health.
230. Methods of Teaching Health in the Elementary and Secondary Schools. (3:3:0)
Basic principles and procedures of health education and their application to the total school health program.
233. Methods of Teaching Physical Education in the Elementary School. (3:3:0)
A method and content course dealing with the theory and practice of physical
328. Technique of Sports. (2:1:2)

Prerequisite: P.E. 123, 124, 125, 126. Emphasis on skills, skill analysis, and officlating.
329. Technique of Sports. (2:1:2)

A continuation of P.E. 328.
3813. History of the Dance. (3:3:0)

History and philosophy of dance and the relationship of dance to allied arts.

## FOR UNDERGRADUATES AND GRADUATES

431. Kinesiology. (3:3:0)

Principles of human motion Anatomical and mechanical analysis of everyday and physical education activities for promoting normal physical development and improvement of performance.

## 436. Physical Examinations and Corrective Physical Education.

(3:3:0)
Practice in administering screening tests with interpretation of findings; organizatlon of programs in physical education for the physically handicapped.
437. Measurements in Physical Education. (3:3:0)

Techniques in physical education and methods of administering tests and using data.
4311. Physical Education for the Junior and Senior High School. (3:3:0)
Prerequisite: Junior standing in physical education. Methods and materials for physical education in the secondary school.

# Department of History 

David M. Vigness, Head of the Department Office: S. Sc. 119-F<br>Professors:<br>Blaisdell, Dillon, L. L. Graves, W. C. Holden, O. A. Kinchen,* Manning, McKay,* Vigness, E. Wallace<br>Associate Professors:<br>Donovan, V. M. Smith, Woods<br>Assistant Professors:<br>B. R. Brunson, Collins, DeLaRue,* G. S. Robbert<br>Instructors:<br>Keller, J. V. Reese<br>* Part-time

The curriculum offered in the discipline of history is based on the belief that every individual is entitled to a liberal education, the main purpose of which is to broaden and deepen his understanding and enjoyment of the world around him. In the process of acquiring a liberal education a person becomes a more effective member of the community, trained in the technique of living in a complex society. History, which is one way of arranging all known facts, can assist an individual to gain a perspective in time by extending his experience beyond the horizon of his own age.

Students may major or minor in history in the Bachelor of Arts Degree program and may choose history as a teaching field for certification in the Bachelor of Arts or Bachelor of Science in Education programs.

The courses and areas of study below are recommended and approved for the programs indicated. Substitutions may be made with the prior approval of the Head of the Department.

Bachelor of Arts Degree, history major: History 131, 132 (or 133, 134), 231, 232, and 18 semester hours in advanced history. Total- 30 semester hours.

Bachelor of Arts Degree, history minor: History 131, 132, 231, 232, and 6 semester hours in advanced history. Total- 18 semester hours.

History may be offered as a teaching field for certification in the Bachelor of Arts and Bachelor of Science in Education programs, and it is one of the social sciences in the broad field social science plan (Plan II) in the latter degree program. A minimum of 24 semester hours is required for certification in each, and the courses acceptable are: History 131, 132, 231, 232, and 12 advanced hours of history including 6 hours in American history.

All courses numbered above 300 are advanced courses; junior classification or higher is prerequisite to enrollment in advanced courses. A student must receive at least a $C$ in an advanced course in history if he wishes to have it count toward his major, minor, or teaching field requirements.

Graduate study toward the Master of Arts and the Doctor of Philosophy Degrees is offered to students admitted to the Graduate School. Doctoral candidates may major in American history with European history as the first minor.

This department participates in the Latin American Area Studies Program and offers courses applicable to a major in that field.

Requests for further information should be addressed to the Head of the Department.

## Courses in History

## FOR UNDERGRADUATES

131, 132. Development of Civilizations. (3:3:0 each)
133, 134. History of England. (3:3:0 each)
231. History of the United States to 1865. (3:3:0)
232. History of the United States since 1865. (3:3:0)
330. History of Texas. (3:3:0)
334. Diplomatic History of the United States to 1900. (3:3:0)
335. Diplomatic History of the United States since 1900. (3:3:0)
3317. History of Military Affairs. (3:3:0)

## FOR UNDERGRADUATES AND GRADUATES

43\%. Constitutional History of the United States to 1865 . (3:3:0)
433. Constitutional History of the United States since 1865. (3:3:0)
434. Early National Period in the United States, 1783-1815. (3:3:0)
436. Social and Cultural History of the United States to 1865. (3:3:0)

43\%. Social and Cultural History of the United States since 1865. (3:3:0)
4311. The Old South. (3:3:0)
4312. The South since the Civil War. (3:3:0)
4321. Colonial South America. (3:3:0)
4322. South America since Independence. (3:3:0)
4327. The American Frontier to 1803. (3:3:0)
4328. The Trans-Mississippi West from 1803. (3:3:0)
4344. Tudor England. (3:3:0)
4347. Constitutional History of England. (3:3:0)
4349. The British Empire. (3:3:0)
4355. The Far East. (3:3:0)
4355. Africa. (3:3:0)
4359. History of Russia. (3:3:0)
4361. Classical Civilizations: Greece and Rome. (3:3:0)
4362. Medieval Civilizations. (3:3:0)
4364. Europe, The Age of Absolutism and the Old Regime. (3:3:0)
4365. The French Revolution and Napoleon. (3:3:0)
4367. Europe, 1870-1918. (3:3:0)
4368. Europe since 1918. (3:3:0)
FOR GRADUATES
(Graduate courses may be repeated for credit with departmental consent)
534. Historical Methods and Historiography. (3:3:0)
5311. Studies in Southern History. (3:3:0)
5313. Studies in United States Social and Cultural History. (3:3:0)
5314. Studies in the Frontier and Western American History. (3:3:0)
5315. Problems in American History. (3:3:0)
5316. Studies in Modern European History. (3:3:0)
5317. Studies in Medieval History. (3:3:0)
5319. Studies in Afro-Asian History. (3:3:0)
5322. Studies in United States Diplomatic History. (3:3:0)
631. Master's Thesis. (3)

Enrollment required at least twice.
634. Seminar in American History. (3:3:0)
635. Seminar in European History. (3:3:0)
831. Doctoral Dissertation. (3)

Enrollment required at least four times.

# Department of Journalism 

W. E. Garets, Head of the Department<br>Office: J. 103

Professor:<br>Garets<br>Assistant Professors:<br>Rooker, Sellmeyer


#### Abstract

In the education of its students the Department of Journalism attempts to supply a broad understanding of the role in a democracy of the mass communications media, along with accurate vocational information and sound training in such journalistic techniques as writing, editing, layout, photography, and typography. The department affers work leading to the Degree of Bachelor of Arts with a major or minor in journalism, and participates in the teacher education program of the College.

All journalistic work demands technical skill and experience along with the widest possible education. In addition to class and lab work, the student gains experience by work on student publications and through summer employment and internships, the latter supervised by the department in cooperation with the Texas Daily Newspaper Association and the Texas Press Association.


## Bachelor of Arts

Students majoring in journalism are required to complete $30-33$ semester hours with a minimun of 23 hours in required courses. By the time the student reaches his junior year he should consider one of the several fields of emphasis which the department offers. Four options are available: news-editorial, newspaper advertising, community newspaper, and radio-television. A journalism major or minor can be shaped to serve as vocational preparation in any of at least five different fields:

1. Service on a newspaper, large or small.
2. Work on a magazine, house organ, trade journal, or professional publication.
3. Careers in newspaper advertising and public relations.
4. Employment in radio and television news and advertising.
5. Teaching in the secondary school.

The following are the required courses in each of the options as indicated:

| News-Editorial |  |  |  |
| :--- | :--- | :--- | :---: |
| 231-232. Newspaper Reporting | 3313. Photojournalism |  |  |
| 335. History of Journalism | 430. Law of the Press |  |  |
| 336. Advanced Reporting | 434. Editorial Writing |  |  |

338. Editing

# Newspaper Advertising 

231. Newspaper Reporting
232. Typography
233. Newspaper Management, Promotion and Circulation
234. History of Journalism
235. Writing for

Radio and Television.
430. Law of the Press
435. Newspaper Advertising Problems and Methods
338. Editing

## Community Newspaper

231-232. Newspaper Reporting
233. Feature Writing
320. Typography
333. Newspaper Management, Promotion, and Circulation
336. Advanced Reporting 338-339. Editing
3313. Photojournalism
434. Editorial Writing
435. Newspaper Advertising Problems and Methods

## Radio-Television

233. Feature Writing
234. Newspaper Reporting
235. Advanced Reporting
236. News Editing
237. Photojournalism

The minor must include Journalism 130, 231, and 338 in the minimum of 18 required hours. Students must be able to type to enter Journalism 231. Majors and minors must have an overall C average in required courses; however, one $D$ will be accepted in a required course provided the cumulative average equals $C$ or better. More than one D will result in the student's repeating the course. Economics 133-134 or 231-232 and Psychology 230 or Philosophy 230 or Sociology 230 are also required for a major in journalism.

## Teacher Education

In the teacher education program of the College the department offers work in a teaching field (Plan I) for those planning careers in the secondary schools, and is approved as one of the social sciences in the broad field (Plan II) program for secondary teachers. For details of the teacher education program, see the discussion in the section of this catalog entitled "Interdepartmental Programs."

## Courses in Journalism FOR UNDERGRADUATES

130. Introduction to Journalism. (3:3:0)

A survey of journalism and its related fields intended to give the student an understanding of communication agencies in modern life and a broad picture of the vocational opportunities.
131. Introduction to News Analysis. (3:3:0)

A study of major news stories of the day and the function of mass communications media in American life. An introduction for both journalism and non-journalism majors to an intelligent following of current events as presented in the newspaper, newsmagazine, radio and television.

## 231, 232. Newspaper Reporting. (3:2:3 each)

Practice in gathering and writing news. Journ. 231 is a prerequisite to all higher journalism courses for both majors and minors. Majors and minors enrolled in this course are required to work on The Daily Toreador.

## 233. Feature Writing. (3:3:0)

Special feature stories; sources for subjects; collection of facts; practice in writing the news feature, side feature, color story. Special feature stories for newspapers, radio, television, wire services.

## 320. Typography. (2:1:3)

Brief history and evolution of typography; choice of types and their arrangement; type harmony and readability; mechanics of printing and publishing; engraving, printing processes, and presses.

## 333. Elements of Newspaper Management. (3:3:0)

Organization, field of service, personnel, equipment, production, community relations, labor relations, accounting, field trips, investigative project.
335. History of American Journalism. (3:3:0)

Study of the development of journalism in America from its European roots to the present and of its interrelation with society.
336. Advanced Reporting. (3:2:3)

Prerequisite: Journ. 231, 232. A course in the interrelation and writing of news on social, political, and economic topics. Instruction in techniques of specialized reporting will be given through off-campus laboratory assignments.

## 3312. Specialized Journalism. (3:3:0)

Designed for students of agriculture, home economics, engineering and science. Preparation in the principles of gathering and writing news feature stories, and magazine articles in their respective fields. Lectures on layout, editing and marketing copy and on preparing the radio and television newscast. Study of technical publications and of job possibilities.
3313. Photojournalism. (3:1:6)

Varied assignments of news and feature picture coverage, stressing use of the press camera. Lecture and laboratory course covering picture processing, and practice and study of picture editing.
3315. Advanced Photojournalism. (3:1:6)

Individual instruction in planning and executing photo assignments: lectures in color photography, portraiture; demonstrations of advanced techniques in photography with all types of cameras.

## 3318. Writing for Radio and Television. (3:2:3)

Training in writing news, continuity and public affairs for broadcast by radio or television; interviews and other multiple voice news shows. Speech 335 recommended.

## 3321, 3322. Magazine Writing and Editing. (3:2:3 each)

A study of the scope, influence and responsibilities of the magazine as a cultural and social force. Survey of editorial problems; intensive writing practice; market study; laboratory problems in copy preparation, picture editing, page layout and typographical display of the magazine. Members of the class are encouraged to work on La Ventana.

## 3325. Principles of Promotion and Public Relations. (3:3:0)

Study of current practices and problems in the field of public relations, with emphasis on various public relations functions, communication and publicity techniques. Planning public relations programs for such institutions as schools, colleges, churches, civic organizations.

## 3341. Newspaper Advertising Problems and Methods.

Problems of selling and servicing newspaper advertising; newspaper advertising makeup and design; rate structures; procedure in newspaper advertising departments.

## FOR UNDERGRADUATES AND GRADUATES

338, 339. Editing. (3:2:3 each)
Prerequisite: Journ. 231 or equivalent. Intensive study and practice of editing principles plus basic problems involved in the design and makeup of the newspaper. Includes practice in makeup, layout, copyfitting, and selection of types. Members of the class are required to work on The Daily Toreador copy desk.

## 411. Special Problems in Journalism. (1)

Prerequisite: Senior or graduate classification, juniors only with consent of Department Head. Individual research on approved problems in one of the following journalistic fields: news-editorial, radio-television, photography, magazine, public relations, and advertising. May be repeated for credit.
430. Law of the Press. (3:3:0)

A study of the laws which guarantee and protect the privileges and define the duties and responsibilities of the press. The course deals with freedom of information and the legal aspects of the newspaper, radio, television, and advertising.

## 432. Journalism for the High School Teacher. (3:3:0)

Study and practice with the problems met by a publications supervisor in organizing and directing high school newspapers and yearbooks, functions of high school publications, organization and training of the staff; editorial and business problems; problems with printers. May be counted as an education elective by secondary education students.

## 433. Public Opinion and Propaganda. (3:3:0)

The nature of public opinion; the role of the newspaper in its formation and how the press in turn is influenced by public opinion. Propaganda analysis; the purpose, devices, and effects of propaganda and censorship. May be taken for psychology credit.

## 436. Public Opinion and Public Issues. (3:3:0)

A broad synthesis course of both the social and natural sciences. A study of some of the great problems that face the citizen; the major mass media of communications and public opinion; how the mass media deal with the great problems.

## 4311. Public Affairs Reporting. (3:3:0)

A study of the newsman's role in interpreting major and continuing issues for the public. Special emphasis will be on state and local government, civil rights, labor and business and religion.
4314. Seminar. (3:3:0)

A seminar in problems of American journalism. Prerequisite: senior standing.

# Department of Mathematics 

Emmett A. Hazlewood, Head of the Department

Office: Ad. 301

Professors:
Bassam, G. Fuller, Hazlewood, Heineman, Rigby, C. L. Riggs*

Associate Professors:
Gilmore, Kazi, Parker, Al-Salam, Woodward
Assistant Professors:
T. Atchison, Bailey, Hildebrand, McGlothin, Megibben, Moreland, Morton, V. B. Roberts, Rowland, G. L. Shurbet, B. T. Smith, M. R. Strandtmann, C. H. Willingham
Instructors:
I. M. Carpenter, Duke, J. H. Hilton, L. H. Kennedy, S. A. Kennedy, K. King, T. O. Lewis,* R. S. Power, Scott
Part-time Instructors:
Caraway, H. Y. Lee, S. K. Rekers, Shipley, Waldron, V. B. Young

* On leave, 1963-1964

The Department of Mathematics offers a major program for those seeking the Degrees of Bachelor of Arts, Bachelor of Science, Master of Science, and Doctor of Philosophy. In addition, the department offers

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a program leading to teacher certification in mathematics under the Degree of Bachelor of Science in Education as well as under other degree programs involving mathematics as a major field. It also participates in the College's Honors Program.

A minimum of 33 semester hours is required for the Bachelor of Arts in mathematics, while 36 hours are required for the Bachelor of Science. For the recommended curriculum in mathematics leading to the Degree of Bachelor of Science, see Page 134. For the curriculum leading to the Bachelor of Arts, see Page 117. Mathematics 434 and 4321 are required for all degrees in mathematics. Information concerning graduate degrees will be found in the Graduate Bulletin.

Beginning freshmen who plan to have a teaching field in mathematics must consult their mathematics adviser regarding their course needs. Semester-hour requirements and normal course options are as follows:

1. 9 semester hours selected from Math 131, 132, 133, 135, 136, 233.
2. 6 hours of Math 231, 232.
3. 9 hours from Math 331, 332, 334, 337, 437, 4313, 4314, 4321.
4. 3 hours of Math 431.

The departmental adviser must approve the 6 hours of advanced work (courses number 300 and above) required of all minors. In order to claim a major or minor in mathematics, a student must have a grade average of C or better overall, and also on the advanced mathematics courses listed on his degree plan.

Beginning science, mathematics and engineering students will be allowed to enroll directly in Math 132 (Analytic Geometry) only if their test scores on the Advanced Achievement Test in Mathematics, or other suitable placement test scores, indicate reasonable proficiency in algebra and trigonometry. Those students not qualifying for Math 132 will be advised to take Math 133 and/or 131. Mathematics majors who are required to take either or both of these courses still will be required to take the normal 18 hours of advanced mathematics needed for the completion of the undergraduate degree in mathematics. All beginning science, mathematics, and engineering students who cannot qualify for direct admission to Math 132 are encouraged to take Math 133 and/or 131 in summer school.

Arts and Sciences students, exclusive of science and mathematics majors, may use any combination of mathematics courses to satisfy general degree requirements if they qualify for enrollment in these courses. The Math 135, 136 sequence is particularly recommended for students needing 6 hours of mathematics. For students needing only 3 hours, Math 136 is recommended as a terminal type course for the student with a good background in high school mathematics; Math 135 is an excellent terminal course for the average student.

## Courses in Mathematics FOR UNDERGRADUATES

[^29]
## 132. Analytic Geometry. (3:3:0)

Prerequisite: Satisfactory placement test scores, or Math. 133, or Math. 131. The straight line and conic sections; transformations of coordinates; polar coordinates; parametric equations; introduction to solid analytical geometry.

## 133. College Algebra. (3:3:0)

Admission granted on the basis of placement test scores. Inequalities; determinants of order 3 and higher; elementary theory of equations; binomial theorem; progressions; mathematical induction.
135. Introductory College Mathematics. (3:3:0)

Basic concepts in elementary mathematics. Number sets and operations; algebraic structures; elementary functions.
136. Elements of Mathematical Systems. (3:3:0)

Prerequisite: Consent of instructor or one semester of college mathematics. The logic of mathematics; proof; set theory; selected mathematical structures; axiom systems; all presented from the elementary viewpoint. Recommended for students in the biological and social sciences as well as for students majoring in mathematics and the physical sciences.
137, 138. Introductory Mathematical Analysis. (3:3:0 each)
Prerequisite: Two units of high school mathematics. Introductory logic and set theory; real number properties; inequalities and equations; relations and functions; vectors and matrices; linear programming; probability; progressions; survey of analytic geometry and elementary calculus. Primarily for business administration majors but may be used as 3 to 6 hours of mathematics to satisfy general degree requirements.
231. Calculus I. (3:3:0)

Prerequisite: Math. 132 or concurrent registration. Differentiation; rates; maxima and minima; rectilinear and curvilinear motion.
232. Calculus II. (3:3:0)

Prerequisite: Math. 231. Formal integration; definite integrals; areas; volumes; arc lengths; centroids; moments of inertia.

## 233. Linear Algebra. (3:3:0)

Prerequisite: Math. 133 or the equivalent. Finite-dimensional vector spaces, linear transformations and matrices, linear equations, quadratic forms, eigenvalues and eigenvectors, and vector spaces over the complex numbers.

## 238. Statistics. (3:3:0)

Prerequisite: Math. 133, or 135 or the equivalent. Collection and tabulation of data; bar charts; graphs; sampling; averages; dispersion; correlation index number; normal curve; probability; application to various fields. Credit for this course may not be used toward a degree in mathematics.
331. Calculus III. (3:3:0)

Prerequisite: Math. 232. Surfaces; partial differentiation; series, multiple integrals; indeterminate forms; hyperbolic functions.
332. Differential Equations. (3:3:0)

Prerequisite: Math. 331 or concurrent registration. Solutions of ordinary differential equations; geometric and physical applications.
334. History of Mathematics. (3:3:0)

Prerequisite: Math. 331 or consent of the instructor. Historical development of mathematics from the earliest records to current results; history of the application of mathematics to science and social science; impact of mathematics on the development of our culture and civilization.

## 335, 336. Higher Mathematics for Engineers and Scientists. (3:3:0 each)

Prerequisite: Math. 331 or concurrent registration. Ordinary differential equations; determinants and matrices; vector algebra and calculus; Laplace transforms; partial differential equations; numerical methods; complex variables.
337. College Geometry. (3:3:0)

Prerequisite: Math. 132. Directed segments and angles; similitude; inversion; geometry of the triangle, of quadrilateral, and circle. Recommended for teachers of geometry in high school.

## FOR UNDERGRADUATES AND GRADUATES

431. Teaching of Mathematics in the Secondary Schools. (3:3:0)

Prerequisite: 12 semester hours of college mathematics and consent of instructor. Particularly for those students who are within one semester of their student teaching.

Only those students working toward teacher certification may use credit in this course toward satisfying minimum requirements for the mathematics major.

## 432. Advanced Differential Equations. (3:3:0)

Prerequisite: Math. 332. Total differential equations; systems of differential equations; partial differential equations.
434, 435. Advanced Calculus. (3:3:0 each)
Prerequisite: Math. 331. Sets; functions; vector fields; partial derivatives; power series; theory of integration; line, surface, and multiple integrals.

## 437. Theory of Numbers. (3:3:0)

Prerequisite: Math. 232. Prime numbers; congruences; theorems of Fermat, Euler, and Wilson; residues; reciprocity law; Diophantine equations.

## 438. Solid Analytic Geometry. (3:3:0)

Prerequisite: Math. 132. Direction angles and cosines; equations of space curves, lines and surfaces; canonical forms.

## 4312. Numerical Mathematical Analysis. (3:3:0)

Prerequisite: Math. 332 or concurrent registration. Finite differences; interpolation; numerical solutions of algebraic, transcendental, and differential equations; empirical equations.
4313. Probability. (3:3:0)

Prerequisite: Math. 232. Permutations and combinations; additive and multhdiscontinuous distribution functions; applications.

## 4314, 4315. Mathematical Statistics. (3:3:0 each)

Prerequisite: Math. 331. Frequency functions; moments; probability; correlation and regression; testing hypotheses; small sample distributions; analysis of variance; nonparametric methods; sequential analysis.

## 4316. Introductory Point-Set Topology. (3:3:0)

Prerequisite: Consent of the instructor. An axiomatic treatment of linearly ordered spaces including properties of closed sets, connected sets, and convergent sequences of points.

## 4318. Finite Mathematical Structure. (3:3:0)

Logical development of modern mathematical structures with applications of principles to physical sciences; compound statements and truth tables; sets and functions; iinear algebra and vector spaces; convex sets; probability theory and Markov chains.
4319. Elementary Functions of Complex Variables. (3:3:0)

Prerequisite: Math. 331. Elementary functions: transformations; integrals and Integral theorems; power series; residues and poles; conformal mapping and applications.

## 4321. Elementary Modern Algebra. (3:3:0)

Prerequisite: Math. 233 or Math. 4324, or consent of instructor. The number system; mathematical induction; integral domains; determinants and matrices; rings and fields.

## 4324. Matrix Theory. (3:3:0)

Prerequisite: Math. 232. Matrices and determinants; rank; equivalence; transformations; vector spaces; characteristic equation of a matrix.
4391. Vector Analysis. (3:3:0)

Prerequisite: Math. 331. Scalar and vector products; gradient; divergence; curl; curvilinear coordinates; applications.

## 4392. Tensor Analysis. (3:3:0)

Prerequisite: Vector analysis or consent of instructor. An analytical treatment of the theory of tensors and extensors and their properties including Riemann-Christoffel Tensor and applications related to special relativity.

## FOR GRADUATES

511, 512. Seminar. (1:1:0 each)
Prerequisite: Graduate standing in mathematics. For graduate students and staff members. Required of all graduate students majoring in mathematics. May be repeated for credit.

## 531. Advanced Problems. (3:3:0)

Prerequisite: Math. 435 and graduate standing. May be used in an individual study or as a seminar. May be repeated in different areas such as algebra, geometry, statistics, and analysis.

536, 537. Modern Algebra. ( (3:3:0 each)
Prerequisite: Math. 233 or 4321. The number system; groups; rings; fields; linear algebra; Galois theory.
538. Foundations of Mathematics. (3:3:0)

Prerequisite: Graduate standing, with undergraduate major or minor in mathematics. Selected topics in algebra; the number system; the axlomatic approach to mathematics.
5312, 5313. Functions of a Complex Variable. (3:3:0 each)
Prerequisite: Math. 435. The algebra of complex numbers and their geometric representations: conformal mapping; power series; properties of analytic functions; theory of integration, including Cauchy and contour integrals.
5314, 5315. Functions of a Real Variable. (3:3:0 each)
Prerequisite: Math. 435. The real number system; set and measure theory; properties of Riemann and Lebesgue integrals.

5316, 5317. Topology. (3:3:0 each)
Prerequisite: Math. 4316 and either Math. 4321 or Math. 434. Point set theory. Introduction to combinatorial topology.

5321, 5322. Methods of Applied Mathematics. (3:3:0 each)
Prerequisite: Math. 4319 or its equivalent. Theory of congruence, special functions; Fourier series; Laplace transforms; boundary value problems; topics in functional analysis.

5323, 5324. Theory of Ordinary Differential Equations I, II. (3:3:0 each)<br>Prerequisites: Math. 432, 435, or consent of instructor.

5325, 5326. Partial Differential Equations I, II. (3:3:0 each)
Prerequisites: Math. 432, 435, or consent of instructor.
5331, 5332. Advanced Topics in Analysis I. II. (3:3:0 each)
Prerequisite: Consent of instructor.
5335, 5336. Advanced Mathematics for Teachers. (3:3:0 each)
Prerequisites: Graduate standing, with undergraduate major or minor in mathematics or its equivalent. Axiomatic approach to selected topics in mathematics.

5341, 5342. Advanced Topics in Algebra I, II. (3:3:0 each)<br>Prerequisite: Consent of instructor.

5351. Advanced Topics in Geometry. (3:3:0)

Prerequisite: Consent of instructor.
5361, 5362. Advanced Topics in Topology I, II. (3:3:0 each)
Prerequisites: Math. 5317 and consent of instructor.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

## Courses in Astronomy

## FOR UNDERGRADUATES

## 111. Survey of Astronomy. (1:1:0)

The main features of the known universe and the principles involved in their discovery. A non-mathematical survey recommended for all students except those planning to take Astron. 231-232.

231, 232. General Astronomy. (3:3:0 each)
Prerequisite: One course in college mathematics with a grade of C or better. The solar, stellar, and galactic systems, studied with attention to technical details.

# Department of Music 

Gene L. Hemmle, Head of the Department

Office: Music 101

Professors:
Elliott, Hemmle, M. D. Killion
Associate Professors:
Ellsworth, Kenney, McCarty, van Appledorn
Assistant Professors:
Humiston, Lawrie, Maynard, Post, B. N. Smith, Tolley
Instructors:
Bowen, Brittin, Catuogno, Gettel, Gilbert, Hill, P. A. Killion,* Mastroianni, G. D. Osborne, K. F. Osborne,* Woodall

* Part-time

The Department of Music has four main objectives: (1) to educate teachers of music; (2) to help each student attain the skills and proficiencies of a strong musician, while achieving through liberal arts courses the same sort of broad general education which is the intellectual foundation of the cultivated man or woman; (3) to develop talent to the highest degree of artistic capability; (4) to help any student enrolled in the College acquire discriminating taste and sound critical judgment through courses in music, supplemented by concerts and through association with distinguished teachers.

Nonmusic majors may elect class or private instruction in voice or in any instrument. Each student enrolled in applied music is carried at his maximum level of achievement, and the nonmusic major is not examined in competition with the music major. Courses designed to serve all students enrolled in the College are: Applied Music (vocal or instrumental, class or private instruction; Applied Music all levels); Music Literature 238, 239, 431, 432; Music Ensemble 010-1 (Tech Choir), 010-2 (Women's Chorus), 011-2 (Piano Ensemble), 010-4 (Tech Opera Theater), 010-5 (Tech Singers), 011-1 (Orchestra), 013-A (Tech Concert Band), 313-B (Tech Symphonic Winds), 313-C (Tech Stage Band).

The Department of Music offers work leading to the Degree of Bachelor of Music with a major in music education (instrumental or vocal), piano, or voice. This degree is for the student who expects to teach or direct vocal or instrumental music in the public schools, or for the student who desires concentration in performance and studio teaching. Requirements and curriculum for each major are shown on Pages 143, 144.

Entering freshman music majors should have studied previously and should have attained tcchnical proficiency in applied music sufficient to qualify for a course numbered 125 or above. Classification as to course will be made during orientation week.

Students transferring from other approved institutions will be administered placement examinations in applied music and music theory.

Music majors enrolled in the College are expected to study applied music with college faculty. Students who qualify for courses below 125 must register for Applied Music 125 until the deficiency is removed. Students following a plan for a major in music education will study the principal instrument for six semesters. Satisfying all requirements for the professional degree in music education may require more than eight semesters. Students following a plan for a major in applied music will study the principal instrument for eight semesters.

The applied music major is required to attain a higher performance proficiency than is required of the music education major concentrating in the same field. Upon request the Department of Music will supply specific requirements for entrance into Applied Music 125. Additional credit for applied music may apply toward the Bachelor of Music Degree only when carried as secondary instruments.

The student must earn a minimum grade of $C$ to qualify for successive levels of freshman, sophomore, and junior music theory.

Students may receive credit for college-level work accomplished prior to entrance into this College. This may be done through advanced standing examinations administered by the faculty of the Department of Music, after the student has obtained permission from the Dean of Arts and Sciences. Advanced standing examinations will be administered only in the fields of applied music and music theory. In order to receive credit by an advanced standing examination, the student must achieve a grade of not less than $B$ on such examinations.

At the end of their sophomore year, all applied music students who wish to enter advanced classes will have their work reviewed by the faculty. Each music major will be required to present a joint recital during the junior year. Applied music majors will be required to present a full recital during the senior year. Permission to present each recital must be obtained from an examining jury during the semester preceding the recital presentation.

The student must meet a proficiency level in required secondary subjects and in sight-singing by examination or course of study.

Attendance at 20 of the student recitals, faculty recitals, and performances by major organizations is required of all music majors each semester. Failure to meet this requirement may result in an increase in the number of hours satisfying degree requirements. Practical experience in accompanying, not to exceed one clock hour per week, is required of students enrolled with piano as a principal instrument.

Students are encouraged to minor in any area outside the major field. It may require additional time to obtain a second teaching field.

## Courses in Applied Music

Additional fees for applied music are shown in the section of this catalog entitled "Expenses." Laboratory hours shown for applied music courses are student-teacher contact hours. Applied music students are required to practice a minimum of three clock hours per week for each semester-hour credit.

## FOR UNDERGRADUATES

113, 114. Percussion. (1:0:2 each)
Fundamental knowledge of snare drum. Ability to tune and play timpani. Performance on all instruments of the battery. Laboratory ensemble experience.

1113, 1114. Voice. (1:0:2 each)
Correct posture and studies for breath control; development of resonance; study of vowel formation; vocalization. Simple songs. Laboratory ensemble experience.

1123, 1124. Piano. (1:0:2 each)
Sight reading and repertoire of simple piano materials. Harmonization and trangposition of easy compositions. Laboratory ensemble experience.

213, 214. Strings. (1:0:2 each)
Abllity to play scales on violin, viola, cello, and bass. Laboratory ensemble experience.

2113, 2114. Voice. (1:0:2 each)
Continuation of Ap. Mus. 1113, 1114. Laboratory ensemble experience.
2123, 2124. Piano. (1:0:2 each)
Continuation of Ap. Mus. 1123, 1124. Laboratory ensemble experience.
313, 314. Brass Instruments. ( $1: 0: 2$ each)
Prerequisite: Ap. Mus. 115. Ability to play scales on trumpet, French Horn, trombone, and tuba. Laboratory ensemble experience.

413, 414. Woodwinds. ( $1: 0: 2$ each)
Prerequisite: Ap. Mus. 115. Abllity to play scales on flute, oboe, clarinet, and bassoon. Laboratory ensemble experience.

Applied Music. 115, 116, 215, 216, 315, 316. Instrument or Voice. ( $1: 0: 1 / 2$ each)

Applied Music. 125, 126, 225, 226, 235, 236, 325, 326, 345, 346, 425, 426, 435, 436, 445, 446. Instrument or Voice. (2:0:1; 3:0:1; 4:0:1)

## PIANO (Sections 7, 8, 9, 10, 25)

FOR UNDERGRADUATES

## Secondary Piano.

Technical work and repertoire recommended by the State Department of Education in Bulletin 449, Pages 64 to 72.

## Freshman Piano.

Major and minor scales, arpeggios, broken chords, Bach, two-part inventions; sonatas; Haydn. Mozart, and Beethoven; romantic and modern compositions.

## Sophomore Piano.

Major and minor scales, arpeggios, broken chords, 16th notes at MM 100 to 120. Bach, two and three-part inventions, Well-Tempered Clavichord; sonatas; Mozart, Beethoven, Op. 10; romantic and modern compositions.

## Junior Piano.

Prerequisite: Faculty approval of performance proficiency. Bach, Well-Tempered Clavichord; Czerny, Op. 740, or studies of similar difficulty; sonatas; Scarlatti, Haydn, Mozart, Beethoven, Concerto No. 1. or 2 ; romantic and modern compositions.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Piano.

Bach, Well-Tempered Clavichord; Beethoven, sonatas equivalent in difficulty to Op. 31; Chopin; ballades, etudes, scherzi; romantic and modern compositions.

## VOICE (Sections 15, 16, 17, 18, 27)

## FOR UNDERGRADUATES

## Secondary Voice.

For course description, see Ap. Mus. 1113, 1114.

## Freshman Voice.

Studies in diatonic and chromatic scales; staccato and legato tones; emphasis on the latter. Simpler early Italian and English classics and repertoire for general use.

## Sophomore Voice.

More advanced technique; songs by Handel, Mozart, Schubert, Schumann, and other composers of the Classic and Romantic Periods. Repertoire for general use.

## Junior Voice.

Advanced vocal technique; studies in style appropriate to various periods. Selections from operas and oratorios of Bach, Handel, Mozart, Gluck and Haydn. Romantic and modern songs.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Voice.

Summary of previous technical exercises; more difficult songs of classic, romantic, and modern composers. Performance in German, French, and Italian languages.

## ORGAN (Sections 6, 26) <br> FOR UNDERGRADUATES

## Secondary Organ.

For non-music majors or music majors failing to qualify for Organ 125 or 126. Repertoires are similar to those for Organ 125; 126, or $225,226$.

## Freshman Organ.

Prerequisite: Piano 125, 126, or equivalent. Dickinson, The Art and Technique of Organ Playing, or Gleason, Method of Organ Playing; Bach, Eight Little Preludes and Fugues, Little Organ Book; Dupre, 79 Chorale Preludes; hymn and anthem accompantments.

## Sophomore Organ.

Selected works from pre-Bach composers; Bach, shorter preludes and fugues; sonatas of Mendelssohn and Widor; smaller works of Franck; works of American composers; church service playing and transcribing.

## Junior Organ.

Bach, preludes, toccatas, fantasies, fugues, concertos, and concert trio sonatas; selected romantic and modern repertoire. Elementary improvisation.

## FOR UNDERGRADUATES AND GRADUATES

## Senior or Graduate Organ.

Bach, major works; representative major works of pre-Bach, romantic and modern composers. Improvisation.

## Senior or Graduate Organ.

Selected major works of Bach; movements from symphonies and sonatas of Reger, Widor, Sowerby, Reubke; major works of Liszt, Dupre, Langlais, Messiaen, Hindemith, and others. Improvisation.

## VIOLIN (Section 21) <br> FOR UNDERGRADUATES

## Secondary Violin.

Technical work and literature outlined in Bulletin 449 of the State Department of Education, or work of equal difficulty.

## Freshman Violin.

Two- and three-octave scales, selected scales in thirds, sixths and octaves; Kreutzer or Mazas etudes as needed; Handel or Mozart sonatas; Viotti or De Beriot concertos; representative solos.

## Sophomore Violin.

Two- and three-octave scales and arpeggios; Kreutzer, Fiorillo etudes; Mozart Concerto No. 4 or equivalent; Beethoven sonata; representative solos.
Junior Violin.
Two- and three-octave scales and arpeggios; Fiorillo and Rode etudes; Bach sonatas; Bruch and Mendelssohn concertos; representative solos.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Violin.

Two- and three-octave scales and arpeggios, selected scales in thirds, octaves and tenths; Rode and Dont etudes; concertos by Mendelssohn, Bruch, Beethoven, Lalo, according to the degree of advancement; solo repertoire.

## VIOLONCELLO (Section 22) <br> FOR UNDERGRADUATES

## Secondary Violoncello.

Technical work and literature outlined in Bulletin 449 of the State Department of Education, or work of equal difficulty.

## Freshman Violoncello.

Scales and arpeggios; studics of Grutzmacher, Lee, and Klengel; representative solos.

## Sophomore Violoncello.

Scales and arpeggios; studies as necded. Studies of Vol. 1, Schlemuller, Dotzauer, Sevcik, and Romberg Concerto; representative solos.

## Junior Violoncello.

Scales and arpeggios; studies as needed; studies of Schroeder, Lee Op. 31, Kreutzer studies; representative solos.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Violoncello.

Scales and arpeggios; concertos and sonatas by Boccherini, Lalo, Brahms, and others; solo repertoire.

## VIOLA (Section 14) <br> FOR UNDERGRADUATES

## Secondary Viola.

Technical work and literature outlined in Bulletin 449 of the State Department of Education, or work of equal difficulty.

## Freshman Viola.

Scales and arpeggios; studies and exercises by Lifschey, Sitt, Wolfahrt; representative solos.

## Sophomore Viola.

Scaies and arpeggios as needed; studies by Campagnoli, Lifschey, Kreutzer; representative solos.

## Junior Viola.

Scales and arpeggios as needed; studies by Kreutzer, Mazas; Bach suites; representative solos; sonatas and concertos by Telemann, Haydn.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Viola.

Studies as needed; advanced repertoire sonatas by Brahms, Bach, Hindemith; concertos by Handel, Mozart; orchestral studies.

## DOUBLE BASS (Section 23) <br> FOR UNDERGRADUATES

## Secondary Double Bass.

Scales and intervals and selected compositions as needed.

## Freshman Double Bass.

Scales and arpeggios; studies from Simandl, Book I; appropriate solos.

## Sophomore Double Bass.

Scales and arpeggios; studies from-Simandl, Books I and II; orchestral studies; tenor clef and scales in three octaves using thumb position; representative solos and concerts.

## Junior Double Bass.

Scales and arpeggios. Studies from Bille New Method Book II emphasizing thumb position; representative solos including concerti by Capuzzi and Dittersdorf.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Double Bass.

Scales and arpeggios, studies in degree of advancement equivalent to Simandl and Kreutzer Etudes; orchestral studies of an advanced type; concert repertoire.

## FLUTE (Section 4) FOR UNDERGRADUATES

## Secondary Flute.

Development of embouchure, breath control, tone, and articulation; major, minor, chromatic scales in simple articulations; simple melodies; broken arpeggios; representative solos.

## Freshman Flute.

Continuation of scales, arpeggios, simple melodies; Popp-Soussmann, Complete Method for Flute, Book I; Studies by Kohler, Book II; Soussmann, Part II; representative solos, including at least one pre-classical sonata.

## Sophomore Flute.

Popp-Soussmann; Duets, Part II; Studies by DeLorenzo; Endresen, Supplementary Studies for Flute; Boehm, Studies; representative solos including at least one Bach sonata and one Handel sonata.

## Junior Flute.

Studies by Boehm continued; Popp-Soussmann, Part III; Roodenburg, Scale, Interval, and Arpeggio Studies for Flute; Studies by Briccialdi; representative solos, including at least one Mozart concerto and one contemporary sonata.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Flute.

Studies by Soussmann and Briccialdi continued; representative solos including Bach, B Minor Suite, and at least one contemporary sonata or concerto.

## OBOE (Section 20) <br> FOR UNDERGRADUATES

## Secondary Oboe.

Development of embouchure, tone, breath control, articulation; Gekeler Method for Oboe; Barrett's Standard Oboe Tutor; studies for development of control in scale, arpegglo, and interval progressions; representative solos.

## Freshman Oboe.

All major and minor scales and arpeggios in fluent legato and staccato; Pares, Daily Technical Studies for Oboe; Barrett, Exercises in Articulation and Progressive Methods; representative solos including Handel, B flat Concerto.

## Sophomore Oboe.

Barrett Studies continued; Sellner, Etudes of Oboe, Part II; studies for intervals, broken chords, and alternate fingerings; representative solos including at least two preclassical sonatas; beginning reed making.

## Junior Oboe.

Studies by Barrett and Sellner continued; representative solos including the Hindemith Sonata.

## 208 APPLIED MUSIC

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Oboe.

Studies by Barrett, Sellner, and Andraud; Bassi, Twenty-seven Virtuoso Studles for Oboe; representative solos including the Coossens Concerto.

## CLARINET (Section 2) <br> FOR UNDERGRADUATES

## Secondary Clarinet.

Development of embouchure, breath controil, tone production and fingering, Klose, Method, Part I; Lazarus, Method, Part III; representatíve solos.

## Freshman Clarinet.

Lazarus, Method, Part II; Baermann, Book II; Klose, characteristic studies; representative solos.

## Sophomore Clarinet.

Baermann, Book III; Rose, Forty Studies; Langenus, Scale Studies; representative solos.

## Junior Clarinet.

Labanchi Method, Book II; Saint-Saens, Sonata Op. 167; representative solos, including one sonata or concerto.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Clarinet. <br> Langenus, Virtuoso Studies and Duets; Jeanjean, Twenty-five Technical and Meiodic Studies; representative solos, including concertos, sonatas, and shorter solos.

## BASSOON (Section 19) <br> FOR UNDERGRADUATES

## Secondary Bassoon.

Development of embouchure, breath control, attack and production of tone; representative solos.

## Freshman Bassoon.

Weissenborn Studies, Book I, Op. 8; Milde, Studies; alternate fingerings; reed making, exercises in tenor clef; Jancourt, Progressive Sonatas, Book II; representative solos.

## Sophomore Bassoon.

F. Oubradous, Daily Scales and Exercises, Books I, II; Weissenborn Studies, Book II; representative solos.

## Junior Bassoon.

Weissenborn Studies; Book II continued; Milde, Concert Studies; A. Giampleri, Sixteen Daily Studies; representative solos.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Bassoon.

Weissenborn, Milde, and A. Giampieri Studies continued; Almenrader, Book II; clef studies, representative solos.

## SAXOPHONE (Section 11) FOR UNDERGRADUATES

## Secondary Saxophone.

Development of embouchure, breath control, tone, and articulation. Caillet, Method, Books I and II; representative solos.

## Freshman Saxophone.

All major and minor scales and arpeggios in fluent legato and staccato articulations; Vivian Scale Exercises; Brooke Method; representative solos.

## Sophomore Saxophone.

Brooke Method continued: Eby Method; Bassi-Iasilli, Twenty-seven Virtuoso Studies; representative solos.

## Junior Saxophone.

Brooke and Eby Methods continued; special studies for intervals, broken chords, alternate fingerings, and high note register; studies by Sigurd Rascher; Virtuoso Studies by Traxler, representative solos.

## FOR UNDERGRADUATES AND GRADUATES

Senior and Graduate Saxophone.
Sinc Virtuoso Caprices by Pantaleo; Iasilli and technical exercises by Calicchio; representative solos.

## CORNET or TRUMPET (Section 3) FOR UNDERGRADUATES

## Secondary Cornet or Trumpet.

Development embouchure; breathing; attack; scale studies; representative solos.

## Freshman Cornet or Trumpet.

Arban, Method; Williams, Book II; Pares, Daily Technical Studies; Rubank (Advanced) ; Kopprasch, Etudes; Clarke; Bellstedt; Gatti, World's Method of Cornet, Part II; emphasis on breath control, attack, and articulation; solos selected from Class II, Interscholastic League Solo List.

## Sophomore Cornet or Trumpet.

Williams, Book II, Arban, Gatti Studies, Clarke, Technical Studies for Cornet; Scholossbert Drills; studies in double and triple tonguing; clef reading (Sachse, Vol. 1); representative solos.

## Junior Cornet or Trumpet.

Williams, Book III, Guilbaut, Conservatory Studies, Clarke, Characteristic Studies; Etudes by Laurent and St. Jacome; clef reading; representative solos, including one sonata or concerto, arias, lieder and other solos.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Cornet or Trumpet.

Smith, Top Tones for Trumpet; Williams and St. Jacome Studies; Paudert, Twentyfour Modern Virtuoso Studies; Etudes by Petit and Balay; representative solos, including concertos, sonatas, and shorter solos.

## FRENCH HORN (Section 5) <br> FOR UNDERGRADUATES

## Secondary French Horn.

Development of embouchure, breath control, articulation, and tone; Pottag-Hovy, Book II, or studies of similar difficulty; solos from Interscholastic Solo List, Class I.

## Freshman French Horn.

Continuation of Kopprasch, Book I; begin Book II, studies for transposition, clef reading extension of range of all major and minor scales and arpeggios; representative solos. including arias, sonatas, and selections from Interscholastic League Solo List, Class II.

## Sophomore French Horn.

Continuation of Kopprasch, Book II Franz Studies; Pottag French Horn Passages; representative solos.

## Junior French Horn.

Continuation of Kopprasch; Franz Studies; Alphonse Etudes, Book III; Gallay, Thirty Etudes, Op. 13; representative solos, including one sonata or concerto, arias, lieder, other solos.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate French Horn.

Continuation of Kopprasch; Franz studies; Alphonse Etudes, Book IV; Michiels Twenty-four Etudes; continued study of transposition, clef reading; representative solos including concertos and shorter solos.

## TROMBONE (Section 12) <br> FOR UNDERGRADUATES

## Secondary Trombone.

Development of embouchure, breath control, articulation; Buchtel, Book II; Muller, Method for Trombone; Cimera, One Hundred Seventy Studies; solos from Interscholastic League Solo List, Class I.

## Freshman Trombone.

Buchtel, Cimera, Muller Studies; Arban, Ceiebrated Method for Trombone, Part I; representative solos, including two arias, one sonata, and solos from Interscholastic League Solo List, Class II.

## Sophomore Trombone.

Studies for legato articulation, added range, clef reading, flexibility, breath control, surety of attack; continuation of Cimera, Muller studies; completion of Arban Book I; Book II; Kopprasch, Book I; representative solos.

## Junior Trombone.

Studies in clef reading transposition; continuation of Kopprasch, Arban, Muller studies; Rochut, Book I; Blazevich, Method, representative solos, including one concerto or sonata, arias, and lieder.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Trombone.

Studies by Tyrrell; Mantia, Trombone Virtuoso; Lea Studies for Cello; study of F trombone; advanced clef studies; representative solos, including concertos, sonatas, and shorter solos.

## BARITONE (Section 1) <br> FOR UNDERGRADUATES

## Secondary Baritone.

Development of the embouchure, breathing, attack; all major scales, articulation, arpeggio exercises; solos from Interscholastic League Solo List, Class I.

## Freshman Baritone.

Continuation of studies for development of embouchure, breath control, attack; all major and minor scales, double and triple tonguing, arpeggio exercises; studies in treble and bass clefs; Rubank, Arban, Tyrrell; solos from Interscholastic League Solo List, Class II.

## Sophomore Baritone.

Studies in arpeggios continued, original scale forms, transpositions; representative solos.

## Junior Baritone.

Continuation of technical studies; Clarke, Characteristic Studies; double and triple tonguing, clef reading, Arban, Tyrrell, St. Jacome, and Smith, Top Tones; representative solos, including one sonata or concerto, arias, and lieder.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Baritone.

Continuation of all technical studies, clef reading, representative solos, including concertos, sonatas, and shorter solos.

## TUBA (Section 13) FOR UNDERGRADUATES

## Secondary Tuba.

Required technique; representative solos; Langey, Method for Tuba; Klose-Vanasek, 270 Tone and Technique Exercises for Tuba.

## Freshman Tuba.

Required technique; Eby, Method for Tuba; Hering, Thirty-two Etudes; transposltion studies; representative solos.

## Sophomore Tuba.

Required technique; Eby, Method for Tuba; Rochut, Etudes, Volume I. Transposition studies continued; representative solos.

## Junior Tuba.

Required technique; Rochut, Etudes, Volume I; Eby, Method for Tuba. Transposition studies continued; studies from band and orchestra literature.

## FOR UNDERGRADUATES AND GRADUATES

## Senior and Graduate Tuba.

Special studies selected from Eby, Rochut, La Fosse, Blazhevich; studies from band and orchestra literature; representative solos.

## HARPSICHORD (Section 27) <br> FOR UNDERGRADUATES AND GRADUATES

## Junior Harpischord.

Prerequisite: Plano 125, 126 or equivalent. Instruction from Couperin: L'Arte de Toucher le Clavecin. Selections from Little Preludes and Well Tempered Clavier, Bach; pleces from The Evolution of Piano Music. Introduction to elements of continuio playing.

## Courses in Music Literature

## FOR UNDERGRADUATES

131, 132. Introduction to Music Literature. (3:3:0 each)
Through directed listening, music of various forms and styles is considered. Introduction to music history showing relationship of music studied to that preceding and following it.

238, 239. Heritage of Music. (3:3:0 each)
For students not majoring in music. Selected compositions will be studied through an interpretation of their historical, functional, and cultural significance.

## FOR UNDERGRADUATES AND GRADUATES

## 330. Voice Repertoire. (3:3:0)

Prerequisite: Ap. Mus. 226 or 236 (Voice). Survey of song repertoire for all volces. Class performance and listening.
332. Piano Repertoire. (3:3:0)

Prerequisite: Ap. Mus. 226 or 236 (Piano). Survey of literature for plano. Class performance and listening.

## 431, 432. History of Music. (3:3:0 each)

Prerequisitt: Junior standing. A stylistic and blographical study of the major periods, medieval to modern, through records, scores, and bibliography. Performance practices, esthetics. Relationships to art, literature, and philosophy, and to social and political history.

## FOR GRADUATES

## 531. Seminar in Music Literature. (3:3:0)

The study of music as an academic discipline. Musicological orientations: systematic vs, historical. Scholarly principles applied to selected topics within the fields of music literature, history, aesthetics and criticism.
532. Choral Repertoire. (3:3:0)

Analysis of choral works of all periods of composition suitable for both small and large ensembles.

## Courses in Music Education

## FOR UNDERGRADUATES

## 231. Music for Classroom Teachers. (3:3:0)

Prerequisite: Sophomore standing. For elementary education majors. Not open to music majors. Rudiments of music, elementary music reading, ear training based upon elementary school music material.
232. Elementary Music Principles, Practices, and Materials. (3:3:0)

Prerequisite: Mus. Ed. 231 or equivalent. For elementary education majors. Not open to music majors. Music for elementary school children. Emphasis upon various music activities at this level.
327. Choral Methods and Techniques. (2:2:0)

Prerequisite: 4 semester hours of voice or equivalent. Conducting technique; procedures in development of choral organizations. Rehearsal techniques for preparation of choral works for public performance.

## 328. Instrumental Conducting. (2:2:0)

Prerequisite: Th. 247 or equivalent. Detailed study of baton technique, score reading, tone production, interpretation. Conducting laboratory ensemble required.

## 336. Secondary Instruments and Methods. (3:3:0)

Prerequisite: Junior standing and Ap. Mus. 226. Study of instruments other than student's principal instrument. Study of repertoire for and the organization and administration of public school instrumental groups.
337. Elementary School Teaching and Supervision of Music. (3:3:0)

Prerequisite: Junior standing. For music majors and minors. Procedures in teaching music in first six grades; selection and presentation of materials; the child voice in singing, its care and development; introduction and development of music reading; rhythmic development; creative music; the listening lesson.

## 338. Secondary School Teaching and Supervision of Music.

Prerequisite: Junior standing or permission of the instructor. For music majors. Study of procedures in teaching music in upper level grades and in high school. General treatment of choral and instrumental music; instruction in theory and general music.

## FOR UNDERGRADUATES AND GRADUATES

## 433. Piano Pedagogy. (3:3:0)

Prerequisite: Ap. Mus. 326 or 346 (Plano). For prospective piano teachers. Teaching methods for beginners and succeeding levels. Correct presentation of rudiments of music, principles of technique, and teaching materials.

43\%. Voice Pedagogy. (3:3:0)
Prerequisite: Ap. Mus. 326 or 346 (Voice). Comparison of known systems of voice teaching; evaluation of the individual voice, various vocal exercises, singing styles, student teaching.

## 4317. Choral Conducting. (3:2:2)

Prerequisite: Senior classification in music education. Study and performance of representative choral works of all periods. Participation in a major choral organization required. This is an individual study course.

## 4318. Instrumental Conducting. (3:2:2)

Prerequisite: Senior classification in music education. Study and performance of instrumental works of all periods. Participation in a major instrumental group required. An individual study course.

## FOR GRADUATES

530, 531. Seminar in Music Education. (3:3:0 each)
Prerequisite: Open to any interested graduate student upon approval of the Music Department. Review of current educational philosophy in America. Special reference to the place of music in the curriculum. Review and criticism of music curricula. Evaluation of music education principles, practices, and materials. General aspect of course is adaptable to interests of all music teachers and educators interested in music. Special studies allow concentration in the field of the student's major activity.
532. Choral Music Workshop. (3:3:0)

Prerequisite: 18 semester hours of music, 6 of which are advanced hours including Mus. Ed. 327 or equivalent. Emphasis in the organization and development of choral organization in the public schools including tone production, rhythmic precision, balance, blend, diction. Individual and group project required.

## 533. Instrumental Music Workshop. (3:3:0)

Prerequisite: 18 semester hours of music, 6 of which are advanced hours including Mus. Educ. 328 or equivalent. Emphasis in the organization and development of instrumental groups in the public schools including tone production.

[^30] tests and festivals. Study of contrasting marching band styles.

## 53\%. Instrumental Repertoire. (3:3:0)

Literature for small and large instrumental ensembles.


#### Abstract

5335. Music for Children. (3:3:0)

Prerequisite: 6 semester hours in music education or two years' experlence in elementary teaching. Emphasis upon development of musical expressions of children through rhythmic activities, song repertoire, dramatic interpretation, creative expression, and appreciative listening to music. Study of material adapted to normal social and musical interests of children. Enrollment limited to graduate students majoring in elementary


 education.
## 630. Master's Report.

631. Master's Thesis. (3)

Enrollment required at least twice.

## Courses in Theory

## FOR UNDERGRADUATES

## 133, 134. Elementary Theory. (3:3:1 each)

Properties of sound; introduction to the keyboard; elementary time and rhythmic reading; triad study and introduction of four-voice chords; key feeling and tonality; sight-singing; harmonic and melodic dictation in major and minor. Alto and tenor clef reading introduced.

## 233, 234. Intermediate Theory. (3:3:1 each)

Prerequisite: Th. 134 or equivalent. Study of eighteenth century style including non harmonic tones, chorale harmonizations, and harmonic dictation. Melodic dictation and sight-singing involving simple and compound meters; keyboard practices including faked bass and figured bass. Analysis and original work in the contrapuntal forms; writing of two and three-part inventions; seventh chords and altered chords.

## FOR UNDERGRADUATES AND GRADUATES

## 333, 334. Form and Composition. (3:3:0 each)

Prerequisite: Th. 234 or equivalent. Study of homophonic forms of musical composition with respect to Viennese classical style; creative writing, augmented sixth chords. Analysis of phrase construction, and larger forms including the symphony. Study of the basic form and style principles of the impressionistic and contemporary periods with analysis performance projects, and application of these styles including ninth, eleventh, and thirteenth chord harmonies and dissonant contrapuntal writing in original compositions.

## 42\%. Instrumentation. (2:2:0)

Prerequisite: Th. 334 or equivalent. Study of properties of wind instruments. Emphasis on devices, techniques, mechanics of band scoring.
531. Seminar in Music Theory. (3:3:0)

Intensive study of various theoretical texts. Theoretical materials and techniques illustrated by comprehensive search and analysis of selected instrumental and vocal scores from the Baroque through the contemporary periods.

## Courses in Ensemble

Each ensemble except 313 may be taken for four successive years since the literature studied will cover a cycle of that period of time. Ensemble 313 may be taken for two successive years. Four semester hours of Ensemble 013 may be substituted for required physical education.

## FOR UNDERGRADUATES

10. Sec. 1. Tech Choir. (1:0:5)

Prerequisite: Audition.
010. Sec. 2. Women's Chorus. (1:0:2) Prerequisite: Audition.
010. Sec. 4. Opera Theater. (1:0:5) Prerequisite: Audition.
010. Sec. 5. Tech Singers. (1:0:5) Prerequisite: Audition.
011. Sec. 1. Symphony Orchestra. (1:0:5) Prerequisite: Audition.
011. Sec. 2. Piano Ensemble. (1:0:2) Prerequisite: Permission of instructor. Restricted to duet performance.
011. Sec. 3. String Ensemble. (1:0:2)

Restricted to duet, trio, or quartet ensemble.
013. Sec. A. Tech Band. (1:0:5)

Prerequisite: Audition. 4 semester hours may be substituted for required physical education.
313. Sec. A. Tech Band. ( $1: 0: 5$ )

Open to junior and senior students.
313. Sec. B. Symphonic Winds. (1:0:2) Open to junior and senior students.
313. Sec. C. Stage Band. ( $1: 0: 3$ ) Open to junior and senior students.

## Military Band

Part of Basic ROTC. For particulars, inquire of the officer in command.
Music Fees for Applied Music (Private)
(See Miscellaneous Special Fees, Page 48.)

# Department of Physics 

Henry C. Thomas, Head of the Department
Office: Sc. 109-B

Professors:<br>Day, Merrymon,* Schmidt, H. C. Thomas Associate Professors:<br>R.E. Berry, Gardner, P. F. Gott, Sandlin<br>Assistant Professors:<br>Basford,* Howe, Lodhi, Mann<br>* Part-time

The Physics Department offers a course of study leading to the Bachelor of Arts or the Bachelor of Science Degree. In addition, the department cooperates with the Engineering School in offering a fouryear program leading to a Bachelor of Science Degree in Engineering Physics.

In fulfilling degree requirements, majors in this department must have a grade average of 2.00 in physics courses, with at least 36 semester hours of physics in which a grade of $C$ or better was received.

The Department offers the Degrees of Master of Science and Doctor of Philosophy. The requirements for these degrees can be found in the Graduate Bulletin.

For those planning to teach physics and other sciences, the following physics courses are required:
I. For students following Plan I (two teaching fields of 24 semester hours each) : Physics 143, 241, 242, 314, 315, 335, 336, plus 6 hours from the following: Physics 331, 337, 338, 341, 432, 434, 435, 439.
II. Science option: Students may elect a science teaching option (Plan II). Work must be distributed in at least three of the science departments-Biology, Chemistry, Geosciences, and Physics. Not more than 8 hours may be in geosciences. The student electing this option should consult the Head of the Physics Department and should become familiar with the discussion of teacher education in the section of this catalog entitled "Interdepartmental Programs."

In addition to completing the above pattern of courses, candidates for degrees other than the Bachelor of Science in Education must meet the usual requirements for those degrees. (See the discussion at the beginning of the section listing the offerings of the School of Arts and Sciences for curricula leading to the B.A. and B.S. Degrees with majors in physics.)

## Courses in Physics

## FOR UNDERGRADUATES

## 141-142. General Physics. (4:3:3 each)

A. general course in beginning physics covering mechanics, heat, sound, electricity and magnetism, light, and modern physics.

## 216 PHYSICS

## 143. Principles of Physics I. (4:3:3)

Prerequisite: Parallel enrollment in Mnth. 231. Kinematics, dynamics, conservation laws, wave motion, fluids, kinetic theory, and thermodynamics.

## 237. Techniques of Photography. (3:2:3)

Prerequisite: Sophomore standing and approval of instructor. A course in fundamental processes and techniques of photography for those who will later need photog. raphy as a scientific tool. May be taken by majors and minors but will not apply toward physics requirements. Additional time needed for darkroom processing to be arranged.

## 241. Principles of Physics II. (4:3:3)

Prerequisite: Phys, 143 and parallel enrollment in Math. 232. Electric and magnetic flelds, dielectrics, magnetic properties of materials, electromagnetism, geometrical and physical optics.

## 242. Principles of Physics III. (4:3:3)

Prerequisite: Phys. 241. Study of atomic and nuclear phenomena.
312, 313. Atomic and Nuclear Physics Laboratory. (1:0:3 each)
Prerequisite: Phys. 242 or parallel enrollment in Phys. 337, 338. Approval of instructor. Credit for either or both semesters.

## 314, 315. Intermediate Laboratory. (1:0:3 each)

Prerequisite: Phys. 143, 241, 242, or equivalent and junior standing. Laboratory course in basic physical principles.
331. Optics. (3:2:3)

Prerequisite: Phys. 143, 241, and 242. Major emphasis on physical optics.
335, 336. Electricity and Magnetism. (3:3:0 each)
Prerequisite: One year of physics and junior standing. Electrostatics, dielectric theory, Laplace's equation, transient and A.C. circuits, magnetic fields, vector potential, magnetic materials, and electromagnetic theory.
337. Introduction to Atomic Physics. (3:3:0)

Prerequisite: One year of physics and junior standing.
338. Introduction to Nuclear Physics. (3:3:0)

Prerequisite: One year of physics and junior standing.
341. Electronics. (4:3:3)

Prerequisite: Phys. 335. General course in electronics stressing the fundamentals of electron behavior in areas of primary importance in the physical sciences.

## FOR UNDERGRADUATES AND GRADUATES

422. Selected Topics. (2:2:0)

Prerequisite: Approval of Head of Department. Lecture course in topics selected either by student request or departmental recommendation and given when deemed necessary. May be repeated in different areas.
432. Thermodynamics. (3:3:0)

Prerequisite: Phys. 143, 241, and 242, or equivalent, and differential equations. First and second laws of thermodynamics, entropy, equations of state, thermodynamics functions.
434, 435. Mechanics. (3:3:0 each)
Prerequisite: Phys. 143, 241, and 242, or equivalent, and differential equations. Statics, kinematics, and dynamics of rigid bodies including Euler's equations, damped and forced vibrations, Lagrange's equations, Hamilton's equations, special relativity.

## 436. Individual Study of Specified Fields. (3:1:4)

Prerequisite: Approval of department. Individual student study of theoretical or experimental projects under the guidance of a member of the staff. May be repeated in different areas.
437, 438. Quantum Mechanics. (3:3:0 each)
Prerequisite: Differential equations. The Schrodinger equation, matrix representations, approximation methods, and scattering with applications in contemporary physics.

## 439. Solid-State Physics. (3:3:0)

Prerequisite: Phys. 335, 336, and differential equations or consent of Department Head. Specific heats of solids, ionic conductivity, ferro-electronics, band theory of solids, semiconductors and transistors, ferro-magnetism.

## 4121. Engineering Physics Seminar. (1:1:0)

Prerequisite: Approval of department. Investigation and study of engineering problems of special interest and value to the student. May be repeated for credit.

## FOR GRADUATES

511, 512. Seminar. (1:1:0 each)

Required of all graduate students.
513. Techniques of Experimental Physics. (1:0:3)

Prerequisite: Graduate standing in physics. The use and development of experimental apparatus, design of experiments, treatment of data.
530. Advanced Topics. (3:3:0)

Prerequisite: Graduate standing and approval of Head of Department. Advanced topics selected by departmental recommendation. May be repeated in different areas.

## 535. Introduction to Statistical Physics. (3:3:0)

Prerequisite: Phys. 432, 437, and 438; enrollment in Phys. 438 may be parallel. Elements of probability theory and statistics; conceptual foundation of kinetic theory, Gibbs' statistical mechanics, the method of Darwin and Fowler, derivation of the laws of macroscopic thermodynamics from statistical considerations; other selected applications in both classical and quantum physics.
536. Advanced Dynamics. (3:3:0)

Prerequisite: Phys. 541 or consent of instructor.
541, 542. Theoretical Physics. (4:4:0 each)
Prerequisite: Working knowledge of advanced calculus, vector analysis, intermediate mechanics, intermediate electricity and magnetism, and contemporary physics. Introduction to contemporary methods of mathematical physics and the theoretical framework of selected areas of present-day physics. Classical vectorial and analytical mechanics, special theory of relativity, classical field theory, partial differential equations of physics, boundary value problems, and elementary quantum mechanics. Theoretical foundations of current departmental research fields are developed.

## 631. Master's Thesis. (3)

Enrollment required at least twice.
633, 634. Advanced Quantum Mechanics. (3:3:0 each)
Prerequisite: Phys. 437, 438, 541, and 542. Review of formal theory of quantum mechanics; quantum theory of angular momentum; relativistic wave equations, formal theory of scattering, including $S$-matrix theory; quantum theory of fields, including quantum electrodynamics theory of weak interactions, theory of strong interactions, and dispersion relations.

## 635, 636. Electromagnetic Theory. (3:3:0 each)

Prerequisite: Math. 434, 435, Physics 335, 336. Advanced treatment of Maxwell's theory, including electrostatics, magnetostatics, theory of radiation, and application of the theory to selected contemporary problems.

637, 638. Structure of Matter. (3:3:0 each)
Prerequisite: Departmental approval. Contemporary concepts of the structure of material and the empirical evidence supporting these concepts. Atomic structure, molecular structure, nuclear structure, sub-nuclear particles; the gaseous, liquid, and solid states; transitions between states. A mature mathematical treatment.

## 639. Advanced Statistical Physics. (3:3:0)

Prerequisite: Phys. 535. Advanced application of statistical methods to problems of transport phenomena, non-equilibrium thermodynamics, imperfect gases, phase transitions, and quantum fluids.

733, 734. Advanced Solid State Physics. (3:3:0 each)
Prerequisite: Departmental approval. A professional level course covering both experimental and theoretical aspects of solid state physics.
735, 736. Atomic and Molecular Spectra. (3:3:0 each)
Prerequisite: Departmental approval. A professional level course covering both experimental and theoretical aspects of atomic and molecular structure.
737, 738. Advanced Topics in Theoretical Physics. (3:3:0 each)
Prerequisite: Departmental aproval. Current topics in theoetical physics which may include aplication of group theory, quantum mechanics of many-body systems, theory of elementary particles, general relativity, and theory of plasmas.
739. Individual Study. (3:1:4)

Prerequisite: Departmental approval. Theoretical or experimental study in probtems of current interest. May be repeated for credit.

7311, 7312. Advanced Nuclear Physics. (3:3:0 each)
Prerequisite: Phys. 437, 438. A professional level course covering both experimental and theoretical aspects of nuclear physics.
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

# Department of Psychology 

Theodore Andreychuk, Head of the Department Office: Psy. 111

Professors:<br>Anderson, Andreychuk, Cobb<br>Kovnar, Kuntz<br>Associate Professors:<br>Ray, Strong, Sweney<br>Assistant Professors:<br>Daley, Heaberlin, White<br>Instructor:<br>Boyd

The Department of Psychology offers work leading to the major or minor in psychology for the Degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy. The advanced degrees encompass a number of different areas in counseling, clinical, and experimental psychology. In addition, the Departments of Psychology and Education jointly offer a graduate program for those wishing to earn a professional certificate in school counseling and guidance. Summer institutes in school counseling are held through the cooperation of the United States Department of Health, Education, and Welfare. For details of the above program see the Bulletin of the Graduate School.

The undergraduate program in psychology is designed to provide the student with a broad exposure to the field. It is not intended to train the student for professional competency. This is done only at the graduate level. However, the holder of a B.A. Degree in psychology can find employment in a number of places such as industry, government agencies, etc.

All majors in psychology are required to take a core program of six courses plus an additional four on an optional basis. The required courses are: $230,240,343,436,437$, and 4317 . Of the optional courses, not more than one may be below the 400 level.

Psychology majors are expected to perform at a high academic level. Grades below $C$ will not be acceptable for fulfillment of either major or minor requirements.

## Courses in Psychology

 FOR UNDERGRADUATES
## 230. General Psychology I. (3:3:0)

Introduction to selected fundamental concepts in psychology. Emphasis on heredity and environment, individual differences, personality dynamics, and group processes. For majors and non-majors.

## 240. General Psychology II. (4:3:2)

Emphasis on experimental psychology, learning theories, and the biological bases of behavior. Introduction to laboratory approaches in the study of behavior. For majors and experimentally orlented non-majors.

## 330. Psychology in Business and Industry. (3:3:0)

Prerequisite: Psy. 230 or 240. Basic psychological principles of behavior in the management of personnel.

## 331. Child Psychology. (3:3:0)

Prerequisite: Psy. 230 or 240, or Educ. 332, or Ch. D \& F.R. 131. Emphasis is placed upon the development of the child from 6 to 12. A study of the developmental processes and enviromental factors which shape the personality and affect the achievement of the child. Oriented to teachers or child guidance workers.

## 332. Mental Health. (3:3:0)

Prerequisite: Psy. 230 or 240 , or Educ. 332, or Ch..D. \& F.R. 131. A study of the individual and social factors which contribute to the development of both healthy and unhealthy personalities.
335. Adolescent Psychology. (3:3:0)

Prerequisite: Psy. 230 or 240 , or Educ. 332, or Ch.D. \& F.R. 131. A general review of approaches to the understanding of social behavior and development of the adolescent. Physical, mental and emotional growth and adjustment are covered. Guidance emphasis. Oriented to public schol certification program.

## 343. Statistical Methods. (4:3:2)

Prerequisite: Psy. 230 or 240, or Educ. 332. Introduction to descriptive and inferential statistics. Covers probability, frequency distributions and parameters, ch! square, $t$ test, $F$ test, correlations, analysis of variance and non-parametric techniques. Practice on calculators and computers.

## FOR UNDERGRADUATES AND GRADUATES

## 432. Personnel Testing. (3:2:3)

Prerequisite: Psy, 330 or equivalent. The principles and methods of test construction and test administration. Survey of the practical fields of personnel measurement including specific aptitudes and achievement, interest, and personality dimensions. Fee $\$ 2$.

## 434. Introduction to Social Psychology. (3:3:0)

Prerequisite: Psy. 230 or 240 . Study of individual experience and behavior in relation to social stimulus situations. Survey of experimental work and reports on current problems.

## 435. Abnormal Psychology. (3:3:0)

Prerequisite: 6 semester hours in psychology. Personality deviations and maladjustments; emphasis on clinical descriptions of abnormal behavior, etiological factors, manifestations, interpretations, and treatments.

## 436. Personality Development. (3:3:0)

Prerequisite: 6 semester hours in psychology. Principles of normal personality structure. Designed to meet the practical needs of teachers, personnel workers. counselors, clinical psychologists, and others who are interested in guidance and the understanding of personality organization.

## 437. Experimental Psychology. (3:2:3)

Prerequisite: Psy. 230 or 240. Recommended: Psy. 333 completed or taken concurrently. A lecture-laboratory course considering (i) the problems of experimentation in clinical, social, and experimental psychology upon animals and human subjects, and (2) content topics such as transfer of training and psychophysics.

## 439. Industrial Psychology. (3:3:0)

dustry.
Prerequisite: Psy. 230 or 330 . Psychological principles and methods applied to in-

## 4314. The Human Element in Engineering. (3:3:0)

Prerequisite: Psy. 230 or 330. Recommended: Psy. 333. Introduction to human factors and their function in man-machine systems. Emphasis is on the perceptual and work capacities of man in relation to various task situations.

## 4316. History of Psychology. (3:3:0)

Prerequisite: 6 semester hours of psychology. Recommended: senior standing. A survey of the history of psychology with emphasis on the evolution of contemporary vlewpoints and methods.

## 4317. The Psychology of Learning. (3:3:0)

Prerequisite: 6 semester hours of psychology. A critical survey of methods, results, and interpretations of human and animal studies with emphasis on understanding the basic concepts and terms employed in this area.

## 4319. Human Learning. (3:3:0)

Prerequisite: Psy. 230 or Educ. 332. An investigation of the research dealing with human learning, particularly in relation to education, training and conditioning. Emphasis will be on higher types of problem solving, programmed instruction, retention, motor skills and language skills. Applied emphasis.

## 4321. Interviewing Principles and Practice. (3:3:0)

Prerequisite: 6 semester hours in psychology and/or consent of instructor. Review of principles. Emphasis on skill which will apply directly to all interview situations such as industrial, clinical, and vocationel counseling. Demonstration, recordings, and discussion. Student participation stressed.

## 4326. Individual Problems Course.

Prerequisite: Advanced undergraduate standing and high scholastic achievement. Readings and papers in selected fields of psychology. Independent work under the indlvidual guidance of a staff member with his prior permission.

## 4327. Physiological Psychology. (3:3:0)

Prerequisite: 6 semester hours of psychology. Recommended: Biol. 142 or equivalent. Introduction to neuroanatomy, electrophysiological measuring techniques, and the mechanisms of receptor and effector systems. A study of the relationship between behavior and the physiological substrate.

## FOR GRADUATES

## 532. Problems in Psychology.

Prerequisite: 12 advanced semester hours in psychology. Readings and papers in selected fields of psychology. Independent work under individual guidance of a staff member with his prior permission.

## 534. Practicum in Psychological Testing. (3:3:0)

Prerequisite: Psy. 5314. Instruction and practice in giving intelligence, aptitude, interest, and/or personality tests. Emphasis on rehabilitation problems during the fall, and on school counseling problems during summer term.

## 539. Occupational Information. (3:3:0)

Prerequisite: Graduate standing. Sources, techniques of collecting, classifying and using educational and occupational information necessary in counseling.

## 5311. Projective Techniques I. (3:3:0)

Prerequisite: Psy. 435, 534, 5324. Psychological principles and theories of perception, motivation and related topics as applied to projective methods. Study and administration of specific projective tests.

## 5312. Projective Techniques II. (3:3:0)

Prerequisite: Psy. 5311. Study and administration of selected projective techniques. Rorschach and TAT.

## 5313. Advanced Projective Techniques. (3:3:0)

Prerequisite: Psy. 5312 and consent of instructor. Interpretation and advanced practice with Rorschach, TAT, H-T-P, and other projective techniques. Case presentation and report writing.

## 5314. Tests and Measurements. (3:3:0)

Prerequisite: Psy. 343 or equivalent. Instruction and supervised practice in . planning a testing program; selection, administration, scoring, and interpretation of individual and group tests, including intelligence, achievement, aptitude and personality tests. Emphasis placed on rehabilitation problems during the fall and on school counseling problems during the summer term.

## 5315. Introduction to Vocational Rehabilitation. (3:3:0)

Prerequisite: 6 advanced hours in psychology; student in vocational rehabilitation counseling. Basic philosophy of rehabilitation; new plans and policies at state and national levels, interagency and community relationships; case and office management, physical restoration; basic philosophy and program for the rehabilitation of the blind; social laws under which the rehabilitation counselor will operate. Field trips and lectures.

## 5316. Introduction to Adjustment Counseling and Psychotherapy. (3:3:0)

Prerequisite: Psy. 435 or 436. Consideration of theories of adjustment counseling. Principal emphasis on client-centered approach to counseling. Attitudes and orientation of the counselor and the counseling relationship, oral discussion, recordings, and role playing. Consideration of special problems in counseling secondary school and college students, physically disabled, and the severely mentally ill patient.

## 5317. Techniques of Counseling: Career Guidance. (3:3:0)

Prerequisite: Psy. 5314. Methods of vocational and educational counseling. Emphasis on relationships of personality development to career patterns. Consideration of techniques of evaluation counseling.

## 5318. Practicum in Techniques of Counseling. (3:2:3)

Two sections are offered:
(1) Prerequisite: Psy. 534, 539, 5316, and 5317. Supervised experience in counseling and preparing case reports. Special emphasis on school counseling and associated problems.
(2) Prerequisite: Psy. 539, 5314, 5316, and 5317. To be taken concurrently with Psy. 5325. Supervised experience in interviewing, adjustment counseling, vocational counseling, and/or psychological evaluation. Special emphasis on the physically disabled, mentally retarded, and emotionally disturbed client. Student works with a limited number of clients through the clinic.
5323. Group Counseling and Psychotherapy. (3:3:0)

Prerequisite: Psy. 5316. Designed to provide both theories of approaches to group work as well as a personal experience with group processes. Various points of view will be studied.

## 5324. Seminar in Personality Theory. (3:3:0) <br> Prerequisite: Psy. 436. Critical review of current theories of personality.

## 5325. Case Studies in Vocational Rehabilitation. (3:3:0)

Prerequisite: Consent of instructor. Critical analysis of actual cases derived from the files of the State Office of Rehabilitation. Study and review of cases of blind persons derived from case records of the State Commission for the Blind.

## *5326. Medical Aspects of Rehabilitation. (3:3:0)

Prerequisite: Consent of instructor. A joint medical-psychological seminar consldering medical aspects and psychological components of disabling diseases and the interaction of these two factors as the individual reacts to the residual handicap. Re habilitation emphasis. Cooperative endeavor with medical specialists presenting medical aspects, and psychologists reviewing psychological components and integrating the two in a rehabilitation framework.

## 5327. The Psychology of Disability. (3:3:0)

Prerequisite: Consent of instructor. A medical psychological approach to rehabilitation of the disabled. Special emphasis upon attitudes toward disability, social and psychological implication of mental and physical disabilities as related to the client's self concept and attitudes of the community toward the client.

## 5334. Advanced Counseling Psychology. (3:3:0)

Prerequisite: Psy. 539 and 5318. Consideration of theories of vocational development and theories of counseling. Discussion of professional issues and problems related to the area of counseling psychology.

## 5336. Advanced Child Psychology. (3:3:0)

Prerequisite: Psy. 331, 435, 436. A course dealing with mental, motor, social. and emotional development of elementary school age children. Effects of environment in producing emotional disturbances.

## 5337. Play Therapy. (3:3:0)

Prerequisite: Psy. 5336. Study of theory and application of play techniques in doing diagnostic and therapeutic work with children; the child's symbolic communications through language, art and play materials. Review of research.

[^31]
## 5341. Experimental Design and Quantitative Methods in Psychology.

 (3:3:0)Prerequisite: Psy. 437, 5342. Logical principles governing sound experimentation; conventional designs utilizing analysis of variance, factor analysis, and multiple and partial correlation.
5342. Advanced Statistical Methods. (3:3:0)

Prerequisite: Psy. 333 or equivalent. Statistical inference including probability, small sample theory, chi square analysis of variance, and non-parametrics.

## 5351. Advanced Experimental Psychology and Psychodynamics. (3:3:0)

Prerequisite: Psy. 437, 5342, 5341. Advanced research techniques; each class member required to design, execute, and write up one or more original experiments, preferably with human subjects. Not a dissertation course. Fee $\$ 3$.
5352. Seminar in Learning Theory. (3:3:0)

Prerequisite: Psy. 4317. Current learning theories including those of Hull, Tolman, Lashley, Spence, Lewin, Hebb, and others.

## 5353. Seminar in Physiological Psychology. (3:3:0)

Prerequisite: Psy. 4327 or equivalent. Open to graduate students in the biological sciences with credit for Psy. 230 or equivalent. Current trends in psycho-physiological research.
5354. Seminar in Perception. (3:3:0)

Prerequisite: Consent of instructor. Major problem areas in psychology of perception such as the study of the psychophysiology of sensory processes; perception theory; implications for usage in social and clinical psychology. Topics may vary from year to year.

## 5355. Seminar in Comparative Psychology. (3:3:0)

Prerequisite: Consent of instructor. Study of the use of sub-human organisms in psychological research. Emphasis on modifiability of behavior as a function of phylogenetic level, social structure of animal groups, instincts, imprinting and learning.
5356. Motivation. (3:3:0)

Prerequisite: Consent of instructor. Study of psychological, social, and physiological factors in motivation. The role of early experience and secondary motives will be emphasized. Human and animal.
5358. Electrophysiological Techniques. (3:3:0)

Prerequisite: Psy. 4327 or consent of instructor. Experimentation and methodology using polygraph and EEG equipment, and psycho-physiological measurement. Suitable for graduate majors in physiology or blo-physics.

## 5359. Advanced General Psychology. (3:3:0)

Prerequisite: Consent of instructor. Advanced study in general psychology. Review of relevant literature.

5362-5363. Internship in Counseling and Clinical Psychology. (3 each)
Prerequisite: By arrangement with department head. Full time supervised internship in an appropriate psychological facility.
561. Proseminar I. (6:6:0)

Prerequisite: Graduate standing. Intensive review and extension of knowledge in selected areas. Emphasis on personality, social psychology, and development of systems. Professional aspects and ethics.
562. Proseminar II. (6:6:0)

Prerequisite: Graduate standing. Intensive review and extension of knowledge in selected areas. Emphasis on learning, physiological and experimental psychology.

## 630. Master's Report. (3)

631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Doctoral Research. (3 each)

## 831. Doctoral Dissertation. (3)

Enrollment required at least four times.

# Department of Sociology and Anthropology 

\author{

W. G. Steglich, Head of the Department <br> Office: Ad. 201 <br> | Professor: |  |
| :---: | :---: |
|  | Steglich |
| Associate Professors: |  |
|  | Davies, Dunn,* Minnis, |
| Assistant P | Professors: |
|  | Bowles, Cartwright |
| Instructor: |  |
|  | Keller |
| * Part-tim |  |

## Sociology

Sociology is one of the social sciences. Its particular concern is the study of the nature of human behavior in groups. As such, it does not prepare the student in a specific way for a vocation. However, students who graduate with a major or minor in sociology are in demand in such public community agencies as health and welfare, recreation, and probation. Also, private agencies-such as Camp Fire Girls, Scouts, Red Cross, etc.-employ sociology majors as counselors, group leaders, etc. Industry is increasingly offering opportunities in the field of personnel work. Service in a variety of government agencies also provides a vocational outlet for people trained in sociology. In many states, sociology majors teach their subject in high schools. For the gifted student, graduate study opens the way to careers in research and college teaching.

A student majoring in sociology must complete 30 semester hours in sociology, including the following courses: 230, 233, 436, 439, and 4316. He must receive a grade of C or better in each advanced course in sociology (all courses having a 300 number or higher) if he wishes to have it count toward a major or minor in sociology.

Students interested in graduate work in sociology should consult the Graduate School Bulletin. Courses are offered leading to the Master of Arts Degree with a major or minor in sociology. In certain doctoral programs, sociology may be chosen as the minor program. This department cooperates in the Latin American Area Studies program described on Page 119 of this catalog.

Sociology may be used as a social science in the broad field (Plan II) program for secondary teacher certification in the teacher education program. For specific courses consult the Head of the Department. See also the discussion of teacher education in the section of this catalog entitled "Interdepartmental Programs."

## Courses in Sociology <br> FOR UNDERGRADUATES

[^32]
## 224 SOCIOLOGY

## 233. Current Social Problems. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor. Principles of group behavior and organization (as learned in Soc. 230) applied to the analysis of problems in such basic social institutions as marriage and the family, the community, the economy, government, education, health and welfare, recreation, etc.
235. The Sociology of Marriage. (3:3:0)

History, present status, and current problems of the marriage institution.
331. Rural Sociology. (3:3:0)
334. The Sociology of Work and Industrial Relations. (3:3:0)

Social organization of industrial concerns, social relationships among employees, and problems of morale and efficiency; focus on occupational careers-in terms of their societal context and as personal techniques of social adaptation.
339. Sociology of Leisure. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor. Sociological study of leisure. Attitudes and conceptions of leisure as developed in primitive and historical societies, Relation of leisure to other aspects of social life such as work, art, morality, and other institutions. Current social and technological influences on American leisure patterns.

## FOR UNDERGRADUATES AND GRADUATES

432. Introduction to Health and Welfare Services. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor. Development of social services in the United States as related to characteristics of the American culture.
433. Criminology. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor.
436. Contemporary Sociological Theories. (3:3:0)

Prerequisite: 9 semester hours of sociology, including Soc. 230, or consent of instructor.

43\%. Social Change. (3:3:0)
Prerequisite: Soc. 230 or consent of instructor.
438. Population Problems. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor.
439. Methods of Sociological Research. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor, Data collection and analysis; interpretation of social data.
4312. The Urban Community. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor. The community in its ecological, cultural, and social aspects.

## 4313. American Minority Problems. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor.

## 4314. Social Stratification. (3:3:0)

Prerequisite: Soc. 230 or consent of instructor. Economic, political, and prestige structures in modern societies. Interrelationships of class, power, and status levels studied to determine their influence on social institutions and personality structure.

## 4316. Development of Sociological Theory. (3:3:0)

Prerequisite: Soc. 230 and 6 hours of advanced sociology. The emergence of systematic sociological theory out of the social philosophies of the past. The evolution of sociology as a discipline in the late nineteenth and early twentieth centuries.

## FOR GRADUATES

531. Sociological Theory. (3:3:0)

Prerequisite: Consent of Department Head. Individual study. May be repeated once for credit.
533. Seminar in Contemporary Sociological Theory. (3:3:0)

Prerequisite: 9 hours of advanced credit in sociology, including soc. 436, or consent of instructor.
534. Seminar in Sociological Research Methods. (3:3:0)

Prerequisite: 9 hours of advanced credit in sociology, including Soc. 439 , or consent of instructor.
535. Seminar in Social Disorganization. (3:3:0)

Prerequisite: Soc. 230, 233, and 6 hours of advanced sociology, or consent of intructor.
537. Seminar in Demography. (3:3:0)

Prerequisite: 12 hours of sociology, including Soc. 438, or consent of instructor.
631. Master's Thesis. (3)

Enrollment required at least twice.

## Anthropology

Anthropology, as the word indicates, is the study of man. It concerns itself not only with the origins of man's customs and institutions, but with his physical origins and development as well. As such, anthropology does not prepare the student in a specific way for a vocation. However, it is one of the basic liberal arts which, in a general way, prepare the student for life in complex society.

A student majoring in anthropology must complete 30 semester hours in anthropology, including Anthropology 231 and 232. Sociology 336 and Philosophy 436 may be credited toward a major in anthropology. He must receive a grade of $C$ or better in each advanced course in anthropology (all courses having a 300 number or higher) if he wishes to have it count toward a major or a minor in anthropology.

In the master's degree program anthropology may be used as a minor only.

## Courses in Anthropology

## FOR UNDERGRADUATES

231. The Origin and Nature of Man. (3:3:0)
232. Cultural Anthropology. (3:3:0)
233. Physical Anthropology. (3:3:0)

## FOR UNDERGRADUATES AND GRADUATES

430. Cultures and Peoples of the Southwest. (3:3:0)
431. Primitive Religions. (3:3:0)
432. Culture and Personality. (3:3:0)
433. Races, People, and Languages of North America. (3:3:0)
434. Pre-Spanish Cultures of Mexico. (3:3:0)

# Department of Speech 

P. Merville Larson, Head of the Department<br>Office: Sp. 3-A<br>Professor:<br>Larson<br>Associate Professors:<br>Ashby, Ickes, Schulz<br>Assistant Professors:<br>Buzzard, Lindell<br>Instructors:<br>James,* Maxey, Robbins<br>* Part-time

Since the time of Isocrates, Aristotle, and Quintilian, the ideal citizen of a free society has been the man or woman broadly educated and skillful in his ability to express himself. The goal of the Department of Speech is to assist every speech student in approaching this ideal as nearly as possible.

Unlimited opportunities are offered the student taking courses or participating in the extracurricular activities of the Speech Department to improve his competence in the oral communication skills essential in a modern dynamic society. For some this may be developing and perfecting their capability in conference and public speaking situations, in preparation for more effective careers in engineering or business. For others it may be improving speech competence for a professional career as a doctor, lawyer, minister, or teacher. For many it may mean exciting, enjoyable experiences in the theater that will contribute to a better use of leisure time after college days are past. For everyone it means more skillful use of an important tool of democracy-government by talk among responsible citizens.

The student wishing to major or minor in speech will find himself prepared for one or more of many interesting and challenging occupations, such as personnel work, recreational work, teaching, speech and hearing therapy, professional or community theater directing, various kinds of work in radio and television, and public relations.

The Department of Speech offers programs for majors and minors working toward the Degree of Bachelor of Arts and also participates in the teacher education program of the College.

## Speech Major Degree Requirements

In addition to the general requirements of the School of Arts and Sciences for the Bachelor of Arts Degree, the following are requirements for the major in speech. All courses in the general speech area are required. A minimum of 3 semester hours are required in each of four of the six numbered groups. A choice may also be made between 4351-History of Speech and 4352-History of Theater, one of which is required. Additional hours may be elected to make the total from 36 to 42 semester hours of speech.

## GENERAL SPEECH

131. Fundamentals of Speech (or 133. Voice and Dictionequivalent)
I. ORAL INTERPRETATION
23\%. Oral Interpretation
132. Senior Projects in Speech
133. Interpretative Reading

## II. PUBLIC ADDRESS

235. Discussion and Debate
236. Parliamentary Procedure
237. Forensic Activities
238. Advanced Public Speaking
239. Senior Projects in Speech
240. Persuasion
241. History of Speech

## III. RADIO-TELEVISION

238. Introduction to Radio and
Television Broadcasting
239. Radio-Television Activities
240. Fundamentals of Radio and Television Broadcasting
241. Radio Program Production
242. Television Program Production
243. Senior Projects in Speech
244. Radio and Television Program Planning and Management

## IV. SPEECH CORRECTION

236. Phonetics
237. Speech Anatomy and Physiology
238. Senior Projects in Speech
239. Introduction to Hearing Problems
240. Principles of Audiometry 4318. Functional Speech Disorders
241. Organic Speech Disorders

4321 \& 4322. Supervised Clinical
Practice in Speech Correction
4323 \& 4324. Supervised Clinical Practice in Hearing and Deafness

## V. SPEECH EDUCATION

432. Senior Projects in Speech
433. Methods in Teaching Speech
434. Directing School Speech Activities

## VI. THEATER

211. Stage Makeup
212. Introduction to Theater and Cinema
213. Principles of Acting
214. Theater Activities
215. Advanced Acting
216. Stagecraft
217. Stagecraft
218. American Theater Tour I

3313-3314. European Theater Tour
431. Creative Dramatics
432. Senior Projects in Speech
4311. Stage Directing Methods
4352. History of Theater

Persons interested in being certified as teachers or speech correctionists may also qualify under the Bachelor of Science in Education Degree program. Advisers in both the Speech and Education Departments should be consulted for details.

## Courses in Speech

## FOR UNDERGRADUATES

131. Fundamentals of Speech. (3:3:0)

Basic principles of speech; emphasis on discussion and original speaking. May not be taken for credit by students having had Speech 338.

## 133. Voice and Diction. (3:3:0)

Characteristics of good voice and speech usage; structure and functioning of the speech mechanism; use of phonetics and phonetic symbols for ear training and transcrip. tion of speech. Practical exercises in developing adequate voice control and diction for effective speaking.

## 211. Stage Makeup. (1:0:3)

A laboratory course in the practice of makeup for the stage. Assigned readings in textbook.
231. Introduction to the Theater and Cinema. (3:3:0)

Modern theater and cinema as art forms; the historical background and traditions of each. Emphasis on a better understanding of the social, cultural, and aesthetic signiffcance of theater and cinema. Attendance, when it can be arranged, at representative plays and motion pictures.
232. Principles of Acting. (3:2:3)

Theories and techniques of the art of acting; character analysis and use of the body and voice in creating a role. Illustrative exercises chosen from classical and contemporary plays.
235. Discussion and Debate. (3:3:0)

Group problem-solving and methods of inquiry and advocacy.
236. Phonetics. (3:3:0)

A study of the International Phonetic Alphabet and its application to the sounds of the English language.

23\%. Oral Interpretation. (3:3:0)
Appreciation of good literature and its effective oral interpretation from the printed page.
238. Introduction to Radio and Television Broadcasting. (3:3:0)

Origin, history, and development of radio and television: basic structure of the broadcasting industry and its social, political, economic, and cultural significance.
239. Speech Development for Personal Competence. (3:3:0)

Deals with principles and practice of skills necessary for personal effectiveness.
311. Parliamentary Procedure. (1:1:0)

Principles and procedure governing deliberative groups, with practice in their usage.

## 317. Radio-Television Activities. (1:0:3)

Opportunity for the student participating extensively in radio-television activities to secure credit for this laboratory work. Limit 4 semester hours.

## 318. Forensic Activities. (1:0:3)

Opporturity for the student participating extensively in forensic activities to secure credit for this laboratory work. Limit 4 semester hours for speech majors and minors, 2 semester hours for others.

## 319. Theater Activities. (1:0:3)

Opportunity for the student participating extensively in theater activities to secure credit for this laboratory work. Limit 4 semester hours for speech majors and minors, 2 semester hours for others.

## 331. Speech Anatomy and Physiology. (3:3:0)

Functioning of the speech mechanism basic to major study in speech. Primarily for speech majors but equally valuable for prospective elementary school teachers.

## 332. Advanced Acting. (3:2:3)

Prerequisite: Speech 232. Continuation of study and application of the theories and techniques of the art of acting; emphasis on characterization, analysis of roles, and techniques and types of performance. Illustrative exercises chosen from classical and contemporary plays.
333. Stagecraft I. (3:2:3)

Prerequisite: Speech 231 or equivalent. Technical problems of play production. Design, construction, and painting of scenery and properties; and special effects.
334. Stagecraft II. (3:2:3)

Prerequisite: Speech 231 or equivalent. Continuation of study of technical problems of play proauction. Stage lighting, costume design and construction.

## 335. Fundamentals of Radio and Television Broadcasting. (3:2:3)

Basic principles and techniques for operation of a radio or television control room. Performance on radio and television; practical experience under broadcast conditions. Leads to the third class FCC license.

## 336. Radio Program Production. (3:2:3)

Prerequisite: Speech 238 or 335 or approval of instructor. Multiple problems faced by the radio station manager. Opportunity to acquire professional facility and technique in direction and production of radio programs on campus station KTXT-FM. Development of creative ingenuity and critical standards is emphasized.

## 338. Business and Professional Speech. (3:3:0)

Prerequisite: Sophomore classification. Principles of speech applied to speech needs of the professional man and woman. Practice in construction and delivery of the various types of speeches and participation in group conference, discussion, and interviews. For majors in fields other than speech.

## 3311. American Theater.

A tour of representative American theaters and productions in the United States and Canada; includes professional resident companies, professional and nonprofessional summer stock, indigenous theater revival productions, community-little theater, arena theater, showboat, and theatrical activities. Summer 1965. Extension credit only.

## 432. Senior Projects in Speech.

(3)

Prerequisite: Senior classification and 9 hours in the area in which the project is to be pursued. Individual study, under guidance of a member of the faculty, of a specific problem of student's choice in one of the areas of speech. Approval of project by Department Head required before registration. May be repeated once for credit.

## FOR UNDERGRADUATES AND GRADUATES

## 430. Advanced Public Speaking. (3:3:0)

Prerequisite: 9 hours of speech, including 3 hours primarily in public speaking. Emphasis on audience analysis and adaptation.
431. Creative Dramatics. (3:3:0)

Principles and methods of developing original dramatizations with children.

## 433. Introduction to Hearing Problems. (3:3:0)

Anatomy of the ear; types of hearing loss; clinical and classroom training and retraining of the hard-of-hearing and deaf through lip reading, auditory training, and speech correction.

## 434. Principles of Audiometry. (3:3:0)

Testing hearing through the use of the pure tone and speech reception audiometer. Use and interpretation of audiograms. Physics of sound as related to hearing. Psychological problems of hearing. Clinical observation and practice required.

## 435. Interpretative Reading. (3:3:0)

Prerequisite: Junior classification and 12 hours of English. Students are advised to complete Speech 133 and/or 237 before taking this course. Problems of transferring meaning from the printed page to the listener. Types of literature for oral interpretation.

## 437. Persuasion. (3:3:0)

Prerequisite: 6 hours of public speaking and a course in psychology or permission of Head of Department. Psychological and rhetorical principles of motivation, suggestion, and other aspects of audience psychology as used in business, radio, and public affairs.

## 439. Methods in Teaching Speech. (3:3:0)

Prerequisite: 18 hours of speech and 9 hours of education. Review of the areas of speech; survey of texts and their critical analysis. Preparation of syllabi.

## 4311. Stage Directing Methods. (3:2:3)

Prerequisite: Junior classification; Speech 231, 232, 333, and 334. Function of the director as related to the principles of play production. Fundamental techniques of directing, with attention to composition, picturization, movement, and stage business. Rehearsal organization, procedure, and techniques. Student direction of representative plays.
4318. Functional Speech Disorders. (3:3:0)

Prerequisite: Junior standing or approval of Department Head. Normal speech development and the etiological factors responsible for nonorganic speech problems such as stuttering, faulty articulation, and certain types of voice problems. Diagnostic and therapeutic management of such cases an essential portion of the study. Observation in speech clinic required.

## 4319. Organic Speech Disorders. (3:3:0)

Prerequisite: Junior standing or approval of Department Head. Etiological factors responsible for organic speech disorders such as aphasia, cerebral palsy, cleft palate, and certain types of voice problems; diagnostic and therapeutic techniques employed in dealing with such problems. Observation in speech clinic required.

## 4321-4322. Supervised Clinical Practice in Speech Correction. (3 each)

35 laboratory hours per credit hour. Prerequisite: Speech 133, 236, 331, 4318 and 4319, or permission of the Department Head. Required of teachers desiring certification in speech therapy.

## 4323, 4324. Supervised Clinical Practice in Audiology and Aural Rehabilitation. (3 each)

35 laboratory hours per credit hour. Prerequisite: Speech 133, 236, 331, 433, and 434 or permission of the Department Head.
4325. Directing School Speech Activities. (3:2:3)

Prerequisite: 12 hours of speech or education and/or teaching experience. Extracurricular speech activities, such as discussion, debate, dramatics, public speaking, and radio. Students will work with individuals and projects in different activities.
4351. History of Speech. (3:3:0)

Prerequisite: Junior classification. Origin, history, and development of speech as a social function and force.

## 4352. History of Theater. (3:3:0)

Prerequisite: Junior classification and Speech 231 or consent of instructor. Origin and history of the theater as a social and aesthetic force.

## FOR GRADUATES

531. Studies and Problems in Speech. (3:3:0)

May be repeated for credit.
535. Pathology of the Hard-of-Hearing. (3:3:0)
536. Speech Pathology. (3:3:0)
538. Educational Television. (3:3:0)
5311. Advanced Organic Speech Disorders. (3:3:0)
5312. Stuttering-Theories and Therapies. (3:3:2)
5313. Aural Rehabilitation. (3:3:2)
5314. Advanced Audiology. (3:3:2)
5315. Advanced Discussion Debate and Conference Methods. (3:3:0)
5316. Dramatic Criticism. (3:3:0)
5317. Studies in Modern Theatre Production. (3:3:0)
5319. Theory and Practice of Scene Design. (3:2:3)
5321. Theory and Practice of Theater Costume Design. (3:2:3)

# Biblical Literature 

Cromwell Cook Cleveland Christian, Episcopal, Lutheran (N.L.C.) and Presbyterian Churches<br>Leon Crouch<br>The Churches of Christ<br>William Peter Hanly<br>Roman Catholic Church<br>Sidney Lewis Harris<br>Baptist General Convention of Texas<br>James Houston Hodges<br>Christian, Episcopal, Lutheran (N.L.C.), and Presbyterian Churches<br>Ralph Edward Macy<br>Christian, Episcopal, Lutheran (N.L.C.), and Presbyterian Churches<br>Cecil Raymond Matthews<br>The Methodist Church

The purpose of this area is to introduce students to that world of literature, the Bible, which has so broadly affected Western culture. Guidance is given in the study of its moral and religious teachings and their relevance to life today. Though recognized for credit by the College, all courses are taught off campus in centers provided by the churches at no expense to the College.

## Courses in Biblical Literature

## 110. Introduction to Biblical Studies. (1:1:0)

An introduction to the history, geography, and people of Biblical lands and places and a survey of the tools, materials and methods of Bible study.
131. Introduction to the Old Testament. (3:3:0)

A study of the history, literature, and significant teachings of the Old Testament.
132. Introduction to the New Testament. (3:3:0)

A study of the history, literature, and significant teachings of the New Testament.
213. The Book of James. ( $1: 1: 0$ )

A study of the background and content of the Book of James.
235. The Old Testament Prophets. (3:3:0)

The Hebrew Prophets, their place in history and their contribution to religious thought.
236. The Life and Teachings of Jesus. (3:3:0)

The life, teachings, and significance of Jesus as presented in the gospels.
239. History of Christian Thought. (3:3:0)

The development of Christian systems of thought from New Testament times through the nineteenth century.
2311. Social Teachings of the Bible. (3:3:0)

Biblical ethics for the present day. Such subjects as marriage, capital punishment, war, slavery, race relations, and other modern social issues will be considered.
2312. The Life and Letters of Paul. (3:3:0)

A review of the life of the apostle Paul with special emphasis upon his epistles and missionary work.
321. Old Testament Poetry and Wisdom Literature. (2:2:0)

Selected studies from the Psalms, Book of Job, and other poetic and wisdom literature in the Old Testament.
323. The Letter to the Romans. (2:2:0)

A study of the background and content of the Book of Romans.
324. The Letter to the Hebrews. (2:2:0)

A study of the background and content of the Book of Hebrews.
331. The Gospel and Letters of John. (3:3:0)

A study of the background and content of the Fourth Gospel and I, II, III John.
332. Religions of the World. (3:3:0)

A study of important features of various religions (e.g. Primitivism, Zoroastrianism, Hinduism, Buddhism, Confucianism, Taoism, Shinto, Zen, Islam, Judaism, Christianity, etc.)
422. The Book of Revelation. (4:2:2)

A study of the background and content of the Book of Revelation.
431. Contemporary Christian Thought. (3:3:0)

Christian theology as expressed in Neo-Thomism, Neo-orthodoxy, Christian Existentialism, Neo-liberalism, Contemporary evangelicalism, etc. European as well as American.
432. Genesis and the Law. (3:3:0)

The origin, history, and religious concepts of the Old Testament books of Law. Special attention will be given to problems of Genesis.

# School of Business Administration 

George G. Heather, Dean<br>Office: C\&O 216<br>John Reese, Assistant Dean<br>Office: C\&O 216

Accounting<br>Business Education and Secretarial Administration<br>Economics<br>Finance<br>Management<br>Marketing

The School of Business Administration, organized in 1942, offers work leading to the degrees of Bachelor of Business Administration and Bachelor of Science. Instruction is given in six departments: Accounting, Business Education and Secretarial Administration, Economics, Finance, Management, and Marketing. The school has a normal semester enrollment of about 2,600 students, with all but about 100 of these classified as undergraduates. In addition, it makes its courses available to students in other schools of the College in order that they may include business administration subjects in their programs.

The School of Business Administration holds full membership in the American Association of Collegiate Schools of Business and is also a member of the National Association of Business Teacher Education.

## Objectives of the School

The objectives of the School of Business Administration may be classified under three headings-education, research, and service. The primary role of the School of Business Administration is to prepare the individual student at the undergraduate and at the graduate levels for personally rewarding and socially useful careers in business and related types of activity. The final product of the School, the graduate, needs the capacity to understand the environment in which he operates as well as the ability to adjust to the changes that are continually occurring. It is believed that this may be accomplished through study in general education, business fundamentals, and the advanced courses of professional preparation through the master's level.

The faculty of the School of Business Administration recognizes, as a second objective, the importance of encouraging research to further the development of business and industry in West Texas, the Southwest, and the United States. Not only may this expand the frontiers of knowledge, but it adds also to the preparation and the quality of the

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faculty. In addition, a research climate fosters in the student an appreciation for research and what might be termed a "research attitude."

Service to the public is the third objective of the School. The faculty assumes a responsibility to disseminate the knowledge it has acquired. At times faculty members may be in a position to provide professional aid in the solution of specific problems.

## Opportunities for Women

Opportunities for business-trained women are continually expanding and becoming more attractive in government, education, and business. In recent years women who have graduated with majors in accounting generally have found ready employment. Merchandising has long provided major opportunities for women, with more and more of them moving into managerial levels. Women also are being employed increasingly in credit management positions and personnel work. And almost every advertising agency and advertising department has one or more women in responsible and creative positions. However, probably the largest number of opportunities still lies in the field of business education and secretarial administration. There is indeed an opportunity for a woman in any field for which she prepares, and it increases rapidly as her strength of purpose and adequacy of preparation strengthen.

## Admission and Registration

Admission to the School of Business Administration, as to the other schools of Texas Technological College, is granted by the Dean of Admissions, to whom all correspondence concerning admission should be addressed.

## Load

The normal study load for regular students in the school is 15 or 16 semester hours each semester. The student who shows promise of compiling only a mediocre grade-record may have further load restrictions imposed. No student is permitted to enroll for a program of more than 17 semester hours (exclusive of required freshman or sophomore physical education) without special approval from the Dean; the student desiring approval of an irregular load should address a written request to the Dean prior to the registration period, incorporating all pertinent information. In a six-week summer term the maximum load is 7 semester hours, composed of two courses, or three courses including a 1-semester-hour physical education activities course.

## Academic Counseling

During his freshman year the beginning business administration student is counseled on academic matters by the freshman adviser. At the time the student has accumulated 24 semester hours, responsibility for counseling is transferred to the adviser of the student's specialization.

## Honors Plan

The Honors Plan of the School of Business Administration is designed to present special instruction, counseling, and recognition to superior students in order that they may better realize and develop their capabilities through stimulating, intensive, and enriched study. Each student is specially advised and instructed so as to promote active study, discussion, research, and creative thought. Students are selected on the basis of superior academic performance and motivation as determined by (a) admissions test scores, (b) high school graduation standing, and (c) personal interviews with faculty advisers. Other students may enter honors work after the freshman year providing they have superior college academic records and sufficient background in tools areas.

Honors Plan students are offered special enriched sections in tools and disciplinary areas such as mathematics, English, economics, and speech, as well as humanities and sciences. Particular emphasis is placed on quantitative and communications tools. The Honors Plan consists of 90 semester hours. Beyond this the student pursues an area of major professional and elective courses. The student who is graduated under this program will have the best possible preparation for graduate and professional work in business administration.

Honors plan students take essentially all the nonprofessional and basic professional courses as prescribed for the Business Administration programs of this catalog. In addition, the curricula of the special honors sections are supplemented to emphasize principles, managerial concepts, and decision-making capability. Two special senior honors courses are of an interdisciplinary nature and serve as capstone courses for the entire four-year Honors Plan. One is a seminar on business policy; the other is an individual research course which is climaxed by a thesis on a problem in one of the areas of business.

Superior students, both undergraduate and graduate, may be afforded the opportunity to work with faculty researchers on business problems. Business research activities will be coordinated through the office of the Dean.

## Undergraduate Study

## Accounting

The curriculum in accounting emphasizes: (1) preparation for public accounting practice and for the Certified Public Accountant examination, (2) a background for government service in administrative or regulatory agencies, (3) foundations for work in managerial accounting and controllership, and (4) groundwork for teaching and research at the college or university level.

The student looking to public accounting practice should plan to continue for at least one year of graduate study to round out his professional background.

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Accounting as a discipline and a profession provides a means for obtaining information essential to modern industry in making policy decisions and in setting up plans for the successful conduct of business. It serves to maintain the system of internal check and control so as to reduce the need for supervision, and to minimize errors, fraud, and waste; and it plays a part in setting and enforcing standards of performance which improve efficiency and co-ordinate and integrate business activities.

The department offers a program leading to the Bachelor of Business Administration with a major in accounting.

The growing complexity of business, of revenue systems, and of all forms of social organizations make increasingly greater demands on the accounting profession. It is therefore recommended that the student looking to public accounting practice plan to continue for at least one year of graduate study to round out his professional background.

## Advertising

This program is offered by the Department of Marketing. It is planned for those qualified students who aspire to positions in advertising management, and to a lesser degree, those seeking careers as advertising specialists. The managerial aspirant is qualified upon graduation to enter a training program for future managers. The agency hopeful can prepare for an agency position by supplementing his advertising sequence with a careful choice of electives both within and outside the School of Business Administration.

## Business Education

The purpose of this curriculum is to prepare competent business teachers. The program is planned to provide a background in liberal arts, a knowledge of business subjects, a philosophy of education, and experience in teaching methods. Completion of the curriculum will qualify the student for a provisional certificate under the broad field, (Plan II) for secondary teachers. Besides consulting his adviser, the business education major should become familiar with the teacher education program at this College as discussed in the section of this catalog entitled "Interdepartmental Programs."

## Economics and International Trade

In this period of world crisis, when the very existence of our economic system is being challenged, a thorough grounding in fundamental economic concepts is essential for the person who would either assume a position of responsibility in the business world or in public office, or who would wish only to meet his full responsibility as an informed and intelligent citizen. Economics may be thought of as a science or as a social science, but in either case it should play an important role in the program of a person seeking a truly liberal education.

The Department of Economics offers programs leading to the Degrees of Bachelor of Business Administration or Bachelor of Science with a major either in economics or international trade.

The major in economics has been designed to allow the student to accomplish one or a combination of three objectives:

1. General preparation for entering the business world in various types of activity, excluding the highly specialized fields. Considerable flexibility is provided in the courses and options available.
2. Specialized preparation as a professional economist. This preparation is designed to produce qualified economists to fill the numerous positions available in business firms, banks, trust companies, insurance companies, government agencies, foundations, and in public school and college teaching.
3. Cultural training in the foundations of our economic institutions, ideas, and policies.

The major in international trade prepares the student for a career in various phases of the export-import business either at home or abroad, or for service in the several governmental departments concerned with such activities.

## Finance

The department offers a program leading to the Bachelor of Business Administration with a major in finance. Since the field of finance is broad and encompasses such areas as money and banking, investments, financial management, and insurance and real estate, the emphasis in the student's training is correspondingly broad.

This curriculum affords the student a broad understanding of the general field and an opportunity for specialized study. Depending on their interests, students may qualify for careers in such fields as banking, financial managemen't, investments, insurance, and real estate.

## Industrial Management

Industry offers excellent career opportunities for students in the field of industrial management and production, particularly those who are prepared to utilize the quantitative tools employed by modern science and technology. The industrial management curriculum provides a rigorous educational experience centered around the principles involved in proper use of materials, machines, manpower, method and standards in manufacturing, as well as in the management function of all business enterprise. Courses are provided in decision theory, industrial organization, production planning and control, materials management and inventory control, manufacturing method and operations analysis, and cost analysis and control.

To function effectively in a wide variety of management situations, an executive should be conversant with all major areas of business and have a fairly keen understanding of the interrelationships among different groups and sections of his organization. This point of view is obviously essential for an upper-level manager if he is to participate effectively with others in the top management group and if he is to
administer activities in his area of responsibility in the best interests of the entire organization. The program in industrial management is designed to help the student develop this kind of broad understanding of business, and the required technical sequence of courses is supplemented to provide understanding of the economic, financial, and human and social aspects of industrial operations.

## Management

The Department of Management offers programs leading to the Degree of Bachelor of Business Administration with a major in management. The management function deals with both human elements and material or physical factors, and the field is a broad one. However, through selection of courses, the student may place his major emphasis upon the area of his greatest interest.

The general business administrator is a person who must get a job done by getting others to do it. Such a person must have a general understanding of all the general functions of the average American business, finance, procurement, production, marketing, accounting, and personnel administration, although he or she may not be a specialist in any one of these fields. The program of study in management is designed to give a broad and deep background in the principles involved in the administration of business and industrial enterprises, not only to those students who plan to seek employment with established concerns but also to those who intend to manage their own businesses.

Successful business operation depends on harmonious cooperation between employer and employees, and the selection, development, and efficient utilization of manpower resources is one of the most difficult tasks of the modern manager. Courses are available in personnel selection and placement, training, wage and salary administration, employee benefit plns, human relations and industrial psychology, and collective bargaining and labor law for the student with a particular interest in personnel administration and industrial relations.

Transportation is a vital segment of the nation's economy. Our railroads, motor transport companies, airlines, pipelines, and the public utility companies require many college graduates each year with training in the management of the flow of goods and commodities through common carriers and in interstate commerce regulations. Numerous governmental agencies charged with the responsibilities of promoting or regulating transport facilities, rates, and services also offer careers to specialists in this field. Courses are available in industrial traffic management, rate determination, and traffic law and interstate commerce regulations.

The office of a business is the center of its system of communications and the depository for its files and records. With the rapidly mounting volume of office work now being done, and the rapid increase in the numbers of office workers required to do it, effective office supervision is needed. There is an ever-growing group of executives who believe that the management of the office is quite as important as the management of a factory or other industrial enterprise. Courses are offered for the purpose of training efficient office managers. This
position has proved to be a stepping stone to greater responsibilities for many of our present executives.

## Marketing

The curriculum in marketing introduces the student to the broad field concerned with the distribution of goods and services to consumers and business users. It includes such diverse activities as retailing, wholesaling, industrial marketing, marketing research, salesmanship, and advertising. By majoring in marketing a student can aim toward such positions as director of marketing, sales manager, research analyst, or professional salesman.

## Pre-Law

Schools of law expect their students to have considerable intellectual maturity and do not normally prescribe specific courses as part of their admission requirements. Some schools of law admit only persons who hold baccalaureate degrees, but most schools admit students who have completed only three years of college study, although such students are usually in a small minority.

The traditional undergraduate preparation for the study of law is the pure liberal arts program. Thus, at Texas Technological College the Head of the Department of Government in the School of Arts and Sciences is the official adviser for pre-law students. For details of the pre-law program, see the discussion under the offerings of the School of Arts and Sciences.

In recognition of the desirability of a knowledge of economics and business law as a foundation for the study of law, the School of Business Administration has developed programs for pre-law students. In such programs emphasis is placed on an analysis of our economic organization as the setting in which the law functions. To derive the greatest potential value from his business background, the student is urged to complete one of the four-year programs leading to the Bachelor of Business Administration Degree, any one of which will provide valuable background information for the attorney. The choice of an exact program should take into consideration the general field of law in which practice is anticipated. The student should consult the pre-law adviser for business administration and should become familiar with the prelaw curriculum.

For the student who expects to be admitted to a school of law after only three years of college preparation, a combination program is provided which will permit the student to receive the Bachelor of Business Administration Degree from this College upon graduation from an approved three-year school of law. To be eligible for this degree, the student first must have completed the pre-law program set forth in this catalog. Then upon certification of graduation from the school of law, the student may apply for the Bachelor of Business Administration Degree from this College. Receipt of the law degree from an acceptable school of law satisfies the fourth-year degree requirements.

## Public Administration

The curriculum in public administration leading to the Degree of Bachelor of Business Administration or Bachelor of Science is intended to qualify those electing it for administrative positions in government, particularly at the municipal level. Persons trained in business administration are finding themselves equally adapted to public service or private business. The curriculum in public administration provides training in such varied areas as accounting, economics, law, taxation, purchasing, personnel, city planning, and public relations. Graduates find opportunities in city management, purchasing, budgeting, personnel, research, accounting and auditing, and various other governmental activities.

The graduate in public administration is urged especially to consider continuing his study through the master's degree in a graduate school of public administration.


#### Abstract

\section*{Retailing}

Retailing involves those marketing activities which are most immediate in putting goods and services into the hands of the consuming public. The program in retailing has been designed for those aiming at careers of leadership in the modern retail establishment. The curriculum includes both broad and specialized courses concerning merchandising, store operations, and other phases of retailing. The program in retailing has been designed for those aiming at careers of leadership in the modern retail establishment in such positions as store manager, department head, buyer, merchandise manager, sales promotion manager, credit manager, and others.


## Secretarial Administration

The curriculum in secretarial administration leading to the Bachelor of Business Administration is designed to qualify the student to become a competent professional secretary. As business becomes more complex, the executive secretary is assuming more and more responsibility. This secretary must be well grounded in the recording, computing, and communicating functions of business. For the well qualified secretary, whether man or woman, there are many opportunities in all parts of the United States and overseas.

A two-year stenographic program is provided for students who wish to acquire the basic knowledge and skills necessary for careers as stenographers and secretaries. It should be elected only by those students who are certain they do not wish a four-year program leading to a degree.

## Graduate Study

The School of Business Administration offers programs in each of its departments leading to the Degree of Master of Business Admin-
istration, in the Department of Economics leading to the Master of Arts, and in the Department of Business Education and Secretarial Administration to the Master of Education. Details of the graduate program of the School of Business Administration will be found in the Bulletin of the Graduate School. The Dean of the School of Business Administration may also be consulted.

## Undergraduate Degrees

## Bachelor of Business Administration

This degree will be awarded to all students who elect the degree and who have fulfilled the minimum requirements as follows:

1. The specific course requirements set forth on the following pages for majors in accounting, advertising, business education, economics, finance, international trade, management, marketing, office management, pre-law, public administration, retailing, or secretarial administration.
2. Additional courses approved by the major adviser to complete the degree program.
3. A minimum grade-point average of 2.00 in all business administration subjects.
4. A total number of semester hours as stated for the major* with a minimum grade-point average of 2.00 . In addition, a minimum of four semesters of freshman and sophomore physical education, band, or basic ROTC must be completed.
5. Application for the degree made through the Office of the Dean of Business Administration at least one year in advance of the proposed graduation date.
6. Completion of a personnel data file with the Placement Service.

## Bachelor of Science

This degree will be awarded to all students who elect the degree and who have completed the minimum requirements as follows:

1. The specific course requirements set forth on the following pages for majors in economics, international trade, or public administration.

2, 3, 4, 5, and 6. Same as for the degree Bachelor of Business Administration.

Selection of a Major. It is recommended that the student not attempt to make final selection of his major until he has completed some college work and has had an opportunity to investigate the study programs which are available to him. The required freshman course, Professional Careers in Business (Mgt. 110), should prove to be of considerable help to the student in making his decision. The student should counsel with the advisers in those fields which he believes to be of

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possible interest to him. Aptitude tests are available in giving students additional help in deciding upon their majors.

Upon the accumulation of 24 semester hours, each student must have selected, and had approved by a major adviser from that particular field, a major field of study from one of the curricula outlined below. The student should notify the freshman adviser of his choice. A student may decide to change to another major at a later time.

Since some courses are offered only in alternate years, there is no reasonable assurance that a student will be able to schedule all of his required courses before an expected graduation date, unless he makes his final major selection and plans his program of courses a full two years in advance.

Length of Degree Programs. Many of the major programs can be completed within normal load limits in eight semesters. Because of their greater semester-hour requirements, some of the majors necessitate a ninth semester or the attendance in one summer session. A student in any major program may be required to attend more than the normal eight semesters because of poor schedule-planning or failure of one or more courses, or for other reasons. Before the close of his junior year each student should plan carefully the scheduling of his remaining degree requirements to determine his proper graduation date, and should file application for the degree in the Office of the Dean of Business Administration.

General Graduation Regulations. For general graduation regulations, including the graduation fee and the fee in connection with a petition for graduation in absentia, the student is referred to the section of this catalog entitled "Academic Regulations."

## Curricula

## Bachelor of Business Administration Bachelor of Science

Each of the following majors and options is designed to prepare the student electing it for a career in a particular field, while at the same time providing him with an understanding of the fundamentals of American business and laying the groundwork for a liberal education. While instruction is organized under the several departments of the school, a particular curriculum may be so organized as to allow the student to take courses in other departments than the one in which he is doing his major work.

## General Degree Requirements

I. Nonprofessional courses ( 52 semester hours):

Eco. 133-134-The Development of American Business and
Economic Institutions I and II
Eco. 231-232-Principles of Economics I and II
Eng. 131-132-College Rhetoric

Eng. 231 or 232-Masterpieces of Literature
Govt. 231-American Government, Organization
Govt. 232-American Government, Functions
Mgt. 110-Professional Careers in Business
Math. 137-Mathematical Analysis
Math. 138-Mathematical Analysis
Physical Education, Band, or Basic ROTC-four semesters
Science-6 semester hours
Speech 338-Business and Professional Speech
American History-6 semester hours*
Humanities: 6 semester hours approved by the major adviser (course lists from him or the Dean); one course from each of two of the following fields:

| Allied Arts | Music Literature |
| :--- | :--- |
| Anthropology | Philosophy |
| English | Psychology |
| Foreign Language** | Sociology |
| History |  |

II. Basic professional courses (28 semester hours):

Acct. 234-235-Elementary Accounting I and II.
Bus. Law 338-339-Business Law I and II (not for pre-law majors)
Fin. 331-Corporation Finance
Mgt. 331-Industrial Management
Mkt. 332-Principles of Marketing
Mkt. 346-Introduction to Business Statistics
Sec. Admin. 333-Business Correspondence
III. Major professional courses as listed in departmental curricula. The student who is given permission to substitute for a Group III course should make certain that the permission from the adviser is at that time recorded on the proper school form made out in triplicate, the original copy to be placed on file in the office of the Dean, the first carbon copy to be retained by the adviser, and the second carbon copy to be preserved carefully by the student. The school assumes no obligation for substitutions claimed by the student unless he can present when needed his copy of the substitution form.
IV. Electives. The American Association of Collegiate Schools of Business prescribes that not less than 40 percent of the total hours required for graduation must be in business and economic subjects, and not less than 40 percent must be in subjects other than business and economics. Freshman and sophomore physical education, band, and basic ROTC are excluded from this computation. Nine hours from Economics 133, 134, 231, and 232 may be counted as nonbusiness courses. The student may need to use part of the Group IV electives to assure the required amount of nonbusiness work.

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# Bachelor of Business Administration Accounting Major 

Mr. Rushing, Adviser

I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses (29 semester hours):

Acct. 334-335-Intermediate Accounting I and II
Acct. 336-Principles of Cost Accounting
Acct. 430-Income Tax Accounting
Acct. 434-Advanced Accounting I
Acct. 437-Principles of Auditing
Accounting electives--9 semester hours
Sec. Admin. 327-Report Writing
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Advertising Major

Mr. Ryan, Adviser

I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses (29 semester hours):

Acct. 332-Analysis of Financial Statements
or Acct. 439-Budgeting
Mkt. 321-Public Relations
Mkt. 334-Principles of Advertising
Mkt. 335-Principles of Retailing
Mkt. 339-Principles of Salesmanship
Mkt. 433-Marketing Problems
Mkt. 436-Marketing Research and Analysis
Mkt. 4311-Advertising Practices
Mkt. 4316-Advertising Administration
Psy 230-Introduction to Psychology
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

# Bachelor of Business Administration Business Education Major 

Mr. Pasewark, Adviser

I. Nonprofessional courses* (52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses (43 semester hours):

Accounting elective
Bus. Educ. 432-Teaching Business Subjects I
Bus. Educ. 433-Teaching Business Subjects II**
Eco. 326-Research in Economics and Business
Educ. 330-Principles of Secondary Education
Educ. 332-Educational Psychology
Educ. 334-Curriculum Development in Secondary Education
Educ. 436-Teaching in Secondary Schools
Educ. 462-Student Teaching
Sec. Admin. 122-Typewriting for Business
Sec. Admin. 131-Elementary Shorthand***
Sec. Admin. 132-Intermediate Shorthand***
Sec. Admin. 321-Office Machines I
Sec. Admin. 322-Office Machines II
Sec. Admin. 327-Report Writing
IV. Electives to complete a total of 129 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 52 academic hours of course work outside the School of Business Administration.
V. Evidence of at least eight weeks of continuous full-time business experience.

## Bachelor of Business Administration or Bachelor of Science Economics Major

Mr. Rouse, Adviser

I. Nonprofessional courses (52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses (38 semester hours) :

Eco. 3314 -Intermediate Economic Theory
Eco. 3311-National Income Analysis
Eco. 430-Development of Economic Doctrines
Eco. 431-Contemporary Economic Doctrines
Eco. 4311-Advanced Economic Theory

[^35]Acct. 331-Managerial Accounting
or Acct. 332-Analysis of Financial Statements
Sec. Admin. 327-Report Writing
Approved electives-18 semester hours
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Finance Major

Mr. Rouse, Adviser

I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses ( 32 to 38 semester hours) :

Eco. 331-Economics of Business Enterprise
or Eco. 3311-National Income Analysis
Fin. 231-Personal Finance
or Fin. 334 -Credits and Collections
Fin. 333-Principles of Money, Banking, and Credit
Fin. 335-General Insurance
Fin. 434-Investments
Sec. Admin. 327-Report Writing
Acct. 332-Analysis of Financial Statements
Approved electives- 12 to 18 semester hours
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Industrial Management Major

Mr. Mize, Adviser

I. Non-professional courses ( 57 semester hours):

Eco. 231-232-Principles of Economics I and II
Eng. 131-132-College Rhetoric
Eng. 231 or 232-Masterpieces of Literature
Govt. 231-American Government, Organization
Govt. 232-American Government, Functions
Mgt. 110-Professional Careers in Business
Math. 133-College Algebra
Math. 131-Trigonometry
Math. 132-Analytic Geometry
Math. 231-232-Differential and Integral Calculus

Physical Education, Band, or Basic ROTC-4 semesters
Chem. 141-142-General Physics
Speech 338-Business and Professional Speech
American History-6 semester hours
Humanities: approved by the major adviser
One course from each of two fields- 6 semester hours:
Allied Arts Music Literature
Anthropology Philosophy
English Psychology
Foreign Language Sociology
History
II. Basic professional courses ( 28 semester hours) :

Acct. 234-235-Elementary Accounting I and II
Bus. Law 338-339-Business Law I and II
Fin. 331-Corporation Finance
Mgt. 331-Industrial Management
Mkt. 332-Principles of Marketing
Mkt. 346-Introduction to Business Statistics
Sec. Admin. 333-Business Correspondence
III. Major professional courses ( 41 semester hours):

Acct. 336-Principles of Cost Accounting
Acct. 4313-Advanced Cost
Eco. 3311-National Income Analysis
Eco. 3314-Intermediate Economic Theory
I.E. 3331-Work Analysis and Design I

Mgt. 332-Quantitative Analysis
Mgt. 333-Collective Bargaining
Mgt. 336-Behavioral Science in Business
Mgt. 432-Administrative Policy
Mgt. 435-Employee Supervision
Mgt. 438-Production I
Mgt. 439-Production II
Sec. Admin. 327-Report Writing
IV. Electives to complete a total of 130 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC.

## Bachelor of Business Administration or Bachelor of Science International Trade Major

Mr. Rouse, Adviser

I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses (39 semester hours):

Eco. 237-Economic Geography
Eco. 337-Economic Systems
Eco. 338-Foreign Trade
Eco. 339-Latin America and the United States

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Eco. 430-Development of Economic Doctrines
Eco. 432-Foreign Market Surveys
Eco. 433-International Economic Relations
Eco. 437-Current Economic Problems
Govt. 4361-U.S. Foreign Policy
Govt. 4363-International Organization
Govt. 4364 -International Law
Govt. 4362-Political Geography
Acct. 331-Managerial Accounting or Acct. 332-Analysis of Financial Statements
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Management Major

Mr. Mize, Adviser
I. Non-professional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses ( 42 semester hours):

Acct. 331-Managerial Accounting or 334 -Intermediate Accounting
Mgt. 331-Industrial Management
Mgt. 333-Collective Bargaining
Mgt. 334-Personnel Administration
Mgt. 432-Administrative Policy
Mgt. 435-Employee Supervision
Sec. Admin. 327-Report Writing Additional approved electives-18-24 semester hours.
IV. Electives to complete a total of 130 semester hours, exclusive of freshman and sophomore physical education, band, or ROTC.

## Bachelor of Business Administration Marketing Major

Mr. Ryan, Adviser

I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses ( 35 semester hours):

Acct. 332-Analysis of Financial Statements
or Acct. 336-Principles of Cost Accounting
Fin. 334 -Credits and Collections
Mkt. 334-Principles of Advertising

Mkt. 335-Principles of Retailing
Mkt. 339-Principles of Salesmanship
Mkt. 433-Marketing Problems
Mkt. 434-Wholesaling
Mkt. 435-Business Cycles and Forecasts
Mkt. 436-Marketing Research and Analysis
Mkt. 439-Sales Management
Psy. 230-Introduction to Psychology
Sec. Admin. 327-Report Writing
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Pre-Law Major

Mr. Dale, Adviser

I. Nonprofessional courses ( 52 semester hours).

Pre-law students should elect a semester of sophomore literature to meet admission requirements of some law schools.
II. Basic professional courses ( 28 semester hours).
III. Major professional courses (12 semester hours): Accounting elective, 3 semester hours
Eco. 326-Research in Economics and Business
Sec. Admin. 327-Report Writing
Electives- 6 semester hours to be chosen from the following:
Anthro. 231-The Nature of Man
or Anthro. 232-Cultural Anthropology
Hist. 133-134-History of England
Psy. 230-Introduction to Psychology
Soc. 230-Introduction to Sociology
or Soc. 233-Current Social Problems
Advanced business administration courses
IV. Electives in business administration to complete a total of 95 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. Students should attempt to elect courses which will provide the most information concerning the areas of business activity in which it is anticipated legal practice will concentrate. It may be necessary to use a part of these electives to assure a required total of not less than 38 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration or Bachelor of Science Public Administration Major

Mr. Clover, Adviser
I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses (28 semester hours).
III. Major professional courses (39 semester hours):

Acct. 432-Governmental Accounting
Arch. 436-City Planning
Eco. 326-Research in Economics and Business
Eco. 334-Taxation and Public Expenditures
Govt. 4321-Local Government
Govt. 4341-Fiscal Administration
Govt. 4353-Administrative Law
Mgt. 334-Personnel Administration
Mgt. 335-Purchasing, Stores, and Inventory Control
Mgt. 435-Employee Supervision
Mkt. 321-Public Relations
Psy. 230-Introduction to Psychology
Sec. Admin. 327-Report Writing
Sec. Admin. 431-Internship
1V. Electives to complete a total of 130 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 52 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Retailing Major

Mr. Ryan, Adviser
I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses ( 33 semester hours) :

Acct. 331-Managerial Accounting
Eco. 331-Economics of Business Enterprise
Mgt. 336-Behavioral Science in Business and Industry
Mkt. 334-Principles of Advertising
Mkt. 335-Principles of Retailing
Mkt. 433-Marketing Problems
Mkt. 436-Marketing Research and Analysis
Mkt. 4315-Retail Buying
Mkt. 4319-Retail Internship
Psy. 230-General Psychology
Phil. 231-Logic
IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 51 academic hours of course work outside the School of Business Administration.

## Bachelor of Business Administration Secretarial Administration Major

Mr. Pasewark, Adviser

I. Nonprofessional courses ( 52 semester hours).
II. Basic professional courses ( 28 semester hours).
III. Major professional courses ( 37 semester hours):

Acct. 246-Machine Accounting
Eco. 326-Research in Economics and Business
Mgt. 339-Office Management
Sec. Admin. 121-Beginning Typewriting
Sec. Admin. 122-Typewriting for Business
Sec. Admin. 131-Elementary Shorthand
Sec. Admin. 132-Intermediate Shorthand
Sec. Admin. 235-Advanced Shorthand
Sec. Admin. 321-Office Machines I
Sec. Admin. 322-Office Machines II
Sec. Admin. 327-Report Writing
Sec. Admin. 331-Secretarial Practice
Sec. Admin. 332-Secretarial Procedures
Sec. Admin. 431-Internship
IV. Electives to complete a total of 129 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. It may be necessary to use a part of these electives to assure a required total of not less than 52 academic hours of course work outside the School of Business Administration.

# Stenography Curriculum - Two-Year Program (No Degree) 

First Year

Hours Spring Semester Hours
Fall Semester
Eng. 131-Col. Rhet. 3 Eng. 132-Col. Rhet.3

3 Math. 138-Math. Anal.
Math. 137-Math. Anal.

$\qquad$ ..... 3
Eco. 231-Prin. of Eco. I Eco. 133-Devel. of Amer. Bus.3 Sec. Ad. 122-Typewrit. for\& Ec. Ad. Instit. I ............................2Sec. Ad. 131-Elem. Shorthand 3 Sec. Ad. 132-Intermed.Mgt. 110-Prof. Careers inBus.
$\qquad$1
Second Year
Fall Semester Hours Spring Semester ..... Hours
Eng. 231 or 232-Mast. of Acct. 235-Elem. Acct. II ..... 3
Lit. 3 Sec. Ad. 327-Report Writing ..... 2
Acct. 234-Elem. Acct. I 3 Sec. Ad. 332-Sec. Procedures ..... 3
Sec. Ad. 235-Adv. Shorthand 3 Sec. Ad. 322-Office
Sec. Ad. 321-Office Machines II ..... 2
Machines I 2 Sec. Ad. 333-Bus. Corres. ..... 3
Sec. Ad. 331-Sec. Practice 3 Spch. 338-Bus. \& Prof. Speech 3
Elective ..... 3 P.E.
P.E. 
............................................................. ..... 16 ..... 17

# Department of Accounting 

Reginald Rushing, Head of the Department Office: C\&O 318-A

Professors:
Norwood, A. T. Roberts, R. Rushing, H. G. Taylor
Associate Professor:
Chisholm
Assistant Professors:
Cox, R. A. Green, L. P. Eaves
Part-time Instructors:
T. J. Edwards, R. W. Hamilton,
J. L. Mason, Segars, R. D. Thornton

## Courses in Accounting

## FOR UNDERGRADUATES

## 121. Elementary Mechanical Coding. (2:0:4)

A beginning course to present the features and operation of the card punch and verifier, designed to develop proficiency in alphabetic and numeric keyboard drills, and in preparation and use of program cards.
231. Industrial Accounting for Engineers. (3:3:0)

Fundamental principles and procedures of accounting; cost accounting systems and cost analysis. Primarily for the nonaccountant to provide a working knowledge of accounting, both as a systematic approach to evaluation of the over-all performance and status of the business firm and as an aid to management in making decisions, planning future activities, and maintaining operational control. Credit will not be given for both 231 and 234.
234. Elementary Accounting 1 . (3:3:1)

Accounting for merchandise operations, proprietorships, partnerships, negotiable instruments, specialized books of original entry, and the voucher system. Credit will not be given for both 231 and 234.
235. Elementary Accounting II. (3:3:1)

Second course in elementary accounting. Partnerships, corporations, cost accountIng, assets, theory and principles of accounting, and interpretation of financial statements.

## 246. Machine Accounting. (4:3:3)

Punched card methods; card design and coding; organization and operation of tabulating machine departments; applications. Practice in wiring panel boards and in the operation of punch, verifier, sorter, and tabulator machines.

## 247. Machine Accounting. (4:3:3)

Punched card methods for auxiliary machines as follows: printing punch, interpreter, collator, reproducing punch; procedure development; punched card accounting applications and systems for accounts payable, accounts receivable, payroll, inventory, billing, sales, management, and supervisor responsibility. Practice in wiring panel boards and in the operation of the interpreter, collator, and reproducing punch; practice with program cards.

## 322. Payroll Accounting. (2:2:0)

Theory and application of federal and state laws pertaining to payroll, such as wage and hour, withholding, unemployment, workmen's compensation, and employment benefits.

## 331. Managerial Accounting. (3:3:0)

Prerequisite: Acct. 235 and nonaccounting major. Accounting as a management ald in decision-making by analyzing financial statements, budget planning and control, internal control, cost control, and cost interpretation.

## 332. Analysis of Financial Statements. (3:3:0)

Prerequisite: Acct. 235 and nonaccounting major. Financial statement preparation and analysis; items on financial statements including their derivation and financial significance; methods in interpreting financial statements.
334. Intermediate Accounting $\mathbf{I}$. (3:3:0)

Prerequisite: Acct. 235. Review of elementary accounting, net income concepts, corporations, current assets, investments.

## 335. Intermediate Accounting II. (3:3:0)

Fixed assets, liabilities and reserves, interpretation and analysis of financial statements, application of funds, cash flow statement, reorganizations, price level impact on financial statements.

## 336. Principles of Cost Accounting. (3:3:0)

Prerequisite: Acct. 235. Techniques of cost accounting, embracing methods of accounting for materials, labor, and factory burden in job order and process cost systems.

## FOR UNDERGRADUATES AND GRADUATES

430. Income Tax Accounting. (3:3:0)

Prerequisite: Acct. 234. Federal revenue acts with reference to taxation of the incomes of individuals; preparation of tax returns for individuals and partnerships.

## 431. Advanced Income Tax Accounting. (3:3:0)

Prerequisite: Acct. 430. Tax court and federal court cases and decisions. Procedure in practicing before the tax court. Study and preparation of returns for corporations and returns involving gift taxes, estate taxes, and inheritance taxes.
432. Governmental Accounting. (3:3:0)

Prerequisite: Acct. 235. Application of accounting principles and systems to the requirements of governmental units, municipal, county, state, and federal. Emphasis on budgetary and fund accounts.
433. Petroleum Accounting. (3:3:0)

Prerequisite: Acct. 235. Accounting for the production, refining, and distribution of oll with emphasis upon production.

## 434. Advanced Accounting I. (3:3:0)

Prerequisite: Acct. 334-335. Partnerships, consignments, ventures, installment sales, insurance, bankruptcies and receiverships, compound interest and annuities, estates and trusts.

## 435. Advanced Accounting II. (3:3:0)

Branch accounting and consolidations.
436. Accounting Systems. (3:3:0)

Prerequisite: Acct. 235. Construction of accounting reports, application of principles of systems and design to the policies, organization, and operating methods of individual companies. Automation and accounting systems. Local field trips.

[^36]438. Advanced Auditing. (3:3:0)

Prerequisite: Acct. 437. Review of auditing standards; case studies in auditing procedure. Completion of an audit practice case.

## 4313. Advanced Cost Accounting. (3:3:0)

Prerequisite: Acct. 336. Advanced theory and techniques of process cost are more fully developed than in Acct. 336 and the scope of applicability broadened. Estimate and standard cost are comprehensively treated with emphasis on cost control. Selected problems supplement the text material.
443. An Introduction to Data Processing, Computers, Programming Techniques. (4:3:3)
Lecture and problems related to data processing, computer components, programming, block diagramming, arithmetic operations, branching, table look-up, instruction modification, loading routines, optimum programming, and programming techniques.

## 444. Large Scale Tape Controlled Computers and Programming

 Techniques. (4:3:3)Lecture and class problems covering machine components and language, arithmetic operations, block diagramming, programming, and optimal programming.

## FOR GRADUATES

531. Controllership. (3:3:0)

Role of the controller in business. Functions of the controllers. Use of accounting and budgeting in business planning.
532. Internship. (3:3:0)

A student is placed in an internship in accounting and upon completion writes a report of his internship.

## 533. Current Accounting Theory. (3:3:0)

Current accounting literature; accounting bulletins of the American Institute of Certified Public Accountants; S.E.C. accounting releases.
534. Seminar. (3:3:0)

Prerequisite: Acct. 235, and limited to nonaccounting majors. Uses of accounting to business and interpretation of financial statements and accounting reports.
536. CPA Review I. ( $3: 3: 0$ )

Emphasis on subject matter appearing in the practice part of the CPA examinations.
537. CPA Review II. (3:3:0)

Emphasis on subject matter appearing in the theory part of the CPA examinations.
5311. Advanced Accounting Problems I. (3:3:0)

A study of advanced accounting problems varying with the needs of the particular students. Individual instruction.
5312. Advanced Accounting Problems II. (3:3:0)

A study of advanced accounting problems varying with the needs of the particular students. Individual instruction.

Special Business Administration Courses for Advanced Study FOR UNDERGRADUATES AND GRADUATES
422. Business Policy Research and Report. (2)
441. Seminar in Business Administration. (4:4:0)

FOR GRADUATES
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Business Education and Secretarial Administration 

William R. Pasewark, Head of the Department Office: C\&O 318-C<br>Professor:<br>Pasewark<br>Associate Professor:<br>Gilliam<br>Assistant Professors:<br>Holtmann, Watt<br>Instructors:<br>Henderson, Kilchenstein, Quicksall

## Courses in Business Education FOR UNDERGRADUATES AND GRADUATES

432. Methods of Teaching Business Subjects I. (3:3:0)<br>Prerequisite: Acct. 235, Bus. Law 339, Eco. 232. Business education as a profession. Methods and materials used to teach basic business subjects, bookkeeping, and office machines. Students teach a lesson in class.

433. Methods of Teaching Business Subjects II. (3:3:0)

Prerequisite: Sec. Admin. 122 and Sec. Admin. 132. Methods and materials used to teach shorthand and typewriting. students teach a lesson in class.

## FOR GRADUATES

## 530. Foundations of Business Education. (3:3:0)

Prerequisite: Consent of instructor. A historical approach to interpreting presentday business education problems.
535. Seminar in Business Education. (3:3:0)

Readings, discussions, and reports. May be repeated for credit.
53\%. Research and Improvement of Instruction in Office Procedures. (3:3:0)
Prerequisite: Mgt. 331 or 339 or equivalent. An evaluation of content, methods, and research to improve the teaching of office procedures.
539. Research and Improvement of Instruction in Typewriting. (3:3:0)
Prerequisite: Bus. Educ. 433. An evaluation of content, methods, and research to improve the teaching of typewriting.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

## Courses in Secretarial Administration FOR UNDERGRADUATES

121. Beginning Typewriting. (2:2:3)

Development of typwriting ability for personal and professional use. Composing
at the typewriter. No credit for those with one year of previous typewriting instruction.

## 122. Typewriting for Business. (2:2:3)

Prerequisite: C grade in Sec. Adm. 121 or equivalent. Development of ability
on electric typewriter. Emphasis on efficient organization and preparation of materials to increase office production.

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## 131. Elementary Shorthand. (3:3:2)

Theory of Gregg shorthand; the alphabet, word beginnings, word endings; brief forms and abbreviations. Development of ability in reading, writing, and transcribing Gregg shorthand. Building recording speed from timed dictation. No credit for those with one year of previous shorthand instruction.
132. Intermediate Shorthand. (3:3:2)

Prerequisite: Sec. Adm. 122 and at least C grade in 131 or equivalent. Bullding recording speed on new material from timed dictation and development of fundamental transcription abillty on the typewriter.

## 235. Advanced Shorthand. (3:3:2)

Prerequisite: Sec. Adm. 122 and at least C grade in 132 or equivalent. Development of ability to transcribe mailably and rapidly business letters dictated at increasing rates of speed. Further development of recording speed.
321. Office Machines I. (2:2:2)

Arithmetical machine systems. Operation of basic calculating and accounting machines.

## 322. Office Machines II. (2:2:2)

Communication and duplication machine systems and processes. Operation of basic dictating, transcribing, and duplicating machines.

## 327. Report Writing. (2:2:0)

Prerequisite: Sec. Admin. 121 or typewriting ability. Writing effective business reports. Emphasis on business reporting procedures and solving internal business reporting problems.
331. Secretarial Practice. (3:3:0)

A comprehensive study of psychology as applied to business. Theory and procedure for filing systems and records management.
332. Secretarial Procedures. (3:3:2)

Prerequisite: Sec. Adm. 132 or equivalent. Scope of the secretarial field; office style dictation and transcription; postal, telegraph, and shipping services; financial and legal responsibilities of the secretary; and secretarial duties incident to travel and meetings. Preparation for Certified Professional Secretary examination.

## 333. Business Correspondence. (3:3:0)

Prerequisite: Sec. Admin. 121 or typewriting ability. Writing psychologically sound business letters in correct and forceful English. Emphasis on solving business problems by writing effective business letters.

## 431. Internship. (3:1:5)

Prerequisite: Senior classification and aproval of instructor. Supervised business experience for a minimum of 90 hours coordinated with lectures.

# Department of Economics 

Robert L. Rouse, Head of the Department Office: C\&O 318-E<br>Professors:<br>Clover, Levy, Rouse<br>Associate Professors:<br>H. A. Anderson, Hildebrand, Weir<br>Assistant Professors:<br>Harding, H. S. Walker, Witt, Wittmann<br>Instructors:<br>Connell, Stewart<br>Part-time Instructors:<br>E. M. Gott, Reedy

## Courses in Economics

## FOR UNDERGRADUATES

## 133. The Development of American Business and Economic Institutions I. (3:3:0) <br> An analysis of how the contemporary American economy has evolved. Emphasis on the use of scientific tools to dissect problems; comparisons of the characteristics of business institutions and the economic process in different eras; and concepts and a way of thinking that are employed extensively in advanced courses.

## 134. The Development of American Business and Economic <br> Institutions II. (3:3:0)

Prerequisite: Eco. 133. A continuation of Eco. 133 with prlmary emphasis upon application of tools of analysis to problems associated with the development of American business and economic institutions most closely related to the contemporary environment.

## 231. Principles of Economics I. (3:3:0)

Prerequisite for business administration majors: Eco. 133 and Eco. 134. An introduction to modern economic society and theories of production and exchange. Emphasis upon monetary and fiscal policy.

## 232. Principles of Economics II. (3:3:0)

Prerequisite: Eco. 231. A continuation of Eco. 231. Emphasis on theories of the firm, value and price determination, and functional distribution, with the application of these theories to the problems of particular firms, industries, and markets. Completion of this course required prior to upper division courses in business administration.

## 235. Principles of Economics. (3:3:0)

An abridged course for students not majoring in economics or business administration. Covers the most significant portions of Eco. 231 and Eco. 232, with emphasis upon monetary and fiscal policy.
237. Economic Geography. (3:3:0)

The characteristics and distribution of man's economic pursuits, his relation to natural conditions and resources, and his significance in the economics of the major regions of the world order.

## 326. Research in Economics and Business. (2:2:0)

Research methods used in the field. A definite problem undertaken for actual experience on the part of the student.
331. Economics of Business Enterprise. (3:3:0)

Prerequisite: Eco. 231-232. The application of economic theory to problems of business enterprise.

## 334. Taxation and Public Expenditures. (3:3:0)

Prerequisite: Eco. 231-232. Analysis of economic aspects of government finance; principles and problems of taxation, public expenditures, budgetary controls, and debt management.

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## 336. The Economics of Regulated Enterprise. (3:3:0)

Prerequisite: Eco. 231-232 or consent of instructor. Analyses of the operations of industries supervised by government commissions. Emphasis placed on the rationale for such controls in terms of the legal and economic development of the "public utility" concept, and on the implications of government commission regulation of business.
337. Economic Systems. (3:3:0)

Prerequisite: Eco. 231-232. The control of economic institutions for the welfare of the general community. The main principles of a planned economy and existing economic systems.
338. Foreign Trade. (3:3:0)

Prerequisite: Eco. 231-232. Principles of international trade, balance of payments, trade policies, and agreements.
339. Latin America and the United States. (3:3:0)

Prerequisite: Eco. 231-232. The economics of Latin American countries and their economic relations with the United States.
3311. National Income Analysis. (3:3:0)

Prerequisite: Eco. 231-232. National income concept and measurement and an analysis of the requirements for high level employment; uses of income analysis for business decisions and public policy.
3312. Economics of Labor. (3:3:0)

Prerequisite: Eco. 231-232. The theory of wages, the problems of unemployment, economic insecurity, industrial disputes, industrial accidents, development and aims of labor unions, and employers' associations.

## 3313. Introduction to Quantitative Economic Analysis. (3:3:0)

Prerequisite: Eco. 231-232 and Math. 137 or equivalent. Use of the basic concepts and symbolism of mathematics in the presentation of economic theory.

## 3314. Intermediate Economic Theory. (3:3:0)

Prerequisite: Eco 231-232. Intermediate price theory and introduction to welfare theory. Includes theory of demand, theory of the firm, and welfare theory.

## FOR UNDERGRADUATES AND GRADUATES

430. Development of Economic Doctrines. (3:3:0)

Prerequisite: Eco. 231-232. The basis, nature, and effects of economic doctrines from ancient times through the nineteenth century.
431. Contemporary Economic Doctrines. (3:3:0)

Prerequisite: Eco. 430 or consent of instructor. The basis, nature, and effects of economic doctrines developed during the twentieth century.
433. International Economic Relations. (3:3:0)

Prerequisite: 12 hours in economics. Comparison of domestic and international economic relations. Political obstacles to international trade. The tariff and commercial treaties. International monetary problems. Financing foreign trade. Foreign loans.

## 435. The Economics of Transportation. (3:3:0)

Prerequisite: Eco. 33\%, or consent of instructor. A study of the economics and regulatory problems of the various forms of domestic transportation and the public policy related to each.

## 437. Current Economic Problems. (3:3:0)

Prerequisite: Eco. 231-232. Fundamental problems of economic life today and proposed solutions. Emphasis on monetary and fiscal problems and policies.

## 4311. Advanced Economic Theory. (3:3:0)

Prerequisite: 12 hours in economics. Contemporary economic principles and thought concerning the production and distribution of goods and services. Fundamental laws of economics as applied to present-day problems and conditions.

## FOR GRADUATES

## 531. Economic Research. (3:3:0)

Prerequisite: Eco. 232. Directed student research in selected areas with written reports under the supervision of a qualified instructor.
532. Advanced Micro-Economic Analysis. (3:3:0)

Prerequisite: Eco. 232 and 430. Economic factors involved in the theory of the firm and determination of price. Special emphasis on the cases of monopoly, monopolistic competition, and oligopoly.
533. Advanced Macro-Economic Analysis. (3:3:0)

Prerequisite: Eco. 232 and 430. The aggregate approach to the economy and the tools of analysis used for the solving of aggregate economic problems.
534. Seminar in Contemporary Economic Problems. (3:3:0)

Prerequisite: Eco. 232. Identification and analysis of contemporary economic problems. The use of the seminar method to explore the nature and extent of the problem, concentrating on student investigation and proposed solutions using economic principles. Enrollment limited to noneconomic majors.

535. Seminar in Economic Policy. (3:3:0)<br>Prerequisite: Eco. 430. Major economic policies of government and industry.

## 5335. Human Geography. (3:3:0)

Enrollment limited to graduate students in elementary education. The geographic environment of mankind and his adjustments to the environment. Attention given to the geographic factor influencing the population: its characteristics, density, distribution, and economic and social activities.
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Finance 

Robert L. Rouse, Head of the Department Office: C\&O 318-E<br>Professors:<br>Heather, Rouse<br>Associate Professors:<br>Abel, Berry, Dale, Reese, Weir<br>Assistant Professors:<br>Comer, Hartley<br>Part-time Instructors:<br>Gillespie, Irvin, Quilliam, Shuman

## Courses in Finance

## FOR UNDERGRADUATES

## 231. Personal Finance. (3:3:0)

Introduction to financial problems of the home and of business. Particular emphasis on those elements that should be considered by the individual before investing in real estate, personal property, insurance, or securities.
331. Corporation Finance. (3:3:0)

Prerequisite: 60 semester hours, including Eco. 232 and Acct. 235. Fundamental aspects of modern business organization, with attention to the financial problems associated with promotion, capitalization, sale of securities, dividend policies, expansion, failure and reorganization, and the provision of working capital.

## 333. Principles of Money, Banking, and Credit. (3:3:0)

Prerequisite: Eco. 232. A basic course, including consideration of monetary standards, organization and functioning of commercial banking and the Federal Reserve System, problems of money, prices, and credit control. Recent monetary and banking trends are emphasized.

## 334. Credits and Collections. (3:3:0)

Prerequisite: Eco. 232 and Acct. 235. Types and analysis of financial statements, credit limits, collection procedures, legal remedies of the creditor, sources of credit information.

## 335. General Insurance. (3:3:0)

Prerequisite: Eco. 231-232. A survey of the entire field of private insurance and a foundation for more specialized courses. The history of insurance, the theory of risk, physical and moral hazards, loss prevention, types of insurance carriers, and the basic features of each of the principal kinds of insurance.

## 336. Life Insurance. (3:3:0)

Prerequisite: Fin. 335 or approval of instructor. The nature of life insurance; various ways of utilizing the protection it offers. Principal features of life insurance and annulty contracts. Group insurance, industrial insurance, disability protection, insurance company investments, and the taxation of policy proceeds.

## FOR UNDERGRADUATES AND GRADUATES

431. The Federal Reserve System. (3:3:0)

Prerequisite: Fin. 333. Analysis of functions and services of the Federal Reserve System.

## 432. Real Estate. (3:3:0)

Real estate practice and finance from the standpoint of the broker, businessman, and property owner. Real estate office organization, leasing and property management valuation and taxation. Legal, financial, economic, and social aspects of the real estate field.
433. Corporate Financial Problems and Cases. (3:3:0)

Prerequisite: Fin. 331. An intensive analysis of selected financial problems concerned with the organization, operation, and dissolution of business organizations; special attention to the corporation.
434. Investments. (3:3:0)

Prerequisite: Fin. 331. Various types of investment media; major emphasis on basic principles of investment, construction of an investment portfolio, security analysis, sources of information, and the mechanism for investment.

## 435. Property Insurance. (3:3:0)

Prerequisite: Fin. 335 or approval of instructor. Fire insurance, marine insurance, and allied lines. Policy forms, underwriting and selection, rate-making, loss adjustments, the operations of agency and brokerage firms, and reinsurance.

## 437. Casualty Insurance. (3:3:0)

Prerequisite: Fin. 335 and 435. Various casualty lines of insurance such as public liablity, automobile, workmen's compensation, aviation, burglary and robbery, glass power plant, and accident and health. Contracts and practices in the field of fidelity and surety bonding. Primarily for those desiring to specialize in insurance.

## 438. Bank Administration. (3:3:0)

Prerequisite: Fin. 333 and 431. Internal operations of a commercial bank; major emphasis on the organization of the bank, sources of bank funds, allocation of bank funds, and supervision and regulation of the commercial bank.

## 439. Real Estate Appraisal. (3:3:0)

Prerequisite: Fin. 432. Application of principle of property valuation to the various classes of realty. Emphasis on the character of land value, axioms of valuation, and application of valuation procedures by use of cost, market, and capitalization of income approach to real estate value. Individual problems and reports on independent property appraisals are required.

## FOR GRADUATES

531. Current Financial Problems. (3:3:0)

Solution and presentation of approved problems involving individual research in the field of finance.

## 532. Seminar in Business Financial Policy. (3:3:0)

Prerequisite: Fin. 433 or equivalent. The financial policy of business organization with emphasis on organization of the finance function, evaluation of the financial performance, and determination of financial requirements.

## 533. Seminar in Investment Analysis. (3:3:0)

Prerequisite: Fin. 434 or equivalent. Security analysis and selected problems in individual and institutional portfolio analysis.
534. Seminar. (3:3:0)

Prerequisite: Fin. 331. A comprehensive study of the problems of business enterprise in financing current operations and long-term capital requirements. Limited to nonfinance majors.
535. Seminar in Current Banking Problems. (3:3:0)

Prerequisite: Fin. 438 or equivalent. Major problems affecting commercial banks and the banking system at the present. Representative case problems will be used as a basis for analysis and decision.

## Courses in Business Law <br> FOR UNDERGRADUATES

338. Business Law I. (3:3:0)

Prerequisite: 60 semester hours. Nature and source of law, courts and procedure, contracts, Texas law of separate and community property, agency.
339. Business Law II. (3:3:0)

Second course in business law. Law of negotiable instruments, business organizations including partnerships and corporations, sales.
3311. Real Estate Law. (3:3:0)

Rights in land; classification of estates; acquisition and creation of property rights, titles; and common conveyances.
3312. Insurance Law. (3:3:0)

General principles of insurance law; the insurance contract; insurance agents and their powers; rights under the fire, life, and accident policies; taxation affecting insurance policies; insurance and community property rights. Study of the rules and regulations adminlstered by the Texas Insurance Commission and how they apply to the companies.

## 3313. Oil and Gas Law. (3:3:0)

General contracts, oll and gas leases and their interpretation, titles, royalty, proration and conservation of oll and gas, regulations governing drilling operations, government lands, cases on oil and gas.

## FOR UNDERGRADUATES AND GRADUATES

4311. CPA Law Review. (3:3:0)

Review of business law with emphasis on subject matter appearing frequently in the CPA law examinations.

# Department of Management 

Freedis L. Mize, Head of the Department<br>Office: C\&O 318

Professors:<br>Cain, Mize<br>Assistant Professors:<br>Harding, Hubbard, Luchsinger<br>Instructor:<br>Robinson<br>Part-time Instructors:<br>Hobbs, Reedy, Renner

## Courses in Management

## FOR UNDERGRADUATES

[^37]
## 262 MANAGEMENT

## *221. Industrial Operations. (2:2:0)

Emphasis on audio-visual presentation of typical processes, methods, and equipment found in modern American industries to give the student some famillarity with mass-production activities.

## 331. Industrial Management. (3:3:0)

Prerequisite: Eco. 231. Principles and methods used in developing and operating industrial and business enterprises; principles of scientific management and their application to problems of organization, plant location, selection of physical properties, methods of control, and manpower utilization.

## 332. Quantitative Analysis for Management Decisions. (3:3:0)

Prerequisite: Acct. 234-235, Eco. 231-232, Math 137, Mkt. 346. The applications of quantitative tools to business problems. Major emphasis is placed on the utilization of analytical concepts in dealing with the decision process.
333. Collective Bargaining. (3:3:0)
(formerly Labor Problems)
Prerequisite: Junior standing in management or consent of the instructor. A study, from the management viewpoint, of labor union development, organization, leadership, and operational techniques. Consideration of collective bargaining issues and procedures. Problems of contract negotiation and administration, including grievance procedure and arbitration.

## 334. Personnel Administration. (3:3:0)

Prerequisite: Junior standinf in management or consent of instructor. Principles and methodology in general personnel management and work force maintenance. Employee recruitment, selection, placement and training, service rating, transfer, and promotion. Special attention to administration of employee services and fringe benefits and to wages and hours problems.

## 335. Purchasing, Stores, and Inventory Control. (3:3:0)

Prerequisite: Mgt. 331. The organization and function of the purchasing department; study of problems of purchasing policies and procedures, sources of supply, prices, contract negotiation and adjustments, quality control, receiving, and stores control.

## 336. Behavioral Science in Business and Industry. (3:3:0)

Prerequisite: Junior standing or consent of the instructor. Theory, methods, and demonstrations of behavioral science applied to problems of business, industrial, and engineering settings. An examination of the motivational, perceptual, attitudinal, social, and organizational factors shaping individual, group, and institutional dynamics that affect the management of the business enterprise.

## 339. Office Management. (3:3:0)

Prerequisite: Eco. 231-232, Acct. 234-235. Standards of office practice, office methods, wage payment plans, seiection and training of office workers, office planning, techniques, and duties and responsibilities of the office manager.

## 3371. Industrial Traffic Management. (3:3:0)

Prerequisite: Junior standing in Business Administration or consent of the instructor. The problems of commercial and industrial traffic management which arise in shipping and receiving commodities are studied as well as the organization and administration of shipping, routing, expediting, receiving, and claim prevention. Attention is given to the functions of industrial and chamber of commerce traffic departments in interpretations of traffic regulations and procedures before regulatory commissions.

## 3381. The Theory of Transportation Ratemaking. (3:3:0)

Prerequisites: Mgt. 3371. A study of the rules, rates and charges governing the movement of goods in common carrier transportation. Includes tariff interpretations and actual practice in developing rates and charges from tariff publications.

## 430. Management of Small Business Enterprise. (3:3:0)

Prerequisite: Mgt. 331 or senior standing and consent of the instructor. A problem course involving the application of principles of management to small-scale enterprise situations. Extensive use of case problems to develop analytical ability in decision, and introduction of elementary game theory and management decision simulation.

## 431. Job Evaluation and Wage Administration. (3:3:0)

Prerequisite: Senior standing in management or consent of instructor. Applications of wage theory to wage problems of the firm, determination of proper wage differentials within the firm, investigation of financial incentives, and administration of the wage program. Includes a comprehensive semester project involving the organization of a company wage structure through use of job evaluation.

[^38]432. Administrative Policy. (3:3:0)

Prerequisite: Seniar standing in Business Administration of consent of instructor. Application of the case method to complex problems of policy formulation in the administration of the firm. The business organization is viewed as a system of interrelated functions operating within the confines of the general economy, Primary emphasis is placed on the use of appropriate analytical tools in the investigation and evaluation of comprehensive business situation. Intended as a capstone course in Business Adminitsration.
433. Recent Labor Legislation. (3:3:0)

Prerequisite: Mgt. 333. Study of permissive areas of activity in Labor relations with particular emphasis on major Federal laws, including Federal Anti-Injunction Act, National Labor Relations Act, Fair Labor Standards Act, and the Labor-Management Reporting and Disclosure Act. General state labor legislation, with emphasis on Texas laws, is included.

## 434. Employee Performance Appraisal and Training. (3:3:0)

Prerequisite: Mgt. 334. A study of principles involved and techniques employed In determining quantitive and qualitive measurements of worker efficiency and ratings. Applications of learning theory, communications, teaching devices, interviewing and simulators, and administration of employee training programs.

## 435. Employee Supervision. (3:3:0)

Prerequisite: Migt. 331. The relation of the supervisor to his subordinates and to higher management, leadership, planning of group work, and the use of the tools of supervision. Particular attention to introducing and training new employees, rating, discipline, problems of absenteeism, and maintenance of morale.

## 436. Office Systems and Procedures. (3:3:0)

(formerly Problems in Office Management)
Prerequisite: Mgt.. 339 or consent of the instructor. Development and standardization of office practices and procedures, work analysis and job simplification, and planning of systems and controls for the administrative services of the business.
438. Production. I. (3:3:0)

Prerequisite: Mgt. 331 Math 231, Mkt. 346, and Eco. 3314. A critical examination of management decision-making techniques with major emphasis on the practical applications of scientific methods to analysis of production activities. Topics treated Include resource allocation through linear and dynamic programming, plant location, plant facilities, inventory control, statistical quality and process control, simulation techniques, and methods of industrial experimentation.

## 439. Production II. (3:3:0)

Prerequisite: Mgt. 438 and Math 232. An extension of Production I with a rigorous application of schematic, statistical, and mathematical tools to problems of system design and resource allocation within the firm.

## 4371. Regulation of Transportation. (3:3:0)

Prerequisite: Mgt. 3371. Study of the Interstate Commerce Act, its interpretation and its applications to the operations of motor carriers, railroads, water carriers and freight forwarders.
4381. Advanced Traffic Management. (3:3:0)

Prerequisite: Mgt. 3371. A study of the major problems faced by industry and by carriers in the movement of goods. Includes carrier operational problems, shipper problems, cost analysis, warehousing, rate negotiation, carrier competition and shipper competition.

## 442. Industrial Management Problems. (4:3:2)

Prerequisite: Mgt. 331 or equivalent background. A problem and field course involving study of location, organization, production facilities and planning, and operation of industrial enterprises. The student is required to make plant inspection tours to observe industrial organization at work.

## FOR GRADUATES

## 511. Individual Problems. (1:1:0)

524. Seminar in Management. (2:2:0)
525. Current Problems in Management. (3:3:0)
526. Research in Management. (3:3:0)
527. Seminar in Management. (3:3:0)

Limited to majors in fields other than management.

# Department of Marketing 

John Allen Ryan, Head of the Department<br>Office: C\&O 318-B

Professor:<br>Ryan<br>Associate Professors:<br>Amason, Golden<br>Assistant Professor:<br>L. L. Luchsinger<br>Instructors:<br>Blackwell,* Hewett<br>Part-time Instructors:<br>Greenidge, Welborn<br>* On leave

## Courses in Marketing

FOR UNDERGRADUATES

## 321. Public Relations. (2:2:0)

Policies and methods of creating and maintaining public good will in business including studies of employee participation and consume: attitude and opinion. Public relations programs of representative business concerns.
332. Principles of Marketing. (3:3:0)

Marketing structures and agencies. Motives and buying habits. Types of middlemen, marketing institutions, and channels. Current marketing practices. Marketing of industrial and consumer goods.

## 334. Principles of Advertising. (3:3:0)

Advertising from the point of view of the needs of businessmen. To acquaint students in business with the tools and techniques of advertising and the use of advertising as a selling force. Consideration of the media available, the publicity budget, relation of the publicity department to other departments of the business, and means of testing and measuring benefits of advertising.
335. Principles of Retailing. (3:3:0)

Prerequisite: Mkt. 332. Analysis of store location; layout, fixtures, and organization; interpreting consumer demand; purchasing, receiving, checking, pricing, and merchandising; sales promotion; inventory and merchandise control; credit; and personnel.
339. Principles of Salesmanship. (3:3:0)

Fundamentals of personal salesmanship applied specifically in the marketing of goods and services and as they may aid any business or professional man.
346. Introduction to Business Statistics. (4:3:2)

Prerequisite: Math. 137 and 138. Techniques of the collection, presentation, analysis, and interpretation of numerical data as applied to business. Emphasis on measurement of seasonal variations, trends, and cyclical fluctuations.

## FOR UNDERGRADUATES AND GRADUATES

431. Industrial Marketing. (3:3:0)

Prerequisite: Mkt. 332. Problems involved in marketing industrial goods, including commodities.

## 433. Marketing Problems. (3:3:0)

Prerequisite: Mkt. 332. Actual marketing cases and problems. Marketing costs, analysis of operating statements, production policy, brand policy, various channels of distribution, sales promotion, sales policies, price determination, price policies, and operating control.
434. Wholesaling. (3:3:0)

Prerequisite: Mkt. 332. Processes and institutions of wholesale marketing from manufacturer or processor to retailer through merchant and functional middlemen. Speclal emphasis upon modern channels of distribution including agents and agency structures, selling agents, manufacturers' agents, brokers, jobbers, commission firms, service and special wholesalers, other intermediary marketing institutions, and consignments.

## 435. Business Cycles and Forecasts. (3:3:0)

Prerequisite: Mkt. 346. Theories of cycles. Causes and proposed remedies. Examination of forecasting services available and techniques employed by them. Problems in specific commodities and securities.
436. Marketing Research and Analysis. (3:3:0)

Prerequisite: Mkt. 332 and 346. Scientific marketing research methods; emphasis on collection, analysis, and interpretation of data as applied to the solution of marketing problems. Class projects include gathering both primary and secondary data and the preparation of written reports.
437. Advanced Business Statistics. (3:3:0)

Prerequisite: Mkt. 346. Statistical methods and their uses in business institutions. A more extended study of some phases of business statistics including sampling, averages, dispersion, time series, index numbers, linear and nonlinear correlation, multiple and partlal correlation, estimates, variance, and the use of statistics in business forecasting.
439. Sales Management. (3:3:0)

Prerequisite: Mkt. 332 and 339. Problems and methods or organization and administration of sales departments including sales research; sales operation including departmental organization, selection, training, equipping, and remunerating sales personnel; sales control, embodying sales territories, routing, expense accounts, quotas, costs, and budgets; sales promotion; and sales policies.
4311. Advertising Practices. (3:3:0)

Prerequisite: Mkt. 334. Analysis of the creative aspects of the advertisement: Copy, layout, and production, to provide a practical account of the work in each of these three areas. Emphasis on the cost-control and strategic decisions in selection and use of the various advertising media.
4312. Advanced Advertising Practices. (3:1:4)

Prerequisite: Mkt. 4311. A specialized, skill-development course. Provides a systematic approach to the actual writing of advertising copy for a variety of products and services in the major advertising media. Layout will be considered as the proper framework for copy. Numerous assignments in actual copywriting and rough layouts.

## 4315. Retail Buying. (3:3:0)

Prerequisite: Mkt. 335. Functions of the retail buyer, emphasizing principles and procedures in buying for resale. Organization for buying, analysis of consumer demand, model stock plans, sources of supply, resident buying, cooperative and central buying, terms and discounts, price quotations, trade relations, selection, and training techniques.
4316. Advertising Administration. (3:3:0)

Prerequisite: Mkt. 4311. Major problems involved in the building, implementing and evaluating of advertising programs as distinguished from individual advertisements. Situations which have confronted actual businessmen in such areas as advertising appropriation, coordination of advertising with other sales efforts, and advertising agency relationships.
4319. Internship. (3:1:5)

Prerequisite: Approval of instructor. The student will follow a schedule of observation and work in an advertising, retailing, or other marketing capacity in one or more business firms. Minimum of 75 clock hours of work.

## FOR GRADUATES

531. Advanced Marketing Problems. (3:3:0)
532. Advanced Marketing Research. (3:3:0)

## 533. Marketing Thought and Theory. (3:3:0)

Prerequisite: Mkt. 332. Principles theories, and problems in marketing. Consideration of the contributions of marketing scholars to the mainstream of marketing thought. The functional, institutional, cost, and historical approaches are utilized in viewing marketing from both the social and firms' point of view.
534. Seminar in Marketing. (3:3:0)

Enrollment limited to nonmarketing majors.
535. Statistical Decision Making. (3:3:0)

Prerequisite: Mkt. 346. Logical analysis of practical business problems in which a decision must be reached under uncertainty. Basic concepts of decision theory applied in a variety of situations.
536. Individual Study in Marketing 1. (3:3:0)

Directed individual study of advanced marketing problems varying with the needs of the particular student.
53\%. Individual Study in Marketing II. (3:3:0)
Directed individual study of advanced marketing problems varying with the needs of the particular student.

## SUGGESTED PROGRAMS BY SEMESTERS <br> 1964-1965

(See preceding pages for official degree requirements.)

| YEAR | ACCOUNTING |  | ADMINISTRATIVE MANAGEMENT |  | ADVERTISING |  | BUSINESS EDUCATION |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | FALL | SPRING | FALL | SPRING | FALL | SPRING | FALL ${ }^{\text {a }}$ ( SPRING |
| FIRST | Eco. 133 <br> Eng. 131 <br> Hist. 231 <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Hist. 232 <br> Math. 138 <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Humanities  <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Hist. 231 <br> Math. 138 <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Mgt. 110 <br> Math. 137 <br> Psy. 230 <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Math. 138 <br> Humanities  <br> P. E.  <br> Science  | Eco. 133 Eco. 134 <br> Eng. 131 Eng. 132 <br> Hist. 231 Hist. 232 <br> Math. 137 Math. 138 <br> Sec. Ad. 122 Mgt. 110 <br> Sec. Ad. 131 asc. Ad. 132 <br> S.E.  P.E.  |
| SECOND | Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Humanities  <br> P.E.  | Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Speech 338 <br> P.E.  | Acct. 234 <br> Eco. 231 <br> Eng. 231 <br> Govt. 231 <br> Sec. Ad. 333 <br> P.E.  |   <br> Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Hist. 232 <br> Speech 338 <br> P.E.  |   <br> Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Hist. 231 <br> P.E.  <br> P.  |   <br> Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Hist. 232 <br> Mikt. 332 <br> P.E.  | Acct. 234 Acct. 235 <br> Eco. 231 Eco. 232 <br> Eng. 231 Eng. 232 <br> Govt. 231 Govt. 232 <br> P.E.  P.E.  <br> Science  Science  |
| THIRD | Acct. 334 <br> Acct. 336 <br> Bus. L. 338 <br> Mkt. 332 <br> Sec. Ad. 333 |   <br> Acct. 335 <br> Bus. L. 339 <br> Fin. 331 <br> Mkt. 346 <br> Acct. Elective |   <br> Acct. 334 <br> Bus. L. 338 <br> Mgt. 333 <br> Mkt. 332 <br> Sec. Ad. 327 | Acct. 335 <br> Bus. L. 339 <br> Mgt. 331 <br> Mgt. 334 <br> Mkt. 346 | Bus. L. 338 <br> Fin. 331 <br> Mkt. 334 <br> Mkt. 346 <br> Speech 338 |   <br> Acct. 332 or 439  <br> Bus. L. 339 <br> Mgt. 331. <br> Mkt. 321 <br> Mkt. 335 <br> Sec. Ad. 333 | Bus. L. 338 Bus. L. 339 <br> Educ. 330 Educ. 334 <br> Educ. 332 Educ. 436 <br> Mkt. 332 Mkt. 346 <br> Sec. Ad. 321 Sec. Ad. 322 <br> P.E.  Sec. Ad. 327 <br> Elective  P.E.  |
| FOURTH |   <br> Acct. 430 <br> Acct. 434 <br> Acct. 437 <br> Sec. Ad. 327 | Mgt. 331 <br> Acct. Elective <br> Acct. Elective |   <br> Fin. 331 <br> Mgt. 335 <br> Mgt. 430 <br> Mgt. 432 | Mgt. 336 <br> Mgt. 431 <br> Mgt. 435 <br> Mgt. 442 | Mkt. 339 <br> Mkt. 436 <br> Mkt. 4311 | $\begin{array}{lr} \text { Mkt. } & 433 \\ \text { Mkt. } & 4316 \end{array}$ | Student Teaching Semester may be either Fall or Spring Non-Student Teaching Semester Acct. Elective <br> Evidence of at least eight weeks of continuous full-time business exporience. |

[^39]SUGGESTED PROGRAMS BY SEMESTERS
1964-1965
(Continued)
(See preceding pages for official degree requirements.)

| YEAR | ECONOMICS |  | FINANCE--Banking |  | FINANCE--Financial Administration |  | FINANCE--Insurance and Real Estate |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | FALL | SPRING | FALL | SPRING | FALL | SPRING | FALL | SPRING |  |
| FIRST | Eco. 133 <br> Eng. 131 <br> Hist. 231 <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Hist. 232 <br> Math. 138 <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Hist. 231 <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Hist. 232 <br> Math. 138 <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Hist. 231 <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Hist. 232 <br> Math. 138 <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Hist. 231 <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  | Eco. <br> Eng. <br> Hist. <br> Math. <br> P.E. <br> Science | $\begin{aligned} & 134 \\ & 132 \\ & 232 \\ & 138 \end{aligned}$ |
| SECOND | Acct. 234 <br> Eco. 231 <br> Eng. 231 <br> Govt. 232 <br> Speech 231 <br> P.E.  <br> P.  <br>   | Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Humanities  <br> P.E.  | Acct. 234 <br> Eco. 231 <br> Eng, 231 or 232 <br> Fin. 231 or 334 <br> Govt. 231 <br> P.E.  <br>   | Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Humanities <br> Elective  <br> Speech 338 <br> P.E.  <br>   | Acct. 234 <br> Eco. 231 <br> Eng. 231 <br> Fin. 231 <br> Govt. 334 <br> P.E. 231 <br> P.  | Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Humanities  <br> Elective  <br> P. E.  <br> Speech 338 | Acct. 234 <br> Eco. 231 <br> Eng. 231 <br> Fin. 231 or 334 <br> Govt. 231 <br> P.E.  <br>   | Acct. . <br> Eco. <br> Govt. <br> Humanities Elective P.E. Speech | $\begin{aligned} & 235 \\ & 232 \\ & 232 \\ & \\ & 338 \end{aligned}$ |
| THIRD | Acct. 331 or 332  <br> Bus. L. 338 <br> Eco. 3314 <br> Fin. 331 <br> Mkt. 332 |   <br> Bus. L. 339 <br> Eco. 3311 <br> Mgt. 331 <br> Mkt. 346 <br> Sec. Ad. 327 |   <br> Bus. L. 338 <br> Fin. 331 <br> Fin. 333 <br> Fín. 335 <br> Eco. 231 or <br>  3311 | Acct. 332 <br> Bus. L. 339 <br> Mkt. 332 <br> Mkt. 346 |   <br> Acct. 334 <br> Bus. L. 338 <br> Fin. 331 <br> Fin. 333 <br> Fin. 335 |   <br> Acct. 335 <br> Bus. L. 339 <br> Mkt. 332 <br> Mkt. 346 <br> Eco. 331 or <br> 3311  |   <br> Bus. L. 338 <br> Fin. 331 <br> Fin. 333 <br> Fin. 335 <br> Eco. 331 | Acct. <br> Bus. L. <br> Fin. <br> Mkt. <br> Mkt. | $\begin{aligned} & 332 \\ & 339 \\ & 336 \\ & 332 \\ & 346 \end{aligned}$ |
| FOURTH | Eco. 430 <br> Sec. Ad. 333 <br> Approved  <br> Electives  | Eco. 431 <br> Eco. 4311 <br> Approved  <br> Electives  | Fin. 431 <br> Fin. 433 <br> Sec. Ad. 333 <br> Mgt. 331 <br> Elective  | Fin. 434 <br> Fin. Ad. 438 <br> Sec. Ad. 327 <br> Electives  | Acct. 430 <br> Eco. 331 or 3311  <br> Fin. 431 <br> Fin. 433 <br> Sec. Ad. 333 <br> .  | Acct. 439 <br> Fin. 434 <br> Sec. Ad. 327 <br> Electives  | Bus. L. 3312 <br> Fin. 432 <br> Fin. 435 <br> Mgt. 331 <br> Elective  <br>   | Bus. L. <br> Fin. <br> Fin. <br> Sec. Ad. <br> Sec. Ad. <br> Elective | $\begin{array}{r} 3311 \\ 434 \\ 439 \\ 327 \\ 333 \end{array}$ |

## SUGGESTED PROGRAMS BY SEMESTERS

(Continued)
(See preceding pages for official degree requirements.)


## SUGGESTED PROGRAMS BY SEMESTERS 1964. - 1965 <br> (Continued)

(See preceding pages for official degree requirements.)

| YEAR | MARKETING |  | OFFICE MANAGEMENT |  | PRE-LAW |  | PUBLIC ADMINISTRATION |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | FALL | SPRING | FALL | SPRING | FALL | SPRING | FALL | SPRING |  |
| FIRST | Eco. 133 <br> Eng. 131 <br> Mgt. 110 <br> Math. 137 <br> Psy. 230 <br> P.E.  <br> Sclence  <br>   | Eco. 134 <br> Eng. 132 <br> Math. 138 <br> Humanities  <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Humanities  <br> Mgt. 110 <br> Math. 137 <br> P.E.  <br> Science  <br>   |   <br> Eco. 134 <br> Eng. 132 <br> Hist. 231 <br> Math. 138 <br> P.E.  <br> Science  <br> Sec. Ad. 121 |   <br> Eco. 133 <br> Eng. 131 <br> Mgt. 110 <br> Math. 137 <br> Humanities  <br> P.E.  <br> Science  | Eco. 134 <br> Eng. 132 <br> Hist. 231 <br> Math. 138 <br> P.E.  <br> Science  | Eco. 133 <br> Eng. 131 <br> Mgt. 110 <br> Math. 137 <br> Psy. 230 <br> P.E..  <br> Science  | Eco. <br> Eng. <br> Math. <br> Humanities <br> P.E. <br> Science | 134 132 138 |
| SECOND | Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Hist. 231 <br> P.E.  <br>   |   <br> Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Hist. 232 <br> Mkt. 332 <br> P.E.  | Acct. 234 <br> Eco. 231 <br> Eng. 231 <br> Govt. 231 <br> Hist. 232 <br> P.E.  |   <br> Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Sec. Ad. 122 <br> Sec. Ad. 327 <br> Speech 338 <br> P.E.  | Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Hist. 232 <br> P.E.  <br>   |   <br> Acct. 235 <br> Eco. 232 <br> Govt. 232 <br> Sec. Ad. 333 <br> Speech 338 <br> P.E.  <br>   | Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Hist. 231 <br> P.E.  <br>   | Acct. <br> Eco. <br> Govt . <br> Hist. <br> Speech P.E. | $\begin{aligned} & 235 \\ & 232 \\ & 232 \\ & 232 \\ & 338 \end{aligned}$ |
| THIRD |   <br> Acct. 332 or 336 <br> Bus. L. 338 <br> Fin. 331 <br> Mkt. 346 <br> Speech 338 | Bus. L. 339 <br> Fin. 334 <br> Mgt. 331 <br> Mkt. 335 <br> Sec. Ad. 327 <br> Sec. Ad. 333 | Acct. 331 <br> Bus. L. 338 <br> Mkt. 332 <br> Sec. Ad. 321 | Bus. L. 339 <br> Fin. 331 <br> Mgt. 331 <br> Mkt. 346 <br> Sec. Ad. 333 | Eco. 326 <br> Mgt. 331 <br> Mkt. 332 <br> Bus. Ad. Elect. <br> Major Elective | Fin. 331 <br> Mkt. 346 <br> Sec. Ad. <br> Bus. 327 <br> Major Elect. | Bus. L. 338 <br> Mkt. 346 <br> Sec. Ad. 333 <br> Mkt. 332 | Bus. L. Fin. Govt. Mgt . Mkt. | $\begin{array}{r} 339 \\ 331 \\ 4341 \\ 334 \\ 321 \end{array}$ |
| FOURTH | Mkt. 334 <br> Mkt. 339 <br> Mkt. 436 | Mkt. 433 <br> Mkt. 434 <br> Mkt. 435 <br> Mkt. 439 | Mgt. 339 <br> Mgt. 431 <br> Sec. Ad. 322 | Mgt. 334 <br> Mgt. 435 <br> Mgt. 436 <br> Sec. Ad. 431 |  |  |   <br> Eco. 326 <br> Govt. 4321 <br> Mgt. 331 <br> Mgt. 335 <br> Sec. Ad. 431 | Acct. <br> Arch. <br> Eco. <br> Govt. <br> Mgt. <br> Sec. Ad. | $\begin{array}{r} 432 \\ 436 \\ 334 \\ 4353 \\ 435 \\ 327 \end{array}$ |

## SUGGESTED PROGRAMS BY SEMESTERS 1964-1965 <br> (Continued)

(See preceding pages for official degree requirements.)

| YEAR | RETAILING |  |  | SECRETARIAL ADMINISTRATION |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | FALL | SPRING |  | FALL | SPRING |  |
| FIRST | Eco. 133 <br> Eng. 131 <br> Mgt. 110 <br> Math. 137 <br> Psy. 230 <br> P.E.  <br> Science  | Eco. <br> Eng. <br> Math. <br> P.E. <br> Science <br> Phil. | $\begin{aligned} & 134 \\ & 132 \\ & 138 \\ & 231 \end{aligned}$ | Eco. 133 <br> Eng. 131 <br> Mgt. 110 <br> Math. 137 <br> Sec. Ad. 121 <br> P.E.  <br> Science  | Eco. <br> Eng. <br> Math. <br> Sec. Ad. <br> Sec. Ad. <br> P.E. <br> Science | $\begin{aligned} & 134 \\ & 132 \\ & 138 \\ & 122 \\ & 131 \end{aligned}$ |
| SECOND |   <br> Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Hist. 231 <br> P.E.  <br>   | Acct. <br> Eco. <br> Govt. <br> Hist. <br> Mkt. <br> P.E. | $\begin{aligned} & 235 \\ & 232 \\ & 232 \\ & 232 \\ & 332 \end{aligned}$ |   <br> Acct. 234 <br> Eco. 231 <br> Eng. 231 or 232 <br> Govt. 231 <br> Sec. Ad. <br> P.E. 132 | Acct. <br> Eco. <br> Govt. <br> Sec. Ad. P.E. | $\begin{aligned} & 235 \\ & 232 \\ & 232 \\ & 235 \end{aligned}$ |
| THIRD |   <br> Acct. 331 <br> Bus. L. 338 <br> Fin. 331 <br> Mkt. 334 <br> Sec. Ad. 333 | Bus. L. <br> Mgt. <br> Mkt. <br> Mkt. <br> Mgt. | $\begin{aligned} & 339 \\ & 331 \\ & 335 \\ & 346 \\ & 336 \end{aligned}$ | Acct. 246 <br> Bus. L. 338 <br> Hist. 231 <br> Mgt. 339 <br> Mkt. 346 | Bus. L. <br> Hist. <br> Mkt. <br> Sec. Ad. <br> Sec. Ad. | $\begin{aligned} & 339 \\ & 232 \\ & 332 \\ & 321 \\ & 333 \end{aligned}$ |
| FOURTH | Mkt. 436 <br> Speech 338 | Eco. Mkt. Mkt. | $\begin{array}{r} 331 \\ 433 \\ 4319 \end{array}$ |   <br> Mgt. Ad. 331 <br> Sec. Ad. 327 <br> Sec. Ad. 331 <br> Sec. Ad. 322 <br> Speech 338 | Eco. <br> Fin. <br> Sec. Ad. <br> Sec. Ad. <br> Humanities | $\begin{aligned} & 326 \\ & 331 \\ & 332 \\ & 431 \end{aligned}$ |

# School of Engineering 

Jobn R. Bradford, Dean<br>Office: WE10s<br>Robert L. Newell, Assistant Dean<br>Office: WE10s

Advertising Art and Design<br>Architecture, Construction or Design<br>Chemical Engineering<br>Civil Engineering<br>Electrical Engineering<br>Engineering Physics<br>Industrial Engineering<br>Mechanical Engineering<br>Petroleum Engineering<br>Textile Engineering<br>Textile Technology and Management

Engineering has been defined as the "scientific utilization of the forces and materials of nature in the construction, production, and operation of works for the benefit of man." The fundamental training of the engineer includes a knowledge of pure science, as well as its application to the various specializations.

The importance of engineering is stressed in the first section of the bill establishing the College, passed by the Thirty-eighth Legislature, in which it is pointed out that the commercial development of the state depends upon the thorough training given to students in the fields of engineering and manufacturing.

The aim of the School of Engineering is to impart a complete knowledge of the fundamentals of engineering, with specialization in one particular branch to that extent which experience indicates to be desirable. The course of study is planned to give the student basic training which he cannot obtain after graduation. As an aid to the development of a scientific attitude, the importance of the qualities of honesty, loyalty, thoroughness, and industry is emphasized; the desire for learning and for a knowledge of the ethics of the profession is fostered. As much specialization as possible is left to the student's later employment. Experience has shown that this type of training produces the most successful engineers.

Upon graduation the student usually spends a period of time in subordinate positions, obtaining experience and preparing himself for the more important work of the executive, designer, consulting engineer, teacher, researcher, or supervisor of manufacturing operations. In the past, from 60 to 70 percent of graduates in engineering eventually held executive positions. Engineering training is recognized as desirable preparation for a commercial career. Indeed, surveys of employment

## 272 ADMISSION, ENGINEERING

records disclose that men possessing an engineering education have found their way into nearly every type of vocation. A few which the engineering student may reasonably expect to enter upon graduation, or after a period of practical experience, are indicated below in the beginning of the departmental descriptions. Attention is called to the fact that in a civilization such as ours, in which one is at all times in contact with the results of our modern industrial development, no type of education is more suitable than that leading to an engineering degree.

## Freshman Programs

Recommended qualifications for admission to the School of Engineering are given in the admission section of this catalog. Students meeting these requirements, as shown by the high school records and the placement tests, will be assigned to the freshman program shown in the departmental curriculum. Entering engineering and architecture (construction option) students with inadequate preparation in mathematics will be required to complete Math. 133, College Algebra; and Math. 131, Trigonometry. The most satisfactory plan to complete these courses without delay is to attend the summer school before the first long session.

Engineering students who need algebra and trigonometry, but are unable to take advantage of the summer school, should schedule the following:

## Alternate Freshman Year for Engineering Students

|  |  |  | SEMESTER | 1st | 2nd |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Math. | 131 | Trigonometry |  | 3 |  |
| Math. | 133 | Col. Alg. |  | 3 |  |
| Eng. | 131 | Col. Rhet. |  | 3 |  |
| Chem. | 141 | Gen. Chem. |  | 4 |  |
| Grph. | 131 | Engr. Graphics |  | 3 |  |
| P.E., Band, or Basic ROTC |  |  |  |  |  |
| Math. | 132 | Anal. Geom, |  |  | 3 |
| Math. | 231 | Calculus I |  |  | 3 |
| Eng. | 132 | Col. Rhet. |  |  | 3 |
| Chem. | 142 | Gen. Chem. |  |  | 4 |
| Grph. | 132 | Engr. Graphics |  |  | 3 |
| P.E., Band, or Basic ROTC |  |  |  |  |  |
|  |  | Total credit hours |  | 16* | $16^{*}$ |
| SUMMER SESSION |  |  | TERM | 1st | 2nd |
| Math. | 232 | Calculus II |  | 3 |  |
| Phys. | 143 | Prin. of Phys. I |  | 4 |  |
| Math. <br> Phys. | $\begin{aligned} & 331 \\ & 241 \end{aligned}$ | Calculus III Prin. of Phys. II |  |  | 3 4 |
|  |  | Total credit hours |  | 7 | 7 |

* Exclusive of P.E., Band or Basic ROTC.

Similar adjustment to compensate for deficiencies in recommended admission requirements can be made in the freshman programs in architecture-design option and construction option, advertising art and design, and textile technology and management.

Special consideration will be given to applicants with strong high school backgrounds, even though they may not meet some of the specific entrance requirements. It should be noted, however, that most students who are admitted with fewer than the recommended qualifications should anticipate its requiring more than two semesters for the completion of the freshman program.

## Acceptance to Advanced Undergraduate Program

At the freshman and sophomore level all engineering programs possess a common core curriculum which emphasizes the basic physical sciences and mathematics. A thorough knowledge of these subjects must be acquired by the undergraduate engineering student before proceeding into the third and fourth years. For this reason, all students embarking upon the junior program must be formally certified as eligible for the advanced undergraduate program and must be accepted by their major departments. To qualify for certification a student must have completed the program for the first two years in its entirety and must have maintained a grade-point average of at least 2.00 . Students failing to meet these requirements may not register for any of the engineering courses in the number series beginning with a three or four, not part of the freshman or sophomore program, until they so qualify. Exceptions to this regulation are the courses: Ch. E. 330, Engineering Materials Science, and M. E. 3321, Engineering Thermodynamics, which comprise part of the core program, and are available to students at any time the prerequisites have been met. It is the responsibility of each student to request certification. Request forms may be obtained at the office of the Dean of Engineering and should be filed at least six weeks prior to registration for advanced undergraduate course work.

## Transfer from Other Colleges

Admission to an advanced level may be obtained upon transfer from accredited universities, colleges, and junior colleges. Consult the academic regulations section of this catalog for regulations regarding transfer procedures and requirements. Students transferring from other institutions whose programs differ from the regular engineering degree plans printed in this catalog are advised to begin during a summer session. By doing so they may be able to compensate for admission deficiencies or fulfill course prerequisites, thus avoiding delay in the completion of work toward a degree.

## Undergraduate Degrees

The School of Engineering offers the following four-year curricula, each leading to the Degree of Bachelor of Science in the respective field of engineering: chemical, civil, electrical, mechanical, industrial, petroleum, engineering physics, and textile. The Degree of Bachelor of Science in Textile Technology and Management is also available under the administration of the Textile Engineering Department. In the Department of Architecture, a five-year curriculum in architecture and
a four-year curriculum in advertising art and design are offered, these leading to the Degrees of Bachelor of Architecture and Bachelor of Advertising Art and Design, respectively.

The courses listed in individual curricula are those prescribed for the various degrees, and the arrangement by freshman, sophomore, junior, and senior years is the recommended sequence of courses, whether students begin them in the summer or during the long session. When a student registers for each semester, he should check course prerequisites carefully and be certain to include in that semester's work the courses which are prerequisite to the ones prescribed for the following semester. Any substitution or deviation from those listed in the programs of study requires written approval from the Dean of the School of Engineering and the head of the department in which the student is majoring.

ROTC courses may be counted toward undergraduate degree requirements in the School of Engineering as follows:

1. Four semesters of basic ROTC may be substituted for the four semesters of physical education which constitute part of the requirements of all undergraduate degrees the College offers.
2. Subject to the approval of the head of the student's major department, one-half of the advanced ROTC credits may be used in satisfying nontechnical electives of the degree program.
General college regulations allow a maximum of 18 semester hours of work on an undergraduate degree to be accomplished by correspondence. In the School of Engineering, not more than 9 of the total 18 credit hours may be in the fields of engineering, science, and mathematics. In all cases, credit for correspondence work is subject to the approval of the Dean of Engineering.

## Bachelor of Science in Agricultural Engineering

The curriculum leading to this degree is under the joint supervision of the Schools of Agriculture and Engineering. The program and courses are described in the listings of the School of Agriculture.

## Application for Degree

A candidate for a degree must register in the School of Engineering and should apply for a degree in the manner indicated below:
a. A student who expects to receive a degree during a particular school year must file an "Application for Degree" with the office of the Dean of Engineering during the spring semester of the preceding year. Prior to his fall registration as a senior student he will receive a list of the courses and be apprised of the number of grade points which he lacks, assuming that his application was made at the proper time.
b. In making application for a degree, the student must indicate the year's catalog under which he plans to graduate, since he must meet the requirements, in their entirety, of a specific year's catalog. This must be a year during which he was registered as a student in the School of Engineering, with the
restriction that all requirements for an undergraduate degree must be completed within seven years of the date of the catalog chosen.
The above regulations of the School of Engineering are in addition to the regulations governing general requirements for graduation in the academic regulations section of this catalog. The final responsibility for meeting all requirements for a degree rests with the student.

## Second Bachelor's Degree

A student who has completed the requirements for a bachelor's degree may receive a second upon completion of the curriculum prescribed for it. To qualify for a second degree awarded by the School of Engineering a minimum of 30 additional hours over and above the number completed for the first degree is required. By the proper selection of courses a student may complete the requirements for the Degree of Bachelor of Science in Engineering and that of Bachelor of Arts in the School of Arts and Sciences in five years.

## Cooperative Program with Other Colleges

The School of Engineering now has a cooperative program of study with Baylor, Hardin-Simmons, North Texas State, and Trinity Universities and Abilene Christian and McMurry. Colleges. Under this program the student attends one of the aforementioned schools for three years and Texas Technological College for two years and one summer. This program of study leads to the awarding of a degree by each institution.

## Advanced Degrees in Engineering

The graduate program in the School of Engineering provides course work and research leading to the Degree of Master of Science in Chemical, Civil, Electrical, Industrial, and Mechanical Engineering; and to that of Doctor of Philosophy in Engineering.

The doctoral program in the School of Engineering is divided into two main categories consisting of the traditional specialization-in-depth in each department and an interdisciplinary program cutting across departmental lines which may include work in the physical and biological sciences and mathematics.

Major course work in the respective field, combined with minor course work in related ones, provides broad and intensive study in important branches of the profession.

Admission to the Graduate School is based upon an above-average undergraduate record and satisfactory standing on the Graduate Record Examinations. The regulations and requirements of the Graduate School are given in the Graduate Bulletin.

## ARCHITECTURE CURRICULUM

## Bachelor of Architecture - Construction Option



- Mintmum hour moguired for graduation-x6s and P.EI., Band or Bansic ROTC


# Department of Architecture and Allied Arts 

Nolan Ellmore Barrick, Head of the Department Office: A.C. 105

Professors:<br>Barrick, Bradshaw, Kleinschmidt, R. I. Lockard, Sasser<br>Associate Professors:<br>Duran, Houghton, R. K. Tracy<br>Assistant Professors:<br>Childers, Goeldner, Howze, Morse, Parkinson, Skorepa, Wodehouse<br>Instructors:<br>Ballew,* Calvert, Gibbons, Greer, Hanna, Koentopp, Pointner, J. Roberts,** Robinson, Rudd, Tivoli<br>* On leave, 1963-1964.<br>** Part-time

The Department of Architecture and Allied Arts is a member of the Association of the Collegiate Schools of Architecture. It is affiliated with the National Institute for Architectural Education, the American Federation of Art, and the College Art Association and it holds valuable teaching aids provided by the Carnegie Foundation. The courses for study in architecture are accredited by the National Architectural Accrediting Board.

Curricula open to both men and women:

1. Bachelor of Architecture-Construction Option, a five-year curriculum.
2. Bachelor of Architecture-Design Option, a five-year curriculum.
3. Bachelor of Advertising Art and Design, a four-year curriculum.
The five-year program for majors in architecture is a gradual, orderly, and integrated development toward apprenticeship and professional practice. Opportunities in many branches of the building industry are open to graduates having the background of architecture. Standards upheld by the various state registration boards are met, and a degree is the logical step toward apprenticeship and a license to practice architecture.

The primary objective is the creative development of the student as an individual through the enlargement of his capacities for principled and disciplined thought.

The Bachelor of Architecture Degree may be obtained through the design option or the construction option. In the design curriculum, emphasis is placed on general requirements which are fundamental to a comprehensive understanding of the many aspects of the profession. The role of an architect as a co-ordinator is stressed. Basic work in the scientific fields is required and added emphasis is placed on draw-

ARCHITECTURE CURRICULUM
Bachelor of Architecture - Design Option


ing and design. In the construction curriculum, considerable attention is given to design with added emphasis being placed on the structural aspects of architectural design.

The two options follow the same sequence of design courses for four years. The fifth year of the design option places heavy emphasis on city planning and urban design, culminating in a thesis chosen by the student with faculty approval. The fifth year of the construction option includes no design but emphasizes engineering subjects and advanced work in structural design.

Architectural majors are urged to spend the summer months in the office of a registered architect. A student may be allowed to substitute an elective for Architecture 435 upon presentation to the Head of the Department of satisfactory evidence of three months of full-time employment in the office of a registered architect and the submission of examples of personal work of satisfactory quality and scope.

The four-year program for majors in advertising art and design is carefully arranged to give a suitable balance of theories, backgrounds, sources, and skills to students who plan to enter any of the diversified branches of the profession. An excellent preparation is given to those entering specialized fields. Students seeking creative training in drawing, print making, painting, sculpture, ceramics, illustration, product design, and art history will find the courses especially designed to allow freedom of expression and to promote creative development.

Insofar as possible the design work in the department is taught by the program-competition method in which the students compete with each other in solving a wide variety of theoretical and practical problems. Individual development is encouraged by advice and criticism through personal conferences between faculty and students.

The problem-solving process, the essence of adequate education in the creative arts, is brought into play at every opportunity. Students are stimulated to recognize needs and to express them in terms of programs in which analysis and research may be applied in reaching creative solutions. A comprehensive collection of books, photographs, prints, projection slides, and art objects is available within the department for research in the allied art fields.

Students who wish to work toward a Bachelor of Arts Degree with a major in art or a Bachelor of Science in Education with a teaching major in art should consult the Head of the Department and arrange for a degree plan.

The department reserves the right to retain, exhibit, and reproduce work submitted by students for credit in any course.

Many courses in architecture and allied arts, especially those in city planning, history of architecture, and history of painting and sculpture, are available for electives to students majoring in education, history, music, government, landscape architecture, etc. Consent of the instructor may be secured in lieu of the professional prerequisites listed.

Freshman courses must be completed before student reaches senior classification. Students who postpone taking freshman courses until the senior year must still take such courses although credit therefrom will not apply toward the hours required for a degree. For the

## ADVERTISING ART \& DESIGN CURRICULUM <br> Bachelor of Advertising Art \& Design



[^40]purpose of this regulation a senior is considered as a student with a minimum of 96 hours to his credit.

## Courses in Architecture

## FOR UNDERGRADUATES

## 121-122. Freehand Drawing I, II. (2:0:6 each)

Representational drawings in charcoal emphasizing fundamental skills. Alternating problems stressing creative interpretation. Culminating work introducing color with pastels.

## 151-152. Principles of Design, Grade I. (5:2:9 each)

Study of the basic principles of design with emphasis on three-dimensional nonobjective problems. Exercises in drafting, lettering, and rendering in several media. Basic problems in projections, perspective, and shades and shadows.

## 221. History of Ancient Architecture. (2:2:0)

Architectural contributons of ancient Egypt, Mesopotamia, Persia, Greece, and Rome to the cultural heritage of Western civilization. Illustrated lectures.
222. History of Medieval Architecture. (2:2:0)

Prerequisite: Arch. 221. Early Christian, Byzantine, Romanesque, and Gothic styles, and their relation to the development of Western culture. Illustrated lectures.
224. Freehand Drawing III. (2:0:6)

Prerequisite: Arch. 121-122, or grade of B or better in 121. Pencil, pen, and ink rendering, and sketching from life and nature.
225. Beginning Watercolor. (2:0:6)

Prerequisite: Arch. 122. Watercolor painting from life and from nature.
226. Materials and Methods of Construction. (2:2:0)

Prerequisite: Registration in Arch. 231. Introduction to properties, specifications, and uses of architectural materials.

## 227. Materials and Methods of Construction. (2:2:0)

Continuation of Arch. 226 with emphasis on analysis of structural systems related to archiltecture.
231-232. Architectural Design, Grade II. (3:0:9 each)
Prerequisite: Arch. 151-152. 9-hour to 45-hour problems under individual criticism dealing with elements of plan and evaluation. Introduction to the project-completing method of study. 9 -hour sketch problems emphasizing composition and presentation.

## 326. Anatomy and Life Drawing. (2:0:6)

Prerequisite: Arch. 224. Study of anatomical structure. Drawing from life.

## 327. Life Drawing I. (2:0:6)

Prerequisite: Arch. 326. Drawing from life in a variety of media and approaches with emphasis upon aesthetic factors. Instruction by individual criticism.

## 331. Fundamentals of Residential Architecture. (3:3:0)

Prerequisite: Junior standing. Fundamentals of residential architecture including historical, aesthetic, and economic problems in the design of housing, with emphasis on single family dwellings.

## 333-334. Architectural Working Drawings. (3:0:9 each)

Prerequisite: Arch. 352. Preparation of working drawings and specifications for small residences or commercial buildings; drawing complete detalls for construction, including heating, plumbing, and electrical services. Occasional visits to buildings under construction.

## 335-336. Mechanical Equipment of Buildings. (3:3:0 each)

Prerequisite: Arch. 227 and 232. Heating and air-conditioning requirements and systems for buildings. Basic theory and problems in illumination and acoustics.

## 351-352. Architectural Design, Grade III. (5:2:9 each)

Prerequisite: Arch. 231-232. 15-hour to 75-hour problems under individual criticism dealing with small building types. The project-completion method of study is used. 9 -hour sketch problems dealing with details of architecture and with larger architectural compositions.

## 282 ARCHITECTURE

451-452. Architectural Design, Grade IV. (5:2:9 each)
Prerequisite: Arch. 351-352. 15- to 90 -hour problems under individual criticism dealing with more comprehensive building types and groups of buildings. 9-hour sketches are offered to test creative abfilty and expression in a limited amount of time.
463. Architectural Design and City Planning, Grade V. (6:1:15)

Prerequisite: Arch. 451-452. 24- to 120-hour problems under individual criticism dealing essentially with projects in city planning and urban design, with large compositions which include groups of buildings, site planning, and studies of transportation and circulation. 9-hour sketches are also assigned.
484. Architectural Design, Grade V. (8:1:21)

Prerequisite: Arch. 463. Continuation of Arch. 463 with advanced design projects and one final "thesis" problem selected and programmed by the individual student.

## FOR UNDERGRADUATES AND GRADUATES

## 323. History of Modern Architecture. (2:2:0)

Prerequisite: Arch. 152. Cultural and social influences as they determine the development of 19 th and 20th Century architecture in Europe and the Americas. Illustrated lectures.
420. Professional Practice. (2:2:0)

Prerequisite: Senior standing. Office organization, ethics, professional relations for architects.
423. Life Drawing II. (2:0:6)

Prerequisite: Arch. 327. Continuation of Arch. 327. May be repeated for credit ( 6 hrs . max.).

## 430. History of Early American Architecture. (3:3:0)

Prerequisite: Arch. 432 and consent of Instructor. The American archltectural heritage. Pre-Columbian, Southwestern Colonial, regional styles of the eastern seaboard. Western Reserve, and Greek Revival. Illustrated lectures.

## 432. History of Renaissance Architecture. (3:3:0)

Prerequisite: Arch. 222. The Renaissance architecture of Europe, emphasizing the development of styles essential to an understanding of the background of Early American and modern architectural growth. Illustrated lectures.
4316-4317. Architectural Sculpture. (3:1:6 each)
Prerequisite: Senior standing. Problems in modeling, carving, and combined techniques using clay, wood, metal, plaster, and other materials. Study of the historic development of sculptural techniques. Plaster-mold making, glazing, and firing.

## 435. Advanced Architectural Working Drawings. (3:0:9)

A. continuation of Arch. 333-334. Preparation of working drawings and specifications to comply with building and zoning codes for superior fire-resistant buildings; analyzing and integrating structural system details with architectural design details.

## 436. City Planning. (3:1:6)

Prerequisite: Senior standing. The theory and problems of city development, community planning, housing, and their drawn and rendered solutions under individual criticism.

## Advertising Art and Design

Allied arts courses which are combined with courses in architecture form the basis for the advertising art and design curriculum. The training and background of several departmental faculty members make it possible to offer courses that are available to students pursuing training in public school art fields both on the undergraduate and graduate levels.

## Allied Arts Courses in Advertising Art and Design FOR UNDERGRADUATES

131, 132. History of Art. (3:3:0 each)
Architecture, sculpture, painting, and the minor arts from prehistoric times to the present. Emphasis is placed upon the arts as they reveal the visual aspects of
man's social, political, and cultural growth. Illustrated lectures. Open to all students except those majoring in architecture.

## 153. Pictorial Composition. (5:2:9)

Prerequisite: Arch. 151. Theory of space design with emphasis on line and area composition. Basic problems in projections, perspective, and shades and shadows.

## 210. Introduction to the Arts. (1:1:0)

Prerequisite: English 132. Art as a contemporary philosophical concept; augmented by lectures on the major arts.

## 220. Advertising Office Practice. (2:2:0)

Prerequisite: Al. A. 153. Office organization, ethics, professional relations in the advertising field.

## 233. Introduction to Lettering. (3:1:6)

Prerequisite: Al. A. 153. Instruction on type and letter forms as design elements; hand lettering for reproduction; introduction to methods of productions for advertising and editorial use.

238-239. Pottery. (3:1:6 each)
Prerequisite: Arch. 151-152, Al. A. 153, or consent of instructor. All hand and simple commercial methods of pottery production. Decorating, glazing, and firing of ware.

328-329. Advanced Lettering and Art Layout. (2:0:6 each)
Prerequisite: Al. A. 233. Functions of the art director. Application of typographic design with addition of illustrative elements for all forms of printed elements.

## 3311-3312. Principles of Drawing and Painting, and Theory of Design. (3:1:6 each)

Prerequisite: Arch. 225, A1. A. 3314. Advanced analysis of principles governing good drawing and painting throughout the ages. Lectures illustrated. Laboratory work in line drawing and color.

## 3314. Commercial Illustration L. (3:0:9)

Prerequisite: Arch. 224, Al. A. 233. Printmaking. Illustration applicable to advertising and commercial flelds. Lithographic drawing on stones and painting in various media for designated processes of reproduction. Intaglio, aquatint, soft ground and lift ground etching on copper and zinc plates.

## 342-343. Commercial Design I. (4:1:9 each)

Prerequisite: Al. A. 233, Arch. 226. Problems for the designer in motion picture and television; display, packaging, and three dimensional design; relationship of advertising to industrial design and the integrated campaign.

## 426-427. Advanced Painting. (2:0:6 each)

Prerequisite: Arch. 225. Principles of design related to various types of composition in conjunction with direct study from the human model, still life, or landscape. Problems in oil or water color may take the form of book illustration, painting, or mural decoration.

## 4212-4213. Commercial Illustration II. (2:0:6 each)

Prerequisite: Al. A. 3314. A continuation of A1. A. 3314, with problems in printmaking and studio practice; specialization in illustration with emphasis on figure representation.

## 4314. Fashion Illustration. (3:0:9)

Prerequisite: Arch. 327, A1. A. 3314. The drawing and rendering of the costumed figure for newspaper and magazine fashion illustration with emphasis on figure construction and draping.

## FOR UNDERGRADUATES AND GRADUATES

## 421. Art Workshop. (2:0:6)

Advanced work in drawing, painting, pottery, sculpture, ceramics, or other graphic media. Instruction on individual project basis. Course may be repeated four times for credit.

## 433-434. Commercial Design II. (3:0:9 each)

Continuation of Al. A. 342-343. Problems involving extended research and group product development. Construction of scale models or execution of the finished product where feasible.

CHEMICAL ENGINEERING CURRICULUM
Bachelor of Science in Chemical Engineering


[^41]* Hixclusive of P.jn., Band or Basic ROTC

4311-4312. Ceramics. (3:0:9 each)
Prerequisite: Al. A. 238-239. Advanced pottery design and production. Glaze calculation and clay body construction. Research.
4318, 4319. History of Painting and Sculpture. (3:3:0 each)
Prerequisite: Junior classification. Illustrated lectures in the development of painting and sculpture from the Egyptian period to the present day. Three hours of library research per week.

## FOR GRADUATES

## 5335. Art in the Modern World. (3:3:0)

Development of influences upon art forces in the modern world. Study of painting, sculpture and architecture from 1800 to present with emphasis on relationship of contemporary art and architecture to literature, philosophy, music and the theater.

# Department of Chemical Engineering 

Arnold J. Gully, Head of the Department<br>Office: Ch.E. 201

Professors:<br>Bradford, Gully, Oberg<br>Associate Professor:<br>Renard<br>Assistant Professor:<br>Heichelheim

Chemical engineering is that branch of engineering concerned with the manufacture of products by separation, purification, or chemical transformation of our natural resources. Industries in which chemical engineers hold dominant positions are typified by petroleum refining and manufacture of petrochemicals, plastics, synthetic fibers, heavy chemicals, and metals and alloys. Areas of specialization within these industries include research, process and product development, process and equipment design, plant operations, economic optimization, analog and digital computer control, sales, and customer service. The educational background and early professional experiences of the chemical engineer make him particularly well qualified for management positions in the chemical and petroleum industries. A large percentage of chemical engineers progress into management after a number of years of strictly technical work.

No area of science and technology is broader in scope than that of chemical engineering. The undergraduate curriculum must consequently provide a broad fundamental background in science, mathematics, and engineering, plus humanistic studies so necessary in the education of the engineer. The first two years include intensive study of chemistry, physics, mathematics, and the engineering sciences common to all branches of engineering. The last two years emphasize advanced chemistry and the fundamentals of chemical engineering. Extensive training is given in stoichiometry, unit operations, thermodynamics, instrumentation, and their applications in chemical process technology.

## 286 CHEMICAL ENGINEERING

Many students find it advantageous to pursue advanced studies at the graduate level. The undergraduate curriculum in chemical engineering provides a firm background for such studies.

The department is now housed in a new building specifically designed to accommodate the specialized laboratories for unit operations, unit processes, process control, fuels and combustion, and research. Equipment includes not only precision instruments for chemical and physical measurements, but relatively large-scale pilot plant equipment in which integral processes and operations can be studied.

It is highly desirable that a chemical engineering student's accomplishments be of highest quality. In addition to the general college requirements for graduation, chemical engineering students must have a minimum grade point average of 2.00 in all courses in their major field. Only one D will be accepted in a course, completion of which requires two semesters.

## Courses in Chemical Engineering <br> FOR UNDERGRADUATES

3111. Chemical Engineering Laboratory. (1:0:3)

Prerequisite: Chem. 142. Elementary engineering measurement of the chemical and physical properties of materials of commercial importance.

## 330. Engineering Materials Science. (3:3:0)

Prerequisite: Phys. 241. Fundamental properties of engineering materials. Interatomic and intermolecular binding forces and energies; thermal energies; crystal structure; amorphous solids; aggregates and imperfections. Physical basis for common electrical, magnetic, and thermal properties.
3311. Chemical Engineering I. (3:3:0)

Prerequisite: Chem, 142, Phys. 143. Material and energy balances for engineering systems subjected to chemical or physical transformations.
3312. Chemical Engineering II. (3:3:0)

Prerequisite: Ch. E. 3311. Basic principles of the unit operations including the fundamentals of heat, mass and momentum transport.

## 3351. Analytical Instrumentation. (3:2:3)

Prerequisite: Ch. E. 3111. Analytical tools used for instrumental analysis and control of process plants.

## FOR UNDERGRADUATES AND GRADUATES

## 4121. Chemical Engineering Seminar. (1:1:0)

Prerequisite: Advanced standing and approval of the Head of Department. Individual study of chemical engineering problems of special interest and value to the student. May be repeated for credit in different areas.
4241-4242. Unit Operations Laboratory. (2:0:6 each)
Prerequisite: Ch. E. 3312. Laboratory experiments on the unit operations of chemical engineering with written reports.
4311-4312. Chemical Engineering III-IV. (3:3:0 each)
Prerequisite: Ch. E. 3312. Theory and practice of selected unit operations of chemical engineering such as fluid flow, heat transmission, evaporation, distillation, and extraction, all illustrated by the solution of numerous problems.
4321-4322. Chemical Engineering Thermodynamics. (3:3:0 each)
Prerequisite: Advanced standing. A problem course applying the laws and principles of thermodynamics to physical and chemical systems and processes.

## 4323. Chemical Reaction Engineering. (3:3:0)

Prerequisite: Chem. 348. An introduction to the kinetics of chemical conversion processes and the design of chemical reactors.
4331. Special Problems in Chemical Engineering. (3:3:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual studies in advanced engineering areas of special interest. May be repeated for credit.
4332. Special Experimental Problems in Chemical Engineering. (3:0:9)

Prerequisite: Advanced standing and approval of Head of Department. Individual experimental studies in an area of special interest to student. May be repeated for credit.

## 4341. Unit Processes. (3:3:0)

Prerequisite: Chem. 353, Ch. E. 4311. Process analysis and synthesis; integration of unit processes and unit operations into operable processing schemes.

## 4343. Engineering Experimentation. (3:3:0)

Prerequisite: Junior standing in physical science or engineering. Strategy in experimentation; planning efficient experiments; analysis of data and presentation of results; evolutionary operation of complex process systems.

## 4352. Process Design. (3:3:0) <br> (Formerly Process Development)

Prerequisite: Ch. E. 4341. A problem course on the application of engineering and economic principles to the design of chemical processes.

## 4353. Instrumentation. (3:2:3)

Prerequisite: Ch. E. 3312. Characteristics of industrial instruments and their manner of use in controlling process variables.

## 4354. Chemical Engineering Plant Design. (3:1:6)

Prerequisite: Ch. E. 4352 or consent of instructor. Development of process and equipment designs for integral manufacturing plants.

### 437.1. Nuclear Engineering. (3:3:0)

Prerequisite: Thermodynamics or its equivalent. Basic principles applicable to engineering problems of the atomic energy field.

## FOR GRADUATES

5311. Transport Phenomena-Heat Transmission. (3:3:0)

Fundamental relations governing energy, momentum, and mass transfer between phases, with special emphasis on heat transmission.
5312. Transport Phenomena-Fluid Dynamics. (3:3:0)

Fundamental relations governing energy, momentum, and mass transfer between phases, with special emphasis on fluid dynamics.

## 5313. Transport Phenomena-Diffusion Processes. (3:3:0)

Fundamental relations governing energy, momentum, and mass transfer between phases, with special emphasis on diffusion processes.

## 5314. Process Dynamics and Automatic Control. (3:3:0)

Prerequisite: Graduate standing in chemical engineering or consent of instructor. Study of the transient behavior of process systems; methods of analysis; synthesis and simulation of control systems; introduction to analog and digital computer control.
5321. Advanced Chemical Engineering Thermodynamics. (3:3:0)

Advanced topics in thermodynamics and its applications to processes and operations.

## 5322. Equilibrium Systems. (3:3:0)

General equations of equilibrium of multicomponent, multiphase systems; the concept of chemical potential and the phase rule; selected techniques for predicting physical and chemical equilibria in both ideal and non-ideal systems.

## 5331. Special Problems in Chemical Engineering. (3:3:0)

Prerequisite: Approval of Department Head. Individual study of theoretical projects under the guidance of a member of the staff. May be repeated for credit in different areas.

## 5332. Experimental Studies in Chemical Engineering. (3:0:9)

Prerequisite: Approval of Department Head. Individual study of experimental projects under the guidance of a member of the staff. May be repeated for credit in different areas.

## 5341. Distillation. (3:3:0)

Theory of distillation with special emphasis on multicomponent distillation and application of theory to problems of design.

## 5343. Reaction Kinetics. (3:3:0)

Theoretical and experimental aspects of the kinetics of uncatalyzed and catalyzed reactions and their mechanism. Rate theory and its application to the design of batch and flow reactors.
5348. Organic Syntheses. (3:3:0)

The major organic unit processes; equipment, reaction theory, and the unitary aspects of each organic unit process are considered.
5351. Chemical Engineering Design. (3:1:6)

Design of the complete plant. Plant location, equipment design or selection, plant layout, building requirements, and estimation of the cost of the plant.

5371-5372. Principles of Nuclear Engineering. (3:3:0 each)
Prerequisite: Graduate standing in engineering, mathematics, or the physical sciences. This course is the basis for all other course work in the nuclear field.

## 5373-5374. Nuclear Chemical Engineering. (3:3:0 each)

Prerequisite: Graduate standing in engineering, mathematics, chemistry, or physics, and preferably Ch. E. 4371. Nuclear reactions, reactor fuel cycles, production of nuclear feed materials, properties of irradiated fuels, and separations processes.
5378. Reactor Shielding. (3:3:0)

Prerequisite: Graduate standing in engineering, mathematics, or the physical sciences. Data and technlques available for the design of a practical shield.

## 5379. Nuclear Reactor Instrumentation and Control. (3:3:0)

Prerequisite: Graduate standing in engineering, mathematics, or the physical sciences. Reactor safety systems and automatic control equipment; the effects of various parameters such as temperature and fission product poisons on reactor control; feedback loops in power reactors and reactor simulation.

5381-5382. Nuclear Radiations Laboratory. (3:2:6 each)
Prerequisite: Graduate standing in engineering, mathematics, or the physical sciences. Acquaints the student with the instruments and techniques used directly or indirectly in the nuclear field. The laboratory is equipped with a water uranium-moderated subcritical reactor. The student will be allowed to a limited extent to carry out research problems as the course develops.
630. Master's Report. ((3)
631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Doctor's Research. (3 each)
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

# Department of Civil Engineering 

Keith Robert Marmion, Head of the Department<br>Office: E.E. 152-A<br>Professors:<br>Decker, Marmion, Whetstone<br>Associate Professors:<br>Keho, Sanger<br>Assistant Professors:<br>Claborn, Kiesling*, Parrish<br>Instructors:<br>Skillman, J. H. Smith<br>* On leave 1963-1964

Some characteristics of the future are indicated by the rapid tempo of scientific and technological advance, the explosion of population and the rate at which we are using our natural resources. Closely as-
sociated with these are the problems of water shortages, stream pollution, smog, obsolete structures, and traffic congestion which must be solved by civil engineers. All of these problems have a common characteristic: They all deal with human needs on a large scale. Civil engineering aims at the fulfillment of these needs through the adaption and control of our environment.

The civil engineer is concerned with the planning, design, construction, and operation of large-scale systems of facilities, such as those involved in water resources and transportation.

Modern technology, which is partly responsible for some of our environmental problems, also provides tools for solving these problems. Civil engineering, in bringing these tools to bear on the problems of man's environment, is concerned with the improvement of that environment. As such, it is of particular interest to young men who are not only challenged by the intellectual rigor of science and mathematics but who are also motivated to exploit the frontiers of science and technology on a large-scale basis for the direct benefit of mankind.

The undergraduate curriculum in civil engineering is arranged so that all students receive training in the basic principles of mathematics and science; in the humanities; in engineering science; and in civil engineering subjects. A system of electives permits some degree of specialization in the areas of highway, hydraulic, sanitary, and structural engineering.

For details of the program in civil engineering leading to the Master of Science Degree in Civil Engineering and to the Doctor of Philosophy Degree, see the Bulletin of the Graduate School.

## Courses in Civil Engineering FOR UNDERGRADUATES

231. Plane Surveying. (3:2:3)

Prerequisite: Math. 232. Precision of measurements; differential and profile leveling; transit stadia; open and closed traverses; area calculations; circular and parabolic curves.
233. Statics. (3:3:0)

Prerequisite: Math. 232, Phys. 143. Equivalent force systems, equilibrium of force systems, friction, centroids, moments of inertia, introduction to structural mechanics.
3121. Soil Engineering Science Laboratory. (1:0:3)
(Formerly C. E. 311)
Prerequisite: Concurrent enrollment in C.E. 3321. Laboratory determination and engineering evaluation of the physical properties of soils.
3151. Mechanics of Fluids Laboratory. (1:0:3)
(Formerly C. E. 312)
Prerequisite: Registration in C.E. 3351.
3201. Portland Cement Concrete Technology. (2:1:3)
(Formerly C. E. 325)
Prerequisite: Junior engineering standing. Studies concerning the physical properties and the proportioning of the constituents of Portland cement concrete.
3211. Mechanics of Solids Laboratory. (2:1:3)
(Formerly C. E. 324)
Prerequisite: Registration in C.E. 3311. Analytical studies of stress and strain; strain measurements; interpretation of strain data.
332. Dynamics. (3:3:0)

Prerequisite: C.E. 233. Motion of a particle and of rigid bodies; kinetics of translation, rotation, and plane motion; work, energy, impulse, momentum.

CIVIL ENGINEERING CURRICULUM
Bachelor of Science in Civil Engineering


Minimum hours required for graduation- 140 and P.E., Band, or Basic ROTC

- See Page 272 for Alternate Freshman Year
* Exclusive of P.E.. Band. or Basic ROTC

337-338. Structural Mechanics. (3:3:0 each)
Prerequisite: Math. 131. Statics, strength of materials, and structural design. For students of architecture, design option, and others who desire a brief and general presentation of the material.
3311. Mechanics of Solids. (3:3:0)
(Formerly C. E. 333)
Prerequisite: C.E. 233. Introductory theory of determination of stress and strain In elastic and inelastic bodies subject to various conditions of loading; deflection of beams; theories of failure.
3321. Soil Engineering Science. (3:3:0)
(Formerly C.E. 3312)
Prerequisite: C.E. 3311, C.E. 3351, Geol. 233, Ch. E. 330, and concurrent registration in C.E. 3121. Physical and mechanical properties of soils; theories of stress, settlement and consolidation.
3341. Structural Analysis I. (3:3:0)
(Formerly C.E. 330)
Prerequisite: C.E. 3311. The analysis of stress functions in framed structures for fixed and moving load systems.
3342. Structural Analysis II. (3:3:0)
(Formerly C.E. 334)
Prerequisite: C.E. 3211 and C.E. 3311. The theory of statically indeterminate structures.
3351. Mechanics of Fluids. (3:3:0)
(Formerly C.E. 339)
Prerequisite: C.E. 233, Math. 331. Hydrostatics; dynamies of viscous and nonviscous fluids; fluid resistance to flow; flow in pipes and open channels.
3355. Surface Hydrology. (3:3:0)

Prerequisite: Registration in C.E. 3351. The occurrence and distribution of water; preclpitation, evapotranspiration, infiltration, runoff.

## 3371. Water and Waste Treatment. (3:2:3)

(Formerly Water Supply And Treatment)
Prerequisite: Registration in C.E. 3355. Quality and quantity of water and wastes in municipal and industrial engineering. Laboratory work in the chemistry of water and wastes.
3373. Sewerage and Sewage Treatment. (3:2:3)
(Formerly C.E. 438)
Prerequisite: Registration in C.E. 3355. Quantity and quality of sewage; sewers and sewage systems; theory of sewage treatment; laboratory work in the chemistry of sewage.
435. Simple Theory of Reinforced Concrete. (3:3:0)

Prerequisite: C.E. 337. For architecture, design option, majors and others whose preparation to enter C.E. 4343 is inadequate. May not be used in lieu of C.E. 4343 to fulfill requirements.
4341. Structural Design I. (3:2:6)
(Formerly C.E. 433)
Prerequisite: C.E. 3341 and C.E. 3342. Plastic and elastic design in homogeneous materlals with special emphasis on steel and aluminum.

## 4343. Reinforced Concrete Structures I. (3:3:0) <br> (Formerly C.E. 431)

Prerequisite: C.E. 3311. Study and application of the elastic and ultimate strength theories of reinforced concrete analysis. Topics considered are beams; tied and spiral columns; spread and combined footings; and prestressed concrete members.

## 4361. Highway Engineering I. (3:2:3)

(Formerly C.E. 430)
Prerequisite: C.E. 231, C.E. 3321, C.E. 3355. Route location, highway planning, traffic engineering, geometric design, drainage, and earthwork; composition, properties, and uses of bituminous materials.

## FOR UNDERGRADUATES AND GRADUATES

## 4121. Civil Engineering Seminar. (1:1:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas.
4261. Traffic Engineering. (2:1:3)

Prerequisite: Enrollment in C. E. 4361 or approval of Head of Department. Studies of speed, volume, accident locations, driver observance of traffic control devices, time delay studies, and the statistical analysis of data.

## 4321. Soil Engineering. (3:3:0)

(Formerly C.E. 4312)
Prerequisite: C.E. 3321. Slope stability, lateral earth pressures, pile foundations, bearing capacity, consolidation and settlement, and earth structures.
4331. Special Problems in Civil Engineering. (3:3:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual studies in advanced engineering areas of special interest. May be repeated for credit.
4332. Special Experimental Problems in Civil Engineering. (3:0:9)

Prerequisite: Advanced standing and approval of Head of Department. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit.
4337. Cost Estimating. (3:3:0)
(Formerly C.E. 4317)
Prerequisite: C.E. 3311. Estimating costs of construction projects to include earthwork; pavements; and concrete, steel, masonry, and timber structures.

## 4339. Law and Ethics in Engineering. (3:3:0) <br> (Formerly C.E. 439)

Prerequisite: Senior standing in engineering or approval of Head of Department. Professional and industrial problems, contracts, specifications, ethics of engineering.

## 4342. Structural Design II. (3:2:3)

(Formerly C.E. 4311)
Prerequisite: C.E. 4341, C.E. 4343. Advanced theory and design in homogeneous and composite materials for complex structures.
4344. Reinforced Concrete Structures II. (3:3:0)
(Formerly C.E. 432)
Prerequisite: C.E. 4343. Continuation of C.E. 4343. Topics considered are masonry dams; retaining walls; beams and girders, two-way slab, and edge-supported slab floor systems.
4351. Intermediate Hydromechanics. (3:3:0)

Prerequisite: C.E. 3351. Dimensional analysis and hydraulic similitude; problems in laminar and turbulent flow, boundary layers, and wave phenomena.

## 4353. Elements of Hydraulic Engineering. (3:3:0) <br> (Formerly C.E. 4316)

Prerequisite: C.E. 3351. Dams; channels and pressure conduits; hydraulic machinery; hydroelectric power.

## 4355. Ground Water Hydrology. (3:3:0) <br> (Formerly C.E. 4315)

Prerequisite: C.E. 3355 and Math. 336, or consent of instructor. Infiltration. Flow of underground water under water table and artesian conditions. Development of ground water supplies. Natural and artificial recharge of ground water reservoirs.
4362. Highway Engineering II. (3:3:0) (Formerly C.E. 436)
Prerequisite: C.E. 3201, C.E. 4361, C.E. 4243. Design, construction, and maintenance of flexible pavement and bases; design, construction, and maintenance of rigid pavements; soil-aggregate roads and soll stabilization.

## FOR GRADUATES

## 5311. Advanced Mechanics of Solids. (3:3:0)

Prerequisite: C.E. 3311. Stress and strain at a point; theories of fallure; unsymmetrical bending; curved flexural members; beams on continuous support; energy methods.
5313. Theory of Elastic Stability. (3:3:0)

Prerequisite: Approval of Head of Department. Theory of the conditions governing the stability of structural members, determination of critical loads for various types of members under the action of various conditions of loading and support.
5314. Theory of Plates and Shells. (3:3:0)

Prerequisite: Approval of Head of Department. Stress analysis of plates and shells of various shapes. Small and large deflection theory of plates. Membrane theory of shells. General theory of shells.
5316. Theory of Elasticity. (3:3:0)

Prerequisite: Approval of Head of Department. Several analyses of stress and strain in rectangular and polar coordinates; stress functions; energy methods; finite difference equations; membrane analogy for torsion.
5321. Advanced Soil Engineering. (3:3:0)

Prerequisite: C.E. 4321. Specialized topics in the theoretical and practical aspects of foundation and earthwork engineering.
5331, 5332. Advanced Work in Specific Fields. (1 to 6)
Prerequisite: Approval of Head of Department. Nature of course and amount of credit depend on the nature of the work and the student's interest and performance. An individual study course.
5342. Advanced Plastic Design. (3:3:0)

Prerequisite: C.E. 4341. Study of the theory of plastic design of steel frames.
5343. Advanced Structural Analysis. (3:3:0)

Prerequisite: C.E. 4344, 4341 or approval of Head of Department. Application of modern design methods to building frames, arches, rigid bents, continuous trusses.
5344. Advanced Reinforced Concrete Design. (3:3:0)

Prerequisite: C.E. 4344. Analysis and design of reinforced concrete structures by inelastic methods.
5346. Design of Structures for Dynamic Loads. (3:3:0)

Prerequisite: Approval of Head of Department. Nature of dynamic loading from earthquake and wind forces; nature of dynamic resistance of structural elements and complete structures; concepts of limit design applied to dynamic loading.
5351. Open Channel Hydraulics. (3:3:0)

Prerequisite: C.E. 3351. Channel geometry and parameters. Uniform and varied flow. Flood routing.

## 5353. Water Resources Engineering. (3:3:0)

Prerequisite: C.E. 4353. Problems in water resources conservation and utilization with particular emphasis on river basin studies involving multiple water uses.

## 5355. Flow in Porous Media. (3:3:0)

Prerequisite: C.E. 4355, or approval of Head of Department. Single and multiple phase flow in confined and unconfined porous formations toward natural outlets or toward wells.

## 5356. Earth Dams. (3:3:0)

Prerequisite: C.E. 3355, registration in C.E. 4321. Selection of dam sites, principles of design of earth dams, flow nets and seepage, selected topics.

## 5371. Advanced Water and Waste Treatment. (3:2:3) <br> Prerequisite: C.E. 3371, C.E. 3373. Advanced methods of water and waste treatment including industrial and radioactive wastes.

630. Master's Report.
631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Doctor's Research. (3 each)
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

## ELECTRICAL ENGINEERING CURRICULUM <br> Bachelor of Science in Electrical Engineering



[^42]- See Page 272 for Alternate Freshman Year
- Exclusive of P.E.. Band, or Basic ROTC


# Department of Electrical Engineering 

Harold Aylesworth Spubler, Head of the Department Office: W.E. 201

Professors:<br>Griffith, Houston, Spuhler<br>Associate Professors:<br>Phillips, Seacat, Stenis<br>Assistant Professors:<br>Coale, Easter<br>Instructors:<br>Adkins, Lankford

Electrical engineering is concerned with the conversion, transmission, and control of energy in electrical form; with the utilization of such energy in the performance of useful work; and with the application of related phenomena to the control, transmission, and processing of information.

The department offers a program leading to the Degree of Bachelor of Science and graduate study leading to the Degrees of Master of Science and Doctor of Philosophy. The objective of the undergraduate program is to provide the student with a broad and deep mastery of the enduring fundamentals upon which he can establish his professional career. Toward this end the electrical engineering curriculum emphasizes basic concepts, analytical methods, and experimental techniques, rather than the acquisition of routine skills. Prerequisite for such training include mathematics, physics, and chemistry; emphasis upon mechanics, thermodynamics, electricity and magnetism; and a study of the properties of the materials with which the engineer must work. Humanistic courses such as English, history, government, and economics provide breadth and balance for the curriculum and strengthen the ability of the student to meet the obligations and responsibilities of his dual role of professional engineer and citizen.

The professional program has been arranged to provide training in the fundamentals of circuit theory, electronics, electromagnetic theory, and energy conversion. Specialized training in their application is provided in the laboratory sequence, with emphasis on experimental techniques. This work involves individual projects which provide the student with training in the planning and execution of experimental investigations; the proper choice and use of laboratory equipment; and the evaluation and interpretation of experimental data. Technical electives in specialized areas such as those of control systems, computers, acoustics, electronic instrumentation, and solid-state devices are provided for students whose interests lie in these directions. The approach to the over-all curriculum is from the standpoint of engineering science, with the purpose of providing the student with the background required for entrance into either a graduate program for continued formal training or a professional career in any of the many specializations open to electrical engineering graduates.

Admission to junior standing as an electrical engineering major is conditioned upon the department's acceptance of a petition, which must be submitted prior to registration for the third year. Such acceptance depends upon the grade record submitted after completion of the first two years. It is expected initially that an overall gradepoint average of 2.00 or better will have been achieved in all courses taken; that above-average grades will have been attained in the mathematics courses taken; and finally, that a grade of C or better will have been made in both E.E. 231 and E.E. 232.

Each student entering the electrical engineering program will be assigned a faculty adviser and will be responsible for arranging a course of study with his advice and approval. All students enrolled in this program will be required to maintain a grade-point ratio of at least 2.00 in their major field during each semester. Any student who fails to meet this requirement in any given semester must fulfill a program outlined by his faculty adviser before being allowed to proceed.

For details of the graduate program in electrical engineering, see the Graduate Bulletin.

## Courses in Electrical Engineering FOR UNDERGRADUATES

## 231-232. Principles of Electrical Engineering. (3:3:0 each)

Prerequisite: Math. 331. Principles of electric and magnetic circuits. Magnetic properties of iron and steel. Induced and generated electromotive force. Forces on conductors. Fundamentals of alternating current circuits. Fundamentals of resistance inductance, and capacitance. Network theorems, resonance phenomena, coupled circuits, analysis, three-phase circuits, and nonsinusoidal waveforms.
3311. Electronics I. (3:3:0)

Prerequisite: E.E. 232. Principles and methods of analysis of high vacuum tubes, gas tubes, rectifiers, photo-tubes, semiconductor diodes, and transistors.
3312. Electronics II. (3:3:0)

Prerequisite: E.E. 3311. Vacuum tube and transistor amplifiers, oscillators, modulators, demodulators, frequency converters, and wave-shaping circuits.
3321. Circuit Theory I. (3:3:0)

Prerequisite: E.E. 232. Transient behavior of electrical circuits and other physical systems. Application of differential equation and Laplace transformation techniques. Initial conditions and initial and final value theorems. Single energy-storage systems, double energy-storage systems, and coupled systems. Introduction to transfer functions.
3322. Circuit Theory II. (3:3:0)

Prerequisite: E.E. 3321. Generalized matrix formulation of the network problems.
Two-port networks and parametric formulation. The filter problem, filter types and
application to filter design. Introduction to the synthesis problem.

## 3323. Methods of Circuit Analysis. (3:3:0)

Prerequisite: E.E. 232, Math, 336. Rigorous treatment of the mathematical methods available and applicable to the analysis of linear circuits, applications of determinants, matrices, linear transformations, vector analysis, complex variable, Fourier series, and integrals.

## 3331. Measurements Laboratory. (3:0:9)

Prerequisite: Junior standing in engineering and registration in E.E. 3311. A laboratory course to accompany third-year basic courses in electrical engineering. Detailed experimental study of the measurement problem. Projects assigned to correlate with the material presented in electronics, network theory, and electromagnetic theory. Use of test equipment and measurement devices.

## 3332. Experimental Laboratory I. (3:0:9)

Prerequisite: E.E. 333i. A laboratory course to accompany third-year basic courses in electrical engineering. Projects assigned to correlate with the theory presented in second-semester junior courses.

## 3341. Electromagnetic Theory I. (3:3:0)

Prerequisite: Junior standing in engineering. General treatment of static electric and magnetic flelds from the vector viewpoint. Laws of Coulomb, Gauss, Ampere, Biot and Savart, and Faraday. Poisson's and Laplace's equations. Development of Maxwell's equations in differential and integral form.

## 3342. Electromagnetic Theory II. (3:3:0)

Prerequisite: E.E. 3341. General solutions for Maxwell's equations. Traveling waves in scalar media. Boundary conditions and constraints imposed by bounding surfaces. Guided waves in three dimensions. Detailed treatment of the one-dimensional case.

## FOR UNDERGRADUATES AND GRADUATES

## 4121. Electrical Engineering Seminar. (1:1:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas.

## 4311. Analog and Digital Computation. (3:3:0)

Prerequisite: Senior standing in engineering. An introductory treatment of analog and digital computers. Circuit types and components. Number systems. Operational techniques. Storage devices. Input-output equipment. Programming.
4317. Electronics III. (3:3:0)

Prerequisite: E.E. 3312. Electronic systems for the processing and transmission of information. Application of matrix, topological, and signal-flow-graph methods to system analysis. Introduction to nonlinear and time-varying linear systems. Effects of nolse and saturation in electronic systems.

## 4318. Physical Electronics. (3:3:0)

Prerequisite: E.E. 3312, E.E. 3342. Introductory study of the physical properties of electron devices; electron ballistics, thermionic emission, conduction through gases and solids; detailed study of model theory for semiconductor and high vacuum devices.

## 4321. Passive Network Synthesis. (3:3:0)

Prerequisite: E.E. 3322. Properties of positive real functions; synthesis of canonical forms for the two-element kind; extension to three-element kind, methods of Brune, Bott-Duffin, and Bode; approximation techniques and introduction to two-terminal pair synthesis.

## 4322. Topological Network Analysis. (3:3:0)

Prerequisite: E.E. 3322. Fundamentals of linear graphs; topological formulation and theory of contacts; realization of loop matrices, terminal matrices of non-oriented nets; linear programming techniques.

## 4331. Special Problems in Electrical Engineering. (3:3:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual studies in advanced engineering areas of special interest. May be repeated for credit.

## 4332. Special Experimental Problems in Electrical Engineering. (3:0:9)

Prerequisite: Advanced standing and approval of Head of Department. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit.

## 4333. Experimental Laboratory II. (3:0:9)

Prerequisite: E.E. 3332. A laboratory course to accompany fourth-year courses in electrical engineering. Projects assigned to correlate the theory presented in first-semester senior courses.

## 4341. Microwave Systems. (3:3:0)

Prerequisite: E.E. 3342. The wave equation and its solution in guiding systems. Discontinuities and impedances in waveguides. Microwave resonators. Microwave antennas and radiating systems. Introductory treatment of the various types of microwave tubes and generation techniques. Application of magnetic materials in component design.

## 4343. Energy Transmission. (3:3:0)

Prerequisite: Senior standing in electrical engineering. Theory and application of transmission lines at power, signal, and high frequencies.

[^43]
## 4352. Energy Conversion II. ( $\mathbf{3 : 3 : 0}$ )

Prerequisite: E.E. 4351. Elements of energy conversion applied to solid state static devices, thermionic and solar devices. The principles of magnetohydrodynamics are also discussed.
4353. Feedback Control Systems. (3:3:0)

Prerequisite: Senior standing in engineering. An introduction to the theory of automatic control systems. Flowgraphs and block diagrams. Stability criteria. Prediction of closed-loop time response. System compensation. Components.

## 4354. Acoustics. (3:3:0)

Prerequisite: Senior standing in engineering. General nature of the acoustics problem. Radiating systems. Dynamical analogies. Microphones and other transducers. Acoustic measurements.
4355. Nonlinear Feedback Systems. (3:3:0)

Prerequisite: E.E. 4353. Behavior of nonlinear systems, phase plane techniques, describing functions; stability considerations and compensation; discontinuous controllers, limit cycles; optimal systems, quasi-optimal concept, representative adaptive systems; analog simulation.

## 4361. Introduction to Information Theory and Noise. (3:3:0)

Prerequisites: E.E. 3312, E.E. 3322. Transmission through linear networks; impulse response and convolution; modulation and modulation systems; nolse and nolse spectra; signal to noise considerations, matched filters; quantization techniques.

## FOR GRADUATES

## 5311. Stability of Nonlinear Systems. (3:3:0)

Prerequisite: Graduate standing. Concepts of stability criteria based upon the methods of Lyapunov and Andronov and Chaiken are applied to nonlinear systems. Techniques based upon piecewise linearization, limit cycles, and other approaches are also discussed.

## 5312. Optimal and Adaptive Control Systems. (3:3:0)

Prerequisite: Graduate standing or consent of instructor. Different control systems are discussed and design techniques based upon Pontryagin's Maximum Principle, Wiener's characterization and phase plane plots are applied to the design of the systems. The use of Orthogonal functions in optimum control systems are also presented.

## 5313-5314. Solid-State Electronics I and II. (3:3:0 each)

Prerequisite: Graduate standing. Quantum mechanics, physical processes in crystalline solids and other media, characteristics of junction devices; thermoelectric, thermionic and electrochemical devices; development and application of circuit models for solld-state devices.

## 5315. Sampled Data and Digital Control Systems. (3:3:0)

Prerequisite: Graduate standing or consent of instructor, Sampling concepts, Z transform, signal flow graphs and state variable methods applied to sampled data systems are presented. The Schur-Cohn and Jury's Stability tests, digital controllers, and Z plane synthesis are described.

## 5317. Advanced Transients. (3:3:0)

Prerequisite: Graduate standing in electrical engineering. Transient analysis using transform methods with emphasis on physical interpretations. Lumped constant linear approximations. Laplace, Fourier transformations. Convolution processes in real and complex domains. $Z$ transforms. Applications to sampled data systems, difference and cyclic switching.

## 5318. Pulse and Timing Circuits. (3:3:0)

Prerequisite: Graduate standing in electrical engineering or consent of instructor. Electron devices as switching elements. R-C coupled circuits, multivibrators (bistable, monostable, and astable). Sweep circuits, pulse transformers, blocking oscillators, lines and pulse-forming networks.

## 5319. Electronic Circuits and Systems. (3:3:0)

Prerequisite: Graduate standing in electrical engineering or consent of instructor. Fundamentals of linear amplifiers, speed of step responses (sag, overshoot, etc.), distrlbuted amplifiers, stagger-tuned amplifiers, synchronous-tuned amplifiers, double-tuned interstages, physical analogies, design procedures, circuit noise, calculation of noise figure.

## 5321. Digital Systems. (3:3:0)

Graduate standing in electrical engineering. A detailed treatment of the concepts and procedures involved in the logical design of digital systems. Boolean algebra and applications. Application equations. Memory units. Input-output equipment. Arithmetic units. The general design problem.

## 5322-5323. Advanced Network Theory I and II. (3:3:0)

Prerequisite: Graduate standing in electrical engineering or consent of instructor. Theory of two-terminal and four-terminal networks, impedance tranformation, Foster's theorem and extensions, conventional and lattice filters, equalizers, network design and synthesis, application of network theory to vacuum-tube circuits.

## 5324. Symmetrical Components. (3:3:0)

Prerequisite: Graduate standing in electrical engineering or consent of instructor. The theory of the method of symmetrical components is reviewed and supplemented in detail; related components are described, and the method is applied to the calculation of voltage and currents in complex systems under conditions of fault and unbalanced loading. The symmetrical component impedances of machines are defined and calculated, also the zero sequence impedance of lines and cables.
5325. Information Theory. (3:3:0)

Prerequisite: Graduate standing in electrical engineering. Probabillty theory of finite systems. General properties of channels of various types. Transmission of information. Discrete channels with and without memory. Coding theorems.

## 5326. Network Applications of Linear Graph Theory. (3:3:0)

Prerequisite: E.E. 4322 or consent of instructor. The theory of linear graphs is presented in detail. Applications are made to topological formulations, flow graphs, contact networks and switching circuits.

## 5327. Multistage Decision Processes. (3:3:0)

Prerequisite: Graduate standing. Concepts of linear programming, optimal search, and stochastic processes are presented. Applications to the transportation problem and polley decisions are made.
5328. Statistical Theory of Communications. (3:3:0)

Prerequisite: E.E. 5317 or consent of instructor. The Fourier methods, WienerHopf criteria, prediction and prediction filters presented. Synthesis of statistical communications networks are discussed.
5331. Theoretical Investigations in Engineering Applications. (3:3:0)

Prerequisite: Graduate standing in engineering. An individual study course involving a rigorous theoretical investigation of some aspect of an engineering problem of current interest. A formal report is required.

## 5332. Experimental Investigation in Engineering Application. (3:0:9)

Prerequisite: Graduate standing in engineering. An individual study course involving an experimental investigation of some aspect of an engineering problem of current interest. A formal report is required.
5341-5342. Advanced Electromagnetic Theory I and II. (3:3:0 each)
Prerequisite: Graduate standing in electrical engineering or consent of instructor. Rigorous treatment of the boundary-value problems encountered in the analysis of systems for gulding electromagnetic waves. Reduction of wave-gulde and obstacle problems to equivalent network problems.

## 5343. Radio Propagation. (3:3:0)

Prerequisites: Graduate standing. E.E. 5342 or consent of instructor. Propagation in a stratified medium; ray theory; ionospheric sounding; transmission problems; crossmodulation and nonlinear effects.

## 5344. Antennas and Radiating Systems. (3:3:0)

Prerequisites: Graduate standing and E.E. 5342 or consent of instructor. Huyghen's principle; Babinet's principle. Reaction concept and variational principles. Applications to antennas and to general method of calculating any result of any practical mesurement of antennas radiation pattern and impedance. Observations of scattering and diffraction.

## 5354. Direct Energy Conversion. (3:3:0)

Prerequisite: E.E. 4352 or consent of instructor. Plasma dynamics, foundations of the production and manipulation of ionized gases. Quantum theory applied to thermoelectric and electrochemical devices.

## 630. Master's Report.

631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Doctor's Research. (3 each)
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

## ENGINEERING PHYSICS CURRICULUM

## Bachelor of Science in Engineering Physics



[^44]- Exclusive of P.E., Band, or Basic ROTC


# Department of Engineering Physics 

Henry C. Thomas, Head of the Department<br>Office: Sc. 109-B<br>\section*{Professors:}<br>Day, Merrymon, * Schmidt, H. C. Thomas Associate Professors:<br>R. E. Berry, Gardner, P. F. Gott, Sandlin<br>Assistant Professors:<br>Basford", Howe, Lodhi, Mann<br>* Part-time

The program leading to the Degree of Bachelor of Science in Engineering Physics is primarily one of engineering science and is administered by the Department of Physics in the School of Arts and Sciences and by the School of Engineering.

The curriculum provides preparation for students who desire careers in either scientific research or in engineering development. Its first purpose, however, is their preparation for positions which require both a thorough and a broad understanding of basic physical principles and a clear conception of the methods and techniques involved in the application of these principles. Therefore, the program is one which includes course work in intermediate and advanced physics, supplemented by a firm grounding in mathematics and fundamental engineering.

The course of study includes work in the areas of mechanics, electricity and magnetism, thermodynamics, fluid dynamics, electronics, and contemporary physics.

## Courses in Engineering Physics

See course listings of Physics Department in School of Arts and Sciences.

INDUSTRIAL ENGINEERING CURRICULUM
Bachelor of Science in Industrial Engineering


Minimum hours required for graduation - 140 and P.E., Band, or Basic ROTC

- Eee Page 272 for Alternate Freshman Yea


# Department of Industrial Engineering and Engineering Drawing 

Richard Albert Dudek, Head of the Department Office: T.E. 118

INDUSTRIAL ENGINEERING STAFF Professor:<br>Dudek<br>Associate Professors:<br>Jenkins, MacKenzie<br>Assistant Professors:<br>Ayoub, Schneider<br>ENGINEERING GRAPHICS STAFF Professor:<br>Perryman<br>Associate Professor:<br>Lindenmeier<br>Assistant Professors:<br>Graham, B. K. Power

Industrial engineering may be defined as the application of engineering methods and the principles of scientific analysis to work and work systems. It is based upon the early works on scientific management by Frederick W. Taylor and those on motion study and methods analysis by Lillian M. and Frank B. Gilbreth. Industrial engineering began as a profession during the early 1900's and has advanced rapidly since World War II.

To quote the American Institute of Industrial Engineers: "Industrial engineering is concerned with the design, improvement, and installation of integrated systems of men, materials, and equipment. It draws upon specialized knowledge and skill in the mathematical, physical, and social sciences, together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems." Industrial engineering is used most widely in manufacturing fields, but contributes and is growing in use in such areas as engineering sales, farm management, home economics, hospital work, surgery, hotel and restaurant operation, retail store operation, architecture, construction work, regional planning, mail order selling, and various branches of the federal government.

The industrial engineering curriculum includes a core of basic courses in mathematics, drawing, physics, chemistry, English, economics, and psychology, as well as the basic courses in mechanical and electrical engineering and engineering mechanics. It is designed to equip the student for graduate work, as well as the professional pursuits mentioned above.

All industrial engineering majors are encouraged to take I.E. 321 , Computer Programming Techniques, during the sophomore or the first semester of the junior year, since many problems presented in ad-
vanced courses can be solved best with the aid of an electronic computer, and the student is expected to make use of this facility. The departmental courses include the basic principles of industrial engineering, industrial statistics, work systems analysis and design, work control, and production design. Problems with which these courses deal are, primarily, those of cost, quality, and quantity of work. Their solution involves organizing, planning, co-ordinating the effective utilization and control of money, materials, facilities, and personnel, and requires the consideration of human and economic, as well as technical, factors.

It is highly desirable that the student's accomplishment be of the best quality. While he may with impunity receive a grade of D at the junior or senior level in one single course, he must repeat any additional courses in which he receives a grade of $D$.

Special programs sponsored by the Student Chapter AIIE and Alpha Pi Mu , the national honor society, as well as organized departmental seminars, supplement course instruction, thus keeping the student informed of latest developments in the growing field of industrial engineering.

For details of the program in Industrial Engineering leading to the Master of Science Degree and to the Doctor of Philosophy Degree, see the Bulletin of the Graduate School.

## Courses in Industrial Engineering

## FOR UNDERGRADUATES

321. Computer Programming Techniques. (2:1:3)

Prerequisite: Consent of the instructor. Programming techniques for digital and analog computers.

## 335. Safety Engineering. (3:3:0)

Prerequisite: Junior standing in engineering or business management. Principles of safety engineering as applied to industrial situations. Costs of accidents, accident prevention methods, industrial safety programs, frequency and severity rates, protective equipment, jigs and fixtures, accident investigations and reports, student reports on related safety subjects.
337. Production Planning and Control. (3:3:0)

Prerequisite: I.E. 3311 or equivalent. Control functions; types of production and control; forecasting and estimating; basic information required for control; initiating production control; flow control; block and load control. Reproduction of forms and communications systems, relationships of product control department with other departments. Value of production control. Linear programming applications to production control.
338. Elements of Methods Analysis. (3:2:3)

Prerequisite: Nonmajor student and consent of instructor. Science and work, the work system, work simplification, operation analysis, forms control and design. Methods improvement techniques and principles of effective work. A survey of work measurement, work sampling, and inventory control. Applications to many areas, as business concerns, the home, the farm, the hospital, etc.
3311. Principles of Industrial Engineering I. (3:3:0)

Prerequisite: Math. 4318. Consideration of the organization through systems approach. Management objectives, decicion theory, "model'" formulation, and introduction to operations research techniques.
3315. Industrial Statistics $I$. (3:3:0)

Prerequisite: Math. 232. Elements of industrial statistics; descriptive statistics, probability, and quality control.

## 3321. Principles of Industrial Engineering II. (3:3:0)

Prerequisite: I.E. 3311 and 3315. Continuation of operations research techniques. Principles and theories of quantitative methods for analysis of work systems.
3325. Industrial Statistics II. (3:3:0)

Prerequisite: I.E. 3315 or equivalent. Statistical inference techniques and applications to work systems.
3331. Work Analysis and Design I. (3:2:3)

Prerequisite: I.E. 3315 and 3321. Principles and techniques of analysis of work measurement, engineering economy, and work flow with applications of design for better work systems. Emphasis on methods and measurement.
3334. Work Analysis and Design II. (3:3:0)

Prerequisite: I.E. 3331. Emphasis on engineering economy analysis.
3341. Work Control I. (3:3:0)

Prerequisite: I.E. 3331. Basic designs of work control systems. Emphasis on forecasting; material and product control.

## 3351. Production Design I. (3:2:3)

Prerequisite: I.E. 3331 and Ch. E. 330 or equivalent. Elements of machines and manufacturing processes, metal removal theory; principles of machine tool design; introduction to automation principles and design.

## FOR UNDERGRADUATES AND GRADUATES

417. Industrial Statistics Problem Laboratory. (1:0:3)

Prerequisite: Parallel registration in I.E. 3315, 3325, or 5317, and consent of Instructor. Experimental study of statistical techniques. Problem design and data analysis.

## 4121. Industrial Engineering Seminar. (1:1:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas.

## 4221. Special Problems in Industrial Engineering. (2:2:0)

Prerequisite: Graduating industrial engineering seniors. Practical solutions of a variety of problems which the industrial engineer may be expected to encounter in his work: plant layout; production planning; engineering economy; methods improvement; materials handing; and others.

## 439. Analysis of Industrial Operations. (3:3:0)

Prerequisite: I.E. 3315 or equivalent. Introduction to operations research techniques. Study of the applications of quantitative methods for analysis of industrial operating problems.

## 4311. Automatic Data Processing Systems. (3:3:0)

Prerequisite: Consent of instructor. Includes: types of equipment, programming procedures, principles of processing in systems design for computer applications in industry.

## 4331. Individual Studies in Industrial Engineering. (3:3:0)

Prerequisite: Senior standing in industrial engineering. May be repeated.
4334. Work Analysis and Design III. (3:2:3)

Prerequisite: I.E. 3334. Emphasis on work flow design.
4341. Work Control II. (3:3:0)

Prerequisite: I.E. 3341. Emphasis on inventory theory, "model" formulation of work control systems, etc.
4351. Production Design II. (3:2:3)

Prerequisite: I.E. 3351. Emphasis on automation and automatic controls.

## 4361. Industrial Engineering Design. (3:3:0)

Prerequisite: Graduating industrial engineering seniors. Design of a complete operational organization with emphasis on the application of theories covered in previous course work.

## FOR GRADUATES

512. Seminar. (1:1:0)

Prerequisite: Graduate standing or consent of instructor. Discussion will concern present research being conducted in the industrial engineering field. Other special topics will also be considered. May be repeated for credit.

## 306 INDUSTRIAL ENGINEERING

535. Engineering Controls for Industrial Safety. (3:3:0)

Prerequisite: Graduate standing or consent of instructor. Design of the industrial safety program under widely variant conditions through proper combination of accident control activities. Workmen's compensation, minimum safety standards legislation, health hazards in industry. Statistical measurements of safety performances. Analytical studies of fire prevention techniques.

## 536. Dynamics of Engineering Economy. (3:3:0)

Prerequisite: Graduate standing or consent of instructor. A continuation of equipment selection and investment, emphasizing depreciation and other economic approaches to the selection and replacement of equipment and structures. Relationship between accounting and engineering economy. MAPI formula. Income tax aspects of economy studies.

5111, 5212, 5213, 5214. Industrial Engineering Case Analysis. (1, 2 ) Prerequisite: Graduate standing or consent of instructor. Special studies and investigations in the application of various industrial engineering techniques.

5301, 5302, 5303. Advanced Work Analysis and Design. (3:2:3 each)
Prerequisite: Graduate standing or consent of instructor. Advanced work measurement techniques; systematic study of biomechanics applied to man-machine systems and assembly lines; validity of pre-determined time systems; study of work stress, fatigue, and the determination of standard task loads.

5307, 5308. Advanced Production Control. (3:3:0 each)
Prerequisite: Graduate standing or consent of instructor. Modern practices and theory of making optimal decisions concerning production, inventories, and human resources. The use of the analytical and mathematical approach to solve complicated decision problems.

## 5311, 5312. Analysis Techniques for Management. (3:3:0 each)

Prerequisite: Graduate standing or consent of instructor. Concepts and principles of operations research. Mathematical and statistical tools which aid management decisions; applications and case studies.

## 5314, 5315. Analysis Techniques for Work Systems. (3:3:0 each)

Prerequisite: Graduate standing or consent of instructor. Concepts and principles of queuing theory, dynamic programming, simulation, and other mathematical and statistical tools which aid in the analysis and design of work systems; applications and case studies.

## 5316. Statistical Reliability Analysis. (3:3:0)

Prerequisite: 3 hours of statistics or consent of instructor. The role of probability and statistics in reliability analysis; statistical models for fatigue and fallure, with emphasis on exponential, Weibull, Gemma, and extreme-value distributions. Design, analysis, and interpretation of multifactor reliability experiments; increased severity testing; improved reliability through redundance and maintenance; applications to component and systems reliability.

## 5317. Advanced Industrial Statistics. (3:3:0)

Prerequisite: 6 hours of statistics or consent of instructor. Analysis of varlance, multiple correlation, analysis of covariance, design of experiments, randomized blocks and Latin square, response-surface analysis, and determination of optimum conditions.
5318. Selected Topics in Advanced Statistics. (3:3:0)

Prerequisite: 6 hours of statistics or consent of instructor. Selected topics chosen from such areas as: nonparametric statistical methods; sequential analysis; multivariate analysis; etc. May be repeated in different areas.
5321. 5322. Decision Theory and Management Science. (3:3:0 each)

Prerequisite: Graduate standing or consent of instructor. Concepts and principles of decision models; theory and practice of management planning and administrative control; decision theory, cybernetics and management science.

5351, 5352. Advanced Production Design. (3:3:0 each)
Prerequisite: I.E. 4351 and Math. 335 and 336. A continuation of Production Design and emphasis on design and construction for automation and automatic controls.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Doctor's Research.
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

Engineering graphics courses are required for all engineering students. The object of these courses is to familiarize the student with the graphic language of the engineer and to train the student to use skillfully and intelligently engineering sketching and drawing techniques as a background for specialized engineering and design problems.

## Courses in Engineering Graphics FOR UNDERGRADUATES


#### Abstract

131. Engineering Graphics I. (3:1:5)

Introduction to space relationships; fundamentals of shape description, free-hand sketching, engineering geometry, pictorial presentations of ideas, and principles of size description. Stress is given to the essentials of sketching and drafting in conveying ideas in the graphic language of the engineer.


132. Engineering Graphies II. (3:1:5)

Prerequisite: E. Grph. 131. Graphical presentation of data, fundamentals of nomography, advanced space relationships, concepts of surface intersections and developments.

# Department of Mechanical Engineering 

Louis John Powers, Head of the Department

Office: E.E. 103

Professors:<br>Mason, Newell, L. J. Powers<br>Associate Professors:<br>Helmers, Martin<br>Assistant Professors:<br>Davenport,* Lawrence, Reis<br>Instructors:<br>Coon, Crutcher<br>* On leave, 1963-1964

In mechanical engineering, instruction is offered leading to the Degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy. Although the bachelor's program is designed as a terminal one, it leads toward graduate study in a specialized engineering field. It recognizes the increasing national growth in graduate engineering education and, through counseling and elective freedom, builds an adequate preparation.

The undergraduate program of instruction is organized on a fouryears plus one summer basis and includes thorough training in the basic sciences of physics, chemistry, and mathematics, in conjunction with a substantial number of cultural studies. Mechanical engineering instruction is provided in three general areas: (1) design and dynamics, (2) physical metallurgy and mechanics of materials, (3) thermodynamics, heat transfer, and heat power. A dynamics laboratory is provided for the study of problems in vibration, transient phenomena in mechanical systems, and experimental stress analysis by means of special mechanical and electronic equipment.

MECHANICAL ENGINEERING CURRICULUM
Bachelor of Science in Mechanical Engineering


Minimum hours required for graduation - 139 and P.E., Band, or Basic ROTC

* See Page 272 for Alternate Freshman Year
** Exclusive of P.F., Band, or Basic ROTC
:*- Junior, or senior course.

Instruction in physical metallurgy is made possible by a wellequipped metallography laboratory in which metals may be prepared, heat-treated, analyzed, and studied microscopically. Laboratory facilities have been developed for analysis, design, and evaluation of machine elements. Work in the field of thermodynamics and heat power is implemented by laboratories containing heat power and heat transfer apparatus. An additional activity arises in conjunction with the analysis laboratory. It is built around an analog computer, thus merging the interests in applied mechanics, applied thermodynamics, and applied mathematics in the solution of engineering problems.

The mechanical engineering staff maintains close relationships with many industries and research agencies, which provide new basic problems and facilities for study and research in the broad field of mechanical engineering.

For details of the program in mechanical engineering leading to the Master of Science Degree and to the Doctor of Philosophy Degree, see the Bulletin of the Graduate School.

## Courses in Mechanical Engineering

## FOR UNDERGRADUATES

## 237. Metals Engineering. (3:3:0)

Prerequisite: Chem. 141. Metallography, heat treatment, and metal fabrication processes for engineering applications.
311\%. Physical Metallurgy Laboratory. (1:0:3)
Corequisite: Concurrent enrollment in M.E. 3317. Metallurgical laboratory techniques, lattice and grain structure analysis, metals testing.

3212, 3213. Heat Power, I, II. (2:2:0 each)
Corequisite: M.E. 3321. Power system components such as fans, compressors, pumps, turbines, and steam generators. Economic and thermodynamic analysis of chemical, solar, and nuclear energy conversion systems.

3214, 3215. Air Conditioning, I, II. (2:2:0 each)
Corequisite: M.E. 3321. Air-steam mixtures; refrigeration; heating, cooling, and ventilation for various environmental requirements.

## 3216. Engineering Analysis. (2:1:3) <br> (Formerly 4214)

Prerequisite: Math. 335. Numerical analysis and analog simulation of typical problems in mechanical engineering.
3314, 3315. Machine Elements, I, II. (3:3:0 each)
Prerequisite: C.E. 233. Analysis of stresses in and functions of machine elements such as gears, cams, linkages, and structural elements. Introduction to mechanical design.

## 3317. Physical Metallurgy. (3:3:0)

Prerequisite: Ch. E. 330 or M.E. 237. Concurrent enrollment in M.E. 3117. Fundamentals of metal behavior in terms of atomic structure, energy levels, and crystal imperfections. Equilibrium diagrams, time-temperature-transformation phenomena.
3321. Engineering Thermodynamics. (3:3:0)

Prerequisite: Phys. 241, Math. 335. Basic laws of thermodynamics, fundamental properties and interrelationships between properties. Evaluation of irreversibility. Application to gases as well as to other systems.

## FOR UNDERGRADUATES AND GRADUATES

[^45]
## 310 MECHANICAL ENGINEERING

## 4131. Engineering Reports. (1:1:0)

Prerequisite: Senior standing. Oral and written report presentation of selected current topics in mechanical engineering technology. May be repeated for credit in different areas.

4212, 4213. Thermodynamics. (2:2:0 each)
Prerequisite: M.E. 3321. K:netic theory, basic chemical thermodynamics, nonequilibrium thermodynamics, introduction to statistical mechanics.

4216, 4217. Design, X, II. (2:1:3 each)
Corequisite: M.E. 3314, 3317. Experimental analysis, case studies in product design, evaluation, and modification.

4312, 4313. Mechanical Engineering Laboratory, I, II. (3:1:6 each) Corequisite: M.E. 3212, 3214. Experimental and developmental testing of basic mechanical equipment.

## 4314. Fluid Dynamics. (3:3:0)

Prerequisite: M.E. 3321. Hydrodynamic theory, compressible flow, dynamic lift and propulsion, dynamic similitude.
4315. Heat and Mass Transfer. (3:3:0)

Prerequisite: Math. 335, M.E. 3321. Heat transfer by conduction, convection, and radiation. Mass transfer in liquids, vapors, and gases.
4316. Dynamics. (3:3:0)
(Formerly 3313)
Prerequisite: Math 335. Newtonian dynamics of rigid bodies, Lagrange's equations, theory of small vibrations.
4331. Special Problems in Mechanical Engineering. (3:3:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual studies in advanced engineering areas of special interest. May be repeated for credit in different areas.

## 4332. Special Experimental Problems in Mechanical Engineering. (3:0:9)

Prerequisite: Advanced standing and approval of Head of Department. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit in different areas.

## FOR GRADUATES

531. Statistical Thermodynamics. (3:3:0)

Prerequisite: M.E. 4213. Quantum mechanics, molecular spectra, statistical mechanics, intermolecular forces.

532, 533. Heat Transmission. (3:3:0 each)
Prerequisite: Math. 335. The fundamental laws of the various modes of heat transmission, numerical and approximate solutions, application of the combined modes of heat transmission to design.

## 534. Gas Dynamics. (3:3:0)

Prerequisite: M.E. 3321. Isentropic and diabatic flow, wave phenomena, aerothermochemistry.

## 535. Classical Hydrodynamics. (3:3:0)

Prerequisite: Math. 336, M.E. 4314. Application of ordinary and partial differential equations to advanced topics in fluid dynamics, including the flow of ideal and of viscous fluids.
539. Physics of Metals. (3:3:0)

Prerequisite: M.E. 3317. Theory of lattice structures, dislocations and slip interference, and semiconductors.
5311. Experimental Stress Analysis. (3:2:6)

Prerequisite: Matin. 335. Theory and application of electric strain gages, brittle coatings, and photoelastic techniques to static and dynamic strain measurements.
5312. Mechanical Vibrations. (3:3:0)

Prerequisite: Math. 335, C.E. 332. Free and forced vibrations of linear and nonlinear mechanical systems. Vibration of elastic bodies.
5313. Classical Dynamics. (3:3:0)

Prerequisite: Math. 335, C.E. 332. Newton's laws, Lagrange's equations of motion, Euler's equations, precessional effects and motions, relativity effects.
5331. Theoretical Studies in Advanced Topics. (3:3:0)

Prerequisite: Graduate standing and approval of the department. Individual theoretical study of advanced topics selected by departmental recommendation. May be repeated for credit in different areas.
5332. Experimental Studies in Advanced Topics. (3:1:6)

Prerequisite: Graduate standing and approval of the department. Individual experimental study of advanced topics selected by departmental recommendation. May be repeated for credit in different areas.

## 630. Master's Report. (3)

631. Master's Thesis. (3)

Enrollment required at least twice.
731-732. Doctor's Research. (3 each)
831. Doctor's Dissertation. (3)

Enrollment required at least four times.

# Department of Petroleum Engineering 

William Lyon Ducker, Jr., Head of the Department Office: Petr. 103

Professor:<br>Ducker<br>Associate Professor:<br>P. Johnson<br>Assistant Professor:<br>Crawford

The petroleum engineering curriculum is concerned with the development, production, reservoir mechanics, valuation, and conservation of petroleum and natural gas reserves.

The student is trained in mathematics, chemistry, physics, geology, engineering mechanics, and related subjects, embracing all background needed in the study of petroleum engineering. Advanced work in production, natural gas, and reservoir engineering prepares the student for the more specialized technical problems encountered in industry. By completing the degree requirements, the graduate is trained for employment as a production, research, or reservoir engineer for oil and gas companies, either domestic or foreign; or for a position with educational or governmental agencies.

The reservoir and production laboratories are equipped for studies in core analysis, the colloidal properties of fluids, viscosimetry, P-V-T relationships, surface energies, permeabilities, areal sweep efficiencies, and other specialized subjects.

The natural gas laboratory is equipped for standard tests on natural gas and natural gasoline, measurement and calibration of flowmetering devices, and experiments in the use of regulation and control equipment.

## PETROLEUM ENGINEERING CURRICULUM

Bachelor of Science in Petroleum Engineering


Minimum hours requred for graduation-140 and P.E., Band, or Basic ROTC

* See Page 272 for Alternate Freshman Year
- Exclusive of P.E., Band, or Basic ROTC

The department maintains, also, a drilling fluid laboratory, with all of the equipment necessary to enable each student to perform the standard tests determining drilling fluid characteristics. The use of special drilling fluids, recognition and control of mud contamination, properties and effects of drilling mud additives, and special drilling mud problems are included in the material covered in the laboratory.

In addition to instructional and laboratory work, field trips to points of interest within the oil-producing area surrounding Lubbock are conducted by the department and by the petroleum engineering student organizations. Laboratory experiments on dynamometer testing of pumping equipment and standard tests on natural gas are performed in the field by the students.

The department offers courses leading only to a minor in petroleum engineering for those working toward the master's degree.

# Courses in Petroleum Engineering 

## FOR UNDERGRADUATES

## 314. Production Laboratory. (1:0:3)

Prerequisite: Enrollment in Pet. E. 333. Reservoir characteristics, core analyses, oll dehydration, corrosion, lease operation, and pumping well characteristics.
320. Well Logging Methods. (2:2:0)

Prerequisite: Pet. E. 331 and Phys. 241. Theories of electrical, microelectrical, radiation, optical, chemical, and mechanical well-logging methods, and applications of these theories. Field examples and problems.
321. Phase Behavior. (2:2:0)

Prerequisite: Phys. 241 and enrollment in M.E. 3321. Introduction to the phase behavior of multiple-component hydrocarbon systems. Application to the production of crude oll and condensate reservoirs and to the separation of natural gasoline from natural gas.

## 322. Rotary Drilling Fluids. (2:1:3)

Prerequisite: Chem. 142 and enrollment in Pet. E. 331. Testing methods for determining drilling fluid characteristics, drilling fluid problems, and the use of special drilling fluids. Laboratory exercises consist of the practice of altering properties of fresh water and special drilling fluids for drilling through troublesome zones with the rotary system.

## 330. Introduction to Petroleum Industry. (3:3:0)

Prerequisite: Junior standing in geology or engineering. A general study of the Industry, including its history; the chemistry of petroleum; its occurrence in nature and its importance in the world economy; leasing and royalty; exploration, drilling, and production methods; conservation, transportation, and refining; economics of the industry.
331. Petroleum Development Methods. (3:3:0)

Prerequisite: Junior standing. Exploration methods; spacing of wells; rotary and cable tool drilling methods; directional drilling; drilling hazards; oil fleld hydrology; and well completion practices.
333. Petroleum Production Methods. (3:3:0)

Prerequisite: Pet. E. 331 and Chem. 343. Properties of reservoir fluids and characteristics of the reservoir which influence oil recovery. Production of wells by flowing, gas lift, hydraulic and sucker rod pumping.

## FOR UNDERGRADUATES AND GRADUATES

## 413. Natural Gas Laboratory. (1:0:3)

Prerequisite: Registration in Pet. E. 434 or 435. Natural gas analysis and testing; measurement and calibration of flow-metering devices; regulation and control devices; gas-phase relations; and natural gasoline techniques.
416. Reservoir Engineering Laboratory. (1:0:3)

Prerequisite: Pet. E. 433. Experiments relating to flow of fluids in porous media, including viscosimetry, P-V-T relationships, surface energies, relative permeability, mobility ratios, and areal sweep efficiencies.

TEXTILE ENGINEERING CURRICULUM
Bachelor of Science in Textile Engineering


Minimum hours required for graduation - 139 and P.E., Band, or Basic ROTC

- See Page 272 for Alternate Freshman Year
* Exclusive of P.E., Band, or Bastc ROTC
... Juntor or sentor level courses

4121. Petroleum Engineering Seminar. (1:1:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas.

## 420. Petroleum Property Evaluation and Management. (2:1:3)

Prerequisite: Parallel enrollment in Pet. E. 433. Economic and physical evaluation of oil and gas producing and processing properties. Contour and isopachous mapping procedures; well log and core analysis interpretation, reserve estimates, reservoir performance, and economic analysis. Evaluation of actual oil properties.
430. Special Natural Gas and Production Problems. (3:3:0)

Prerequisite: Pet. E. 333. Theory, design, and operation of gas lift systems. Production problems to include gas-oll control, water control, decline curves, formation damage due to well completion, and well workovers.

## 433. Reservoir Engineering. (3:3:0)

Prerequisite: Pet. E. 333. Fundamentals of fluid flow in porous media, including petro-physics; reservoir energy and producing mechanisms; and application of the material balance.
434. Natural Gas Engineering. (3:3:0)

Prerequisite: Pet. E. 333. The properties and behavior of hydrocarbons and related systems, and the associated thermodynamics.
435. Advanced Natural Gas Engineering. (3:3:0)

Prerequisite: Pet. E. 434. The application of the fundamentals of natural gas engineering to the production of natural gas and condensate reservoirs; the processing, transportation, distribution, and measurement of natural gas and its derivatives. Problems and design.
436. Advanced Reservoir Engineering. (3:3:0)

Prerequisite: Pet. E. 433. Analysis of primary depletion mechanisms, including water drive, solution drive, gas-cap reservoir, and condensate reservoirs. Economic studies of secondary recovery methods.
4331. Special Problems in Petroleum Engineering. (3:3:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual studies in advanced engineering areas of special interest. May be repeated for credit.

## 4332. Special Experimental Problems in Petroleum Engineering.

 (3:0:9)Prerequisite: Advanced standing and approval of Head of Department. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit.

# Department of Textile Engineering and Textile Research Laboratories 

L. E. Parsons, Acting Head of the Department<br>Office: T.E. 131

Professor:
Parsons
Assistant Professor:
B. K. Power

The textile industry today is a modern, scientific, management and research-oriented enterprise, which supplies not only the ordinary apparel and household textiles but a large and ever-increasing number of well engineered and highly complex products for industry. Notable developments in textiles have come from the industry in the form of special

## TEXTILE TECHNOLOGY AND MANAGEMENT CURRICULUM

Bachelor of Science in Textile Technology and Management


[^46]high performance fabrics for space age travel. Development and production of such fabrics requires both scientific and engineering skills and the best in management ability.

It is the purpose of the Textile Engineering Department to supply personnel trained in technology and management as well as those with special skills in the engineering sciences, all having a backgroud in the field of textiles. Because of many job offerings and excellent and rapid advancement opportunities in production management and distribution of textiles, most graduates go into this field. Consequently, the Textile Engineering Department, beginning in the fall of 1964, is offering a new curriculum leading to a Bachelor of Science Degree in Textile Technology and Management. Where the regular textile engineering curriculum contains many engineering science and related courses, this new curriculum, in addition to the usual textile courses, leans more heavily toward the field of industrial management. Women students will find this new degree to be an excellent entrance into textile styling, merchandising, and related areas.

The Textile Research Laboratories are available both to private and public agencies for research on cotton utilization and textile manufacturing problems. The complete and modern manufacturing facilities comprising the laboratories are used jointly for teaching and research.

Close co-operation between the teaching and research staffs allows the joint use of the talents of each. Students profit greatly by being able to observe and even participate in the continuous research operations, thus gaining first-hand knowledge of the manner in which they are carried on. This knowledge is often found applicable by students upon their entrance into industry.

## Courses in Textile Engineering

## FOR UNDERGRADUATES

## 230. Applied Textiles. (3:3:0)

Textile raw materials, manufacturing processes, and end uses. Designed especially for students interested in buying, selling, marketing, merchandising, or advertising textiles. It has a broad coverage of the field useful in understanding the applications of the many new synthetic fibers of today. Not for textile engineers.
235. Textile Fibers. (3:3:0)

Physical and chemical properties of the natural fibers. Attention is given stressstrain and other characteristics affecting manufacturing performance. First introduction to theory of fiber structure.
239. Cotton Evaluation and Marketing. (3:2:2)

The structure of the cotton marketing system. Special emphasis on new laboratory techniques of fiber analysis and evaluation. Grading and stapling covered in the laboratory. Open also to other majors.
331. Principles of Fiber Processing I. (3:2:3)

Fundamental principles and practices for processing cotton and man-made fibers into yarn. Analysis of machine operations and performance standards.
332. Principles of Fiber Processing II. (3:2:3)
Includes preparation of yarns to meet specific end uses. Correlation of machine
performance capabilities of fundamental fiber properties.
333. Textile Bleaching. (3:2:3)

[^47]
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## 334. Textile Dyeing and Finishing. (3:2:3)

Theory and practice of dyeing and coloring all types of textile fibers, yarns, and fabrics, as well as industrial finishing of these fabrics.

## 431. Textile Testing and Quality Control. (3:2:3)

Instrumentation for manufacturing process control. Test data are correlated and process control charts prepared from data obtained in mill scale operation methods of sampling and testing for product and machine performance. Technical reports emphasize rigorous statistical treatment of test data.
432. Man-Made Fibers. (3:3:0)

The physical, chemical, and engineering propertles of the most important manmade fibers. Studied also are raw materials used, manufacturing methods, classification of fibers, and their principal fields of application.

## 436. Fabric Design and Construction. (3:2:3)

Theory and practice in designing and weaving fabrics. In the laboratory, engineering analysis is made of weaving mechanisms and their application to fabric construction.

## 43\%. Fabric Analysis and Advanced Design. (3:2:3)

Prerequisite: T.E. 436. Fabrics are analyzed for data to permit duplication or improved design. Special mechanisms and design of complex fabric structures are covered.

## FOR UNDERGRADUATES AND GRADUATES

## 4121. Textile Engineering Seminar. (1:1:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas.
4331. Special Problems in Textile Engineering. (3:3:0)

Prerequisite: Advanced standing and approval of Head of Department. Individual studies in advanced engineering areas of special interest. May be repeated for credit.
4332. Special Experimental Problems in Textile Engineering. (3:0:9)

Prerequisite: Advanced standing and approval of Head of Department. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit.

## School of Home Economics

Willa Vaughn Tinsley, Dean Office: H.E. 151-B<br>Applied Arts<br>Clothing and Textiles<br>Food and Nutrition<br>General Home Economics<br>Home Economics Education<br>Home and Family Life<br>Child Development and Family Relations<br>Home Management

The School of Home Economics was one of the four initial schools of the College when it opened in 1925. Since then this school has continuously revised its program to meet the steadily expanding roles of educated women as homemakers, mothers, citizens, employees, and attractively intelligent persons. Teaching continues to be the most appealing profession for graduates in home economics, although increasing numbers of home economists are being employed in business and government. The demand for qualified home economists is always greater than the supply.

## Objectives of the School

The objectives of the School of Home Economics may be classified under the three headings of education, research, and service, with the three aims overlapping at many points. The two major objectives of the school are the education of women for personal family living and for employment in the field of home economics. Research is carried on to expand the boundaries of knowledge in home and family living and in the professional fields of home economics. An effective program in home economics by its very nature provides a service to the campus and the community.

The School of Home Economics designs its offerings to serve both men and women in three groups: students majoring in home economics in preparation for a career in that field; students registered in other schools of the College who wish training either for homemaking or for supplementing their degree plans; and persons in the area served by the College who wish to take refresher courses in home economics or to work toward an advanced degree.

## Admission

Admission to the School of Home Economics, as to the other schools of the College, is under the direction of the Dean of Admissions, to whom all correspondence concerning admission should be addressed.

## Undergraduate Degree Programs in Home Economics

The School of Home Economics offers work leading to the Degree of Bachelor of Science in Home Economics with a major in applied arts, clothing and textiles, food and nutrition, home economics education, or home and family life. The degree is also given with a major in general home economics for those students who wish a broad background of preparation for homemaking and related occupations but who do not wish to specialize in any one of the other professional areas of home economics.

In co-operation with each of the other departments in the school, the Department of Home Economics Education offers a program with a double major. The program leads to the Bachelor of Science in Home Economics with a major in home economics education and in the other major department chosen from applied arts, clothing and textiles, food and nutrition, or home and family life. The graduate with a degree including a double major is qualified to teach home economics education in the public schools and also has a major in another field of home economics. Students following the program do not have elective courses and may also need to attend college somewhat longer than those electing a single major.

## Pre-Nursing

Although Texas Technological College does not offer a degree program in nursing, students who contemplate nursing as a profession may secure a number of college courses which are required in all degree programs in nursing. Inquiries should be addressed to the Dean of Home Economics for a recommended curriculum.

## Load

Normally, students in the School of Home Economics carry a load of $16-18$ semester hours. No student is permitted to enroll for a program of more than 18 or less than 12 semester hours without special approval of the Dean.

In a six-week summer term the maximum load is 7 semester hours, composed of two courses or three courses including a 1 -semester-hour physical education activities course.

## Home Economics Advisory Program

One of the outstanding features of the School of Home Economics at Texas Tech is its faculty-student advisory program. This program is designed to assist the student in planning her college program intelligently and to help her anticipate and solve personal problems through close relations with the faculty. Each student enrolled in the school is assigned a faculty adviser for her freshman and sophomore years. When the student achieves junior standing ( 64 semester hours), the head of her major department becomes her adviser. Transfer students are at once assigned to department heads for purposes of advisement. In home economics education a member of the faculty is
designated as adviser for juniors, and another for seniors. Either advisers or advisees may request the Dean to make a change in assignment at any time and for any reason.

The faculty adviser:

1. Advises the student as to the courses to be taken each semester.
2. Helps the student arrange a schedule for enrolling in these courses.
3. Assists the student in the selection of a major and in making out a degree plan.
4. Counsels with the student on personal problems (when the student wishes help).

## Selection of a Major

The student should not attempt to make a final selection of her major until she has investigated the programs available. An entering freshman is encouraged to take the beginning course in each of the five areas of home economics: applied arts, clothing and textiles, food and nutrition, child development and family relations, and home management. The required freshman course, Personal Competence in College (Child Development and Family Relations 112), should prove of considerable help to the student in making her decision.

Because of poor schedule planning, failure in one or more courses, or for other reasons, a student in any major program may be required to attend more than the normal eight semesters. Before the close of her junior year each student should plan carefully the scheduling of courses needed to fulfill the degree requirements in order to determine her expected date of graduation.

## Aid to Students

A number of assistantships are available in home economics providing financial assistance as well as valuable experience to capable students. A student interested in employment of any type should consult with her adviser, the head of her department, or the Dean.

Numerous scholarships, fellowships, and loans are also available. Loan funds are discussed earlier in this catalog. For details of scholarships, fellowships, and awards see the bulletin on that subject issued. by the College, copies of which are available from the Registrar.

The services of the Placement Service are also available without charge to any student of the College seeking a position after graduation or temporary employment while a student.

## Graduate Study

The School of Home Economics offers work leading to a Master of Science Degree in Home Economics with majors in clothing and textiles, food and nutrition, and home economics education. Minors are offered in these departments as well as in applied arts and in home and

## 322 BACHELOR OF SCIENCE, HOME ECONOMICS

family life. A cooperative plan with the State Agricultural Extension Service provides a Master of Science Degree for home economists in this service. For details of the graduate program see the Bulletin of the Graduate School.

## Bachelor of Science in Home Economics

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours):
Eng. 131-132-College Rhetoric
Eng. 231-232-Masterpieces of Literature
Govt. 231-American Government, Organization
Govt. 232-American Government, Functions
*Hist. 231-232-History of the United States
Physical education or band, 4 semesters
Science, 18-20 semester hours selected from at least two of the three following science groups:

1. Biological (Zool. 137 or equivalent required)
2. Physical
3. Social (Soc. 230 or 233 or 331 required)
II. Courses to provide basic concepts in personal and family living (20 semester hours):
Ap. A. 131-Design Applied to Daily Living
Ch. D. \& F.R. 131-Personal and Family Relationships
Cloth. \& Text. 131-Wardrobe Analysis, Construction and Buying
Food \& Nutr. 131-Nutrition and Food
H. Mgt. 131-Management and Consumer Problems
H.E. Ed. 333-Introduction to Research in Home Economics
H.E. Ed. 411-Home Economics Seminar
III. Additional courses in major fields of home economics (as listed in departmental curricula).
IV. Courses in the School of Home Economics and in other schools of the College to support major field (as listed in departmental curricula).
v. Electives in any school of the College to complete 127 semester hours.

# Department of Applied Arts 

Bill C. Lockhart, Head of the Department<br>Office: H.E. $265-B$

Professors:<br>Kincaid, Lockhart<br>Associate Professors:<br>Beitler, T. A. Lockard<br>Assistant Professors:<br>Kriwanek, Queen<br>Instructors:<br>Harland, Hellberg, Story

Instruction given by the Department of Applied Arts is offered in the belief that every individual has some creative ability which can be developed under proper guidance and in a sympathetic environment, and with the conviction that most persons welcome experience in the creation or selection of artistically appealing objects for daily living or business.

Courses are designed to appeal to students in all parts of the College who wish an experience in creative art work as a part of their liberal education, as well as to those in the School of Home Economics who are planning careers in fields based on training in applied art. There is a growing demand for qualified designers, and concentration in applied arts may lead to careers in interior design, teaching, or recreation.

A student may earn the Bachelor of Science Degree in Home Economics in the Department of Applied Arts by choosing one of several options.

## Crafts Option

The person choosing this program is given a sound foundation in design principles, supplemented by a complete and thorough examination of the various craft areas. Graduates who have selected this option are now designing and producing crafts either for manufacturers in industry or in their own shops and homes as a private endeavor.

## Interior Design Option

In recent years there has been a decided increase in the demand for individuals with training in interior design. Such training offers preparation for work in interior design specialty shops and in furniture or accessory shops. Businesses of various kinds employ trained personnel to design window displays; manufacturers employ people with this background as consultants or designers.

## Art Education Option

A teacher certification plan leading to a secondary art certificate or an all-level art certificate is available through a joint program

| FRESHMAN YEAR |  |  | SOPHOMORE YEAR |  |
| :---: | :---: | :---: | :---: | :---: |
| Eng. 131-132 | Col. Rhet. | 6 | Eng. 231-232 Mast. of Lit. | 6 |
| P.E. or Band |  | 2 | P.E. or Band | 2 |
| *Science |  | 6 | *Zool. 137 Anat. \& Phys. | 3 |
| Ap. A. 131 | Design Applied to Daily Living | 3 | *Science | 3 |
| Ch. D. \& F.R. 112 | Pers. Comp. in Col. | 1 | Ap. A. 328 Apprec. of Art Today | 2 |
| Ch. D. \& F.R. ${ }^{131}$ | Pers. \& Fam. Rel. | 3 3 | Ap. A. electives Cloth. \& Text. 231 | 3 |
| Food \& Nutr. 131 | Nutr. \& Food ${ }^{\text {a }}$, | 3 | Cloth. \& Text. 237 Apparel Selec. \& Des. | 3 |
| H. Mgt. 131 | Mgt. \& Consumer Prob. | 3 | Elective(s) to complete normal load |  |
| Ap. A. 133 | Intermediate Design | 3 |  |  |
| Ap. A. 112 | Philosophies and Purposes in Applied Arts | 1 | Total credit hours | 31 |
|  | Total credit hours | 34 |  |  |
| JUNIOR XEAR |  |  | SENIOR YEAR |  |
| Govt. 231-232 Amer, Govt. 6 |  |  | Food \& Nutr. 334 Human Nutr. <br> H.E. Ed. 333 Intro. to Research in H.E. <br> H.E. Ed. 411 H.E. Seminar | 3 |
| **Hist. 231-232 Hist. of the U.S.*ScienceAp. A. elective |  | 6 |  | 3 |
|  |  | 6 |  | 1 |
|  |  | 3 3 | H. Mgt. or Ap. A. elective H.E. elective | 3 |
| $\begin{aligned} & \text { Ap. A. } \\ & \text { Ch. D. \& F.R. } \\ & \text { Elective(s) to complete } \end{aligned}$ | Child Growth \& Devel. | 3 | Elective(s) to complete normal load | 19 |
|  | normal load | 3 |  |  |
|  | Total credit hours | 30 | Total credit hours | 32 |

* For sclence requirements, see Page 354.
* Hist. 330 may be substituted for Hist. 231 or 232.
involving the Departments of Applied Arts, Architecture and Allied Arts, and Education. A student working toward certification in art education may obtain his degree in any one of three schools: Arts and Sciences, Engineering, or Home Economics.

For information concerning the requirements in art courses, a student working toward certification in art education should consult the Head of the Department of Applied Arts. For information concerning the requirements in professional education, the student should consult the Head of the Department of Education in the School of Arts and Sciences. He should also familiarize himself with the teacher education program as discussed earlier in this catalog in the section entitled "Interdepartmental Programs."

## Double Major Option

A student desiring to combine a major in applied arts with the teaching of home economics in the secondary schools may select a double major in applied arts and home economics education.

## Interdisciplinary Option

Through cooperative arrangements with the School of Arts and Sciences, the Department of Applied Arts in the School of Home Economics and the Department of Architecture and Allied Arts in the School of Engineering offer a major in art leading to the Degree of Bachelor of Arts in the School of Arts and Sciences. For information concerning requirements for this degree, consult the Head of the Applied Arts Department.

The Department of Applied Arts reserves the right to retain, for one year, students' class projects for exhibition or reproducing purposes.

Each senior major in the department is required to arrange a public exhibit of his work at some time during his last regular semester in college.

## Bachelor of Science Degree in Home Economics Applied Arts Major

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living (20 semester hours).
III. Additional courses in applied arts (to total 24 semester hours*):

Ap. A. 112-Philosophies and Purposes in Applied Arts
Ap. A. 133-Intermediate Design
Ap. A. 331-Interior Design
Ap. A. 328-Appreciation of Art Today
Ap. A. Electives-12 semester hours

[^48]> IV. Courses in the School of Home Economics and in other schools of the College to support major field (18 semester hours):

> Ch. D. \& F.R. 233-Child Growth and Development
> Cloth. \& Text. 231-Textiles for the Consumer
> Cloth. \& Text. 237-Apparel Selection and Design
> Food \& Nutr. 334 -Human Nutrition
> H. Mgt. or Ap. A. Elective-3 semester hours
> H.E. Elective- 3 semester hours
V. Electives in any school of the College to complete 127 semester hours.

## Courses in Applied Arts

FOR UNDERGRADUATES

## 112. Philosophies and Purposes in Applied Arts. (1:1:0) (Formerly Survey in Applied Arts)

131. Design Applied to Daily Living. (3:1:4)

Elements and principles of design as they function in the life of the individual.

## 133. Intermediate Design. (3:1:4)

Prerequisite: Ap. A. 131 or equivalent.
231. Costume Design. (3:1:4)

## 232. Introduction to Crafts. (3:1:4) <br> (Formerly Crafts Survey) <br> Prerequisite: Sophomore standing.

## 236. Rendering for Interiors. (3:1:4)

## 328. Appreciation of Art Today. (2:2:0) <br> (Formerly Ap. A. 228) <br> Practice in aesthetic evaluations.

331. Interior Design. (3:1:4)

Prerequisite: Sophomore standing. Application of design principles to selection and arrangement of furnishings for a home with emphasis on utility, beauty, and con venlence.
332. Woodwork. (3:1:4)

## 334. Furnishings for Interiors. (3:3:0)

## 336. Textile Design. (3:1:4)

An experimental approach to the methods of designing for fabrics.
337, 338. Art in Elementary Education. (3:1:4 each)
Practical application of current art education practices in providing creative experlences for children in our schools.
3311. Advanced Crafts. (3:1:4)

Prerequisite: Advanced standing. Individual study in a specific craft.

## FOR UNDERGRADUATES AND GRADUATES

411. Special Problems. (1:0:2)

Prerequisite: Advanced standing. Advanced work in applied arts through individual Investigation. May be repeated for credit.
431. Silk Screen. (3:1:4)
432. Sculpture. (3:1:4)
433. Advanced Interior Design. (3:1:4)

Prerequisite: Ap. A. 331.
434. Metalwork. (3:1:4)
435. Jewelry. (3:1:4)
436. Art in Secondary Education. (3:2:2)

Investigation and study of current art education practices for secondary schools.
439. Experience Training in Applied Arts. (3:1:6)

Prerequisite: Advanced standing. Student arranges to gain first-hand experience In a local business firm or institution; work must be done in the field of applied arts in which the student has chosen an option; may be repeated once for credit.

## FOR GRADUATES

511. Advanced Applied Arts Unit. (1:0:2)

Individual investigation in applied arts. May be repeated for credit.
531. Special Problems. (3:1:4)

Advanced work in applled arts in which student has had previous training. May be repeated for credit.
537. Art for Exceptional Children. (3:1:4)

Review of the characteristics of atypical children; application of this knowledge in unfolding the creative potentialities of each child through the use of art experiences as a vocational as well as recreational medium.
538. Vocational Arts Orientation and Evaluation in Rehabilitation
Counseling. (3:1:4)
Planned for students in Vocational Rehabilitations Counselor Training Program.
5335. Theory and Practice of Art for Elementary Teachers. (3:1:4)

Art activities and experiences for the child.

# Department of Clothing and Textiles 

Gene Shelden, Head of the Department Office: H.E. 259<br>Professors:<br>Petzel, Shelden<br>Associate Professor:<br>L. A. Kinchen<br>Assistant Professors:<br>Gerlach, Messer<br>Instructor:<br>Dorsey<br>Part-time Instructor:<br>J. C. Key

The department offers programs leading to the Degree of Bachelor of Science in Home Economics with a major in clothing and textiles. Instruction is designed to prepare the graduate for a career in one of the many aspects of the clothing and textile industry, or for teaching in the public schools. Whichever curriculum is chosen, emphasis is placed on the psychological and sociological aspects of clothing, as well <br> Bachelor of Science in Home Economics FASHION OPTION}


## CLOTHING AND TEXTILES CURRICULUM

## CLOTHING AND TEXTILES CURRICULUM

* For science requirements, see Page 354.
* Hist. 330 may be substituted for Hist. 231 or 232.
as on the wise selection and purchase of clothing and textiles for the individual and the home. The student may choose one of four options.

The clothing and textiles staff confers with the student in helping her to find the particular option which best fits her talents and interests, and which therefore appears to be the most promising one for her.

## Fashion Option

This curriculum is planned to help the student develop creative ability and fashion judgment in preparation for entering some phase of fashion work, for example, designing, fashion co-ordinating, or retailing. This option provides opportunity for a wide choice of courses in the arts.

## Merchandising Option

The merchandising program combines the fashion work of the department with courses in the School of Business Administration. Thus the student has an opportunity to develop discriminating taste in fashion as well as to obtain training in operations concerning retail functions.

Students who complete the fashion or the merchandising option may have the advantage of an additional training period with the employing firm.

## Technology Option

Textile technology prepares the individual to enter technical aspects of clothing and textiles, such as laboratory testing, fabric analysis, and specification buying. This training is based on a strong background in chemistry, physics, and mathematics, plus the requirements in clothing and textiles.

## Double Major Option

The double major option combines the requirements of the fashion option with the requirements of the Home Economics Education Department, thus preparing the student to enter either fashion work or teaching.

## Master of Science in Home Economics

The department offers, also, work leading to a Master of Science in Home Economics with a major in clothing and textiles.

## Degree Requirements

In meeting degree requirements of 127 hours for a major in clothing and textiles, students must make a grade of C or above in all clothing and textiles courses. Students not measuring up to this academic standard will be required to enroll in additional course work as stipulated by the Head of the Department.

## CLOTHING AND TEXTILES CURRICULUM <br> Bachelor of Science in Home Economics <br> TECHNOLOGY OPTION



* For science requirements, see Page 354.
* Hist. 330 may be substituted for Hist. 231 or 232.


## Bachelor of Science Degree in Home Economics Clothing and Textiles Major Fashion Option

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living (20 semester hours).
III. Additional courses in clothing and textiles (to total 24 semester hours*):

Cloth. \& Text. 231-Textiles for the Consumer
Cloth. \& Text. 332-Dressmaker Tailoring and Design
Cloth. \& Text. 237-Apparel Selection and Design
Cloth. \& Text. 433-History and Philosophy of Dress
Cloth. \& Text. 436-Flat Pattern Design
Cloth. \& Text. Electives - 6 semester hours
IV. Courses in the School of Home Economics and in other schools of the College to support major field (17 semester hours) :

Ap. A. 231-Costume Design
Ap. A. 328-Appreciation of Art Today
Ap. A. 331-Interior Design
Ch. D. \& F.R.-Elective- 3 semester hours
Food and Nutr. 334-Human Nutrition
H. Mgt. Elective- 3 semester hours
V. Electives in any school of the College to complete 127 semester hours. (Recommended: foreign language - 12 semester hours; speech - 3 semester hours; journalism - 3-6 semester hours).

## Bachelor of Science Degree in Home Economics Clothing and Textiles Major Merchandising Option

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living (20 semester hours) .
III. Additional courses in clothing and textiles (to total 24 semester hours*):

Cloth. and Text. 231-Textiles for the Consumer
Cloth. and Text. 332-Dressmaker Tailoring and Design
Cloth. and Text. 237-Apparel Selection \& Design
Cloth. and Text. 334 -Family Clothing
Cloth. and Text. 433-History \& Philosophy of Dress
Cloth. and Text. Electives-6 semester hours
IV. Courses in the School of Home Economics and in other schools of the College to support major field ( 27 semester hours):

Acct. 234-Elementary Accounting I
Ap. A. 328-Appreciation of Art Today
Ap. A. Electives- 3 semester hours

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## CLOTHING AND TEXTILES CURRICULUM <br> Bachelor of Science in Home Economics MERCHANDISING OPTION

| Freshman year |  | SOPHOMORE YEAR |  |
| :---: | :---: | :---: | :---: |
| Eng. 131-132 Col. Rhet. | 2 | Eng. 231-232 Mast. of Lit. | 6 |
| ${ }^{\text {P. Science }}$ or Band | ${ }_{6}^{2}$ | P.E. or Band 137 Anat. \& Phys. *Zool. | ${ }_{3}$ |
| Ap. A. 131 Design Applied to Daily Living | 3 | *Science | 6 |
| Ch. D. \& F.R. 112 Pers. Comp. in Col. | 1 | Act. 234 Elem. Acct. I | 3 |
| Ch. D. \& F.R. 131 Pers. \& Fam. Rel. | 3 | Cloth. \& Text. 332 Dressmaker Tailoring \& Des. | 3 |
| Cloth. \& Text. 131 Wardrobe Anal., Constr., \& Buying | 3 | Cloth. \& Text. 237 Apparel Selec. \& Des. | 3 |
| Food \& Nutr. $131 \quad$ Nutr. \& Food | 3 | Elective(s) to complete normal load |  |
| H. Mgt. 131 Mgt. \& Consumer Prob. | 3 | (Recommended: Eco. 231-232-Prin. of Eco. I, II) | 7 |
| Clective(s) to complete normal load | 3 | Total credit hours | 33 |
| Total credit hours | 33 |  |  |
| JUNIOR YEAR |  | SENIOR YEAR |  |
| Govt. $\left.\begin{array}{l}\text { 231-232 }\end{array} \quad \begin{array}{l}\text { Amer. Govt. } \\ \text { Hist. of the U.S. }\end{array}\right]$ | ${ }_{6}^{6}$ |  | 3 3 |
| *Science 231232 Alst. or tho U.S. | 3 | Ch. D. \& F.R. elective | 3 |
| Mkt. 332 Prin. of Marketing | 3 | Cloth. \& Text. 433 Hist. \& Phil. of Dress | 3 |
| Mkt. $3335 \quad$ Prin. of Retailing | 3 | Cloth. \& Text. elective | 3 |
| Ap. A. 328 Apprec. of Art Today | 2 | Food \& Nutr. 334 Human Nutr. | 3 3 |
| Cloth. \& Text. 334 Family Clothing | 3 | H.E. Ed. 333 Intro. to Research in H.E. | 3 |
| Cloth. \& Text. elective Elective(s) to complete normal load (Recommended: speech) | 3 3 | H.E. Ed. H. Mgt. elective ${ }^{411} \quad$ H.E. Seminar | 1 3 |
|  |  | Elective(s) to complete normal load | 4 |
| Total creait hours | 32 | Total credit hours | 29 |

* For science requirements, see Page 354.
* Hist. 330 may be substituted for Hist. 231 or 232.

Ch. D. \& F.R. Elective- 3 semester hours
Food \& Nutr. 334 -Human Nutrition
H. Mgt. Elective-3 semester hours

Mkt. 332-Principles of Marketing
Mkt. 335-Principles of Retailing
Mkt. 4315-Retail Buying
V. Electives in any school of the College to complete 127 semester hours. (Recommended: Eco. 231-232-Principles of Economics I, II; speech- 3 semester hours).

## Bachelor of Science Degree in Home Economics Clothing and Textiles Major Technology Option

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education ( 54 semester hours).
Science requirements for clothing and textiles major with technology option are specified as follows:

Zool. 137-Anatomy \& Physiology
Soc. 230-Introduction to Sociology
Chem. 141-142-General Chemistry Chem. 341-Introductory Organic Chemistry Phys. 141-142-General Physics
II. Courses to provide basic concepts in personal and family living ( 20 semester hours).
III. Additional courses in clothing and textiles (to total 24 semester hours*):

Cloth. \& Text. 231-Textiles for the Consumer
Cloth. \& Text. 332-Dressmaker Tailoring and Design
Cloth. \& Text. 237-Apparel Selection and Design
Cloth. \& Text. 431-Textile Testing and Analysis
Cloth. \& Text. 433-History and Philosophy of Dress
Cloth. \& Text. 438-Historic Textiles
Cloth. \& Text. Electives- 6 semester hours
IV. Courses in the School of Home Economics and in other schools of the College to support major field ( 23 semester hours):
Ap. A. 328-Appreciation of Art Today
Ap. A. Elective- 3 semester hours
Ch. D. \& F.R. Elective- 3 semester hours
Food \& Nutr. 334-Human Nutrition
H. Mgt. Elective- 3 semester hours

Math. 133-College Algebra
Math. 238-Statistics
Eng. 233 or 234 -Technical Writing
V. Electives in any school of the College to complete 127 semester hours.

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## Courses in Clothing and Textiles

## FOR UNDERGRADUATES

131. Wardrobe Analysis, Construction, and Buying. (3:1:4)
132. Clothing and Household Fabrics for the Beginning Homemaker. (3:1:4)
For students not applying for a degree in home economics. Experience in buying of fabrics for the individual and the home.

## 231. Textiles for the Consumer. (3:3:0)

Fibers, fabrics, finishes, labeling, and care of textiles; emphasis on buying of fabrics for the individual and the home.
237. Apparel Selection and Design. (3:1:4)

Prerequisite: Ap. A. 131 or equivalent.
332. Dressmaker Tailoring and Design. (3:1:4)

Prerequisites: Cloth. \& Text. 131, 237.
333. Problems in Upholstering and Draperies. (3:1:4)

Refinishing and upholstering a chair; making drapes; consumer problems in buying upholstered furniture.

## 334. Family Clothing. (3:3:0)

Basic philosophy of dress in the American culture; selecting and retailing of clothing for different family patterns and family members with emphasis on children's clothing.

## FOR UNDERGRADUATES AND GRADUATES

411. Special Problems. (1:0:3)

Prerequisite: Cloth. \& Text. 332. May be repeated for 2 or 3 hours of credit.
431. Textile Testing and Analysis. (3:1:4)

Prerequisite: Cloth. \& Text. 231.
432. Dress Design Through Draping. (3:1:4)

Prerequisites: Cloth. \& Text. 332, 237.
433. History and Philosophy of Dress. (3:3:0)
436. Flat Pattern Design. (3:1:4)

43\%. Demonstration Techniques in Clothing. (3:3:0)
Prerequisite: Cloth. \& Text. 332.
438. Historic Textiles. (3:3:0)

## FOR GRADUATES

511. Advanced Clothing Problems. (1:0:3)

May be repeated for credit.
518. Seminar. ( $\mathbf{1 : 1 : 0 )}$

May be repeated for credit.
531. Special Problems in Clothing and Textiles. (3:1:4)

May be repeated for credit.
534. Custom Tailoring. (3:1:4)
535. Advanced Problems in Upholstery, Draperies, and Other Household Fabrics. (3:1:4)
(Formerly Home Furnishings)
5335. Textiles for Elementary Teachers. (3:3:0)

Prerequisite: Graduate standing in elementary education. Consumer source materials; historical and recent developments in textiles; units of special significance for each members.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Food and Nutrition 

Mina Wolf Lamb, Head of the Department<br>Office: H.E. 263

Professor:
Lamb
Associate Professor:
G. K. Holden

Assistant Professors:
C. M. McPherson, Zeches Instructors:

Kassouny, Wood*

* Jointly with the Department of Home and Family Life

Instruction in the Department of Food and Nutrition emphasizes the increasingly important role of food and nutrition in the personal lives of people and in the operation of institutions of every type, such as hospitals, schools and colleges, industries, and military establishments. The aim of this department is to add to the liberal education of students of the College through a knowledge of food and nutrition and an ability to apply the principles. Of major concern is providing students with a sound foundation for professional careers in the many aspects of food and nutrition.

The need for graduates trained in the field of food and nutrition far exceeds the number available. Indeed, students in their junior and senior years may receive substantial financial aid from the Department of the Army in order to qualify as dietitians; upon graduation a student qualifying for a dietetic internship can receive a commission in any of the military branches. Besides finding employment as dietitians, graduates in food and nutrition also find attractive opportunities for research in industry and government or for teaching in college.

The Department of Food and Nutrition offers work leading to the Bachelor of Science in Home Economics with a major in food and nutrition. The student may direct his program toward one of several professional areas. The curriculum meets the academic requirements specified by the American Dietetic Association for approved dietetic internships and membership in the association.

The department also offers work leading to the Degree of Master of Science with a major in food and nutrition.

## FOOD AND NUTRITION CURRICULUM

## Bachelor of Science in Home Economics



* For science requirements, see Page 354.
* Hist. 330 may be substituted for Hist. 231 or 232.


## Double Major

Students interested in teaching at the secondary level may plan a double major with home economics education.

## Interdisciplinary Opportunities

The student may strengthen his program by arranging his degree plan to take advantage of work offered in other departments, such as chemistry, psychology, management, marketing, education, industrial engineering, horticulture, and animal husbandry.

## Bachelor of Science Degree in Home Economics Food and Nutrition Major

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (55-56 semester hours).
Science requirements for food and nutrition majors are specified to meet American Dietetics Association standards:

Bact. 231-Bacteriology
Zool. 235-236-Anatomy, Physiology, and Hygiene
Chem. 141-142-General Chemistry
Chem. 341-Introductory Organic Chemistry
Chem. 342-Physiological Chemistry
Soc. 230-Introduction to Sociology or
Soc. 233-Current Social Problems
Psy. 330-Psychology in Business \& Industry
II. Courses to provide basic concepts in personal and family living (20 semester hours).
III. Additional courses in food and nutrition (to total 24 semester hours*) :

Food \& Nutr. 231-Principles of Food Preparation
Food \& Nutr. 331-Meal Management
Food \& Nutr. 334 -Human Nutrition
Food \& Nutr. 347-Management in Quantity Food Production
Food \& Nutr. Electives- 9 semester hours
IV. Courses in the School of Home Economics and in other schools of the College to support major field (12 semester hours):

Ap. A. 331-Interior Design
Ch. D. \& F.R. Elective- 3 semester hours
Cloth. \& Text. 231-Textiles for the Consumer
H. Mgt. 432-Home Management Residence
V. Electives in any school of the College to complete 127 semester hours.

# Courses in Food and Nutrition <br> FOR UNDERGRADUATES 

## 111. School Lunch Workshop. (1)

Admission by special approval. May be used for degree credit with dean's approval.

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## 338 FOOD AND NUTRITION

131. Nutrition and Food. (3:2:2)

Sclence of nutrition and food as applied to everyday living.
231. Principles of Food Preparation. (3:1:4)

Sclentific and efficient methods of food preparation.
331. Meal Management. (3:1:4)

Prerequisite: Junior standing. Management of time, money, equipment, and energy in food purchasing, preparation, and serving family meals.

## 334. Human Nutrition. (3:2:3)

Prerequisite: Human anatomy and physiology or other biological science. Physlological functioning of nutrients, their availability, and emphasis in menu and dietary planning; bloassay and dietary analysis as tools in teaching and in research.
347. Management in Quantity Food Production. (4:2:6)

Prerequisite: Food \& Nutr. 331, junior standing. Organization and management of food production in quantity; emphasis on skill in portion and cost control, arrangement of work area, time and labor management, and selection of personnel.

## FOR UNDERGRADUATES AND GRADUATES

411. Problems in Food and Nutrition. (1:1:0)

May be repeated for credit.
421. Advanced Food Production Management. (2:1:3)

Further study and experience in responsibility of management to produce quality food for group service.
422. Food Technology. (2:1:2)

Prerequisites: Junior standing, bacteriology, and other laboratory science. Conslderation and observation of numerous technological aspects of food in production, preservation, processing, and merchandising.
425. Food Demonstrations. (2:1:2)

Prerequisites: Food and Nutr. 331 and chemistry. Study, observation, and practice of demonstration methods used with food in teaching, merchandising, and television.
431. Nutrition in Disease. (3:2:3)

Prerequisite: Food and Nutr. 334 and organic chemistry. Concepts of abnormal nutrition and disease treated by dietary modification; hospital and clinic experiences.
432. Advanced Human Nutrition. (3:3:0)

Prerequisite: Food \& Nutr. 334 and organic chemistry. Concepts of normal nutrition in the chemistry and physiology of the human body.
436. Experimental Methods with Food. (3:1:6)

Prerequisite: Food \& Nutr. 331 and chemistry. Investigation of the chemical and physical factors influencing quality in food; consideration of proportions, manipulation of ingredients, and additives in preparation.
439. Food Economics. (3:1:4)

Prerequisite: Food \& Nutr. 131, junior standing. Food economics and legislation as related to the purchase of food, use of time, labor and equipment, and nutritional adequacy of dietaries.

## FOR GRADUATES

## 515. Special Aspects of Food and Nutrition. (1:0:3) <br> May be repeated for credit.

531. Research in Food and Nutrition. (3:1:6)

May be repeated for credit.
533. Seminar in Food and Nutrition. (3:3:0)

May be repeated for credit.
534. Advanced Problems in Human Nutrition and Foods. (3:3:0) May be repeated for credit.

# 5335. Principles and Applications of Nutrition for Elementary Teachers. (3:3:0) <br> Principles of nutrition, the nutrient and food requirements of the school child, and technics for motivating children to sound food habits. 

630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required twice.

# Department of Home Economics Education 

L. Ann Buntin, Head of the Department<br>Office: H.E. 154-B

Professor:<br>Buntin<br>Associate Professors:<br>Drake, Williamson<br>Instructors:<br>Bell, Carano, Sitton

The curriculum of the Department of Home Economics Education is designed to meet the legal requirements for teaching vocational homemaking in the secondary schools of Texas. Texas Technological College has been approved by the State Department of Education to provide training in vocational homemaking education. On successful completion of this curriculum the student is recommended for the Permanent Provisional Vocational Homemaking Certificate. The student may qualify for this certificate while earning a bachelor's or master's degree.

While the curriculum for the major in home economics education provides preparation for teaching at secondary, college, and university levels, such preparation also helps young women find employment in home demonstration work of the Agricultural Extension Service, religious education work in church organizations, home service work with public utility programs, and other fields related to home economics. The curriculum also provides a valuable foundation for the vocation of homemaking.

Each year a large number of West Texas high schools cooperate with the College in its student teaching program for home economics education students. In her student teaching activities, the student is given an opportunity to develop her leadership abilities, to observe and assist in teaching youth and adults, and to work with students in their homes. In addition to student teaching, selected juniors in this department are offered an opportunity to serve as apprentice teachers in the summer phase of the high school homemaking program.

## Teacher Certification

Each student working toward any teacher's certificate must file a certification plan with the College Director of Teacher Certification
during the last semester of the sophomore year. See directions, The Certification Plan, Page 71 this catalog.

## Requirements for Admission to Student Teaching

Each person expecting to receive a teaching certificate in vocational homemaking must meet the following admission standards to student teaching:

1. Must have completed approximately 90 hours of the home economics education curriculum, including the requisite courses in professional home economics and a majority of the courses designed to support the major field.
2. Must file an application with the Department of Home Economics Education to enroll in student teaching during the first semester of the junior year.
3. Must have a grade-point average of 2.25 or higher on all college work and a grade-point average of 2.25 or higher in professional education courses as well as in home economics courses. No grade below C in home economics courses will be accepted in establishing this average.
4. The student must pass the health examination required of teachers in the school system in which the student teaching is performed.
5. The applicant must present evidence that he is free from extreme handicaps that are judged by the Committee on Student Teaching to be detrimental to effective classroom instruction.
6. Proficiency in the use of the English language must be demonstrated.
7. Students transferring to this College in their senior year who wish to be recommended for certification must include in their requirements at least 3 semester hours in each of the subject matter departments in the field of home economics. This requirement may be increased on the recommendation of the Head of the Department of Home Economics Education.

## Double Majors

An increasing number of students in the School of Home Economics desire to qualify in two major areas of home economics. This choice is encouraged, since women who enter professional fields often find it highly advantageous to be prepared for a number of occupations related to the broad areas of home economics. Many professional women must adapt their occupational choices to family needs and situations. The choice of a second major should be made early, preferably not later than the last semester of the sophomore year or first semester of the junior year in order that carefully designed programs may be planned. A student intending to complete requirements for two majors usually must plan to spend a longer time in college. Careful selection of electives may shorten this period.

## Graduate Study

The Department of Home Economics Education offers work leading to the Degree of Master of Science in Home Economics with a major in home economics education. It also cooperates in the program for the Degree of Master of Education with a major in home economics education. Graduate work is also available for those wishing to meet the requirements for a professional certificate in teaching. In addition, the School of Home Economics is approved to offer a specialized program for supervision in home economics education.

For details of the above programs see the Bulletin of the Graduate School.

## Bachelor of Science Degree in Home Economics Home Economics Education Major

I. Academic foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living (17 semester hours).
III. Additional courses in professional development (to total 24 semester hours*):

Educ. 332-Educational Psychology
Educ. 334 -Curriculum Development in Secondary Education
H.E. Ed. 331-Philosophy and Principles of Vocational Home Economics
H.E. Ed. 426-Problems in Student Teaching
H.E. Ed. 432-Methods of Teaching Home Economics
H.E. Ed. 434.-Current Issues and Developments in Home Economics Education
H.E. Ed. 436-Home, School, and Community Experiences in Home Economics Education
H.E. Ed. 461-Student Teaching in Home Economics
IV. Courses in the School of Home Economics and in other schools of the College to support major field ( 33 semester hours):

Ap. A. 331-Interior Design
Ch. D. \& F.R.-Child Growth \& Development, or Ch. D. \& F.R.- 331-Later Childhood
Ch. D. \& F. R. 433-Family Relations
Cloth. \& Text. 231-Textiles for the Consumer
Cloth. \& Text. 332-Dressmaker Tailoring \& Design
Cloth. \& Text. 237-Apparel Selection \& Design
Food \& Nutr. 331-Meal Management
Food \& Nutr. 334-Human Nutrition
H. Mgt. 432-Home Management Residence
H. Mgt. Elective- 3 semester hours

Ch. D. \& F. R. Elective- 3 semester hours
V. Electives in any school of the College to complete 127 semester hours.

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## HOME ECONOMICS EDUCATION CURRICULUM

## Bachelor of Science in Home Economics



[^53]
## Courses in Home Economics Education FOR UNDERGRADUATES

331. Philosophy and Principles of Vocational Home Economics. (3:3:0)

Prerequisite or parallel, Educ. 332. For majors. Study and observation of typical vocational home economics programs in various school communities; principles of learning; critical review of literature with emphasis on experimental data in various fields of home economics.

## 333. Introduction to Research in Home Economics. (3:3:0)

Survey of research in selected areas of home economics; application of the scientific method to selected problems; understanding of recent theories of learning.

## 411. Home Economics Seminar. (1:1:0)

Required of all seniors in home economics. Emphasis upon professional aspects of employment; upon relating the total curriculum to professional use; upon research in home economics; upon continued growth of the home economist and current problems in home economics.

## FOR UNDERGRADUATES AND GRADUATES


#### Abstract

426. Problems in Student Teaching. (2:0:4)

Prerequisite or parallel: H.E. Ed. 461. Analysis of student teaching problems and ways and means whereby they may be solved.


432. Methods of Teaching Home Economics. (3:3:0)

Prerequisite: H.E. Ed. 331 Development of plans for providing effective learning in home economics; selection, use, and evaluation of learning experiences; guided observation of vocational home economics classes and programs.

## 434. Current Issues and Developments in Home Economics Education. (3:3:0)

Adult education; recent trends in curriculum and their significance for home economics education at elementary and secondary school level.

## 436. Home, School, and Community Experiences in Home Economics Education. (3:3:0)

Methods of evaluating the growth of the learner; provision for effective learning in home economics through experiences in home, school, community and Future Homemakers of America.
461. Student Teaching in Home Economics.

Prerequisite: H.E. Ed. 432.

## FOR GRADUATES

## 514. Specific Problems in Teaching Home Economics. (1:1:0)

A study of the organization and presentation of selected areas or aspects of the home economics program. May be repeated for credit.

## 531. Administration and Supervision of Home Economics Education. (3:3:0) <br> Administration and supervision of typical home economics programs on both vocational and non-vocational basis with special attention to resources, school-community

 curricula, and management. Designed for experienced home economists.532. Curriculum Development in Home Economics. (3:3:0)

Philosophy and development of year-round program in home economics education; legislation affecting the home economics programs; survey of recent curriculum developments and their implication for home economics education.
533. Evaluation in Home Economics. (3:3:0)

Procedures for appraisal of progress in the total program in home economics. Development of evaluative instruments and interpretation of data in the evaluation of various types of home economics programs.

## 534. Techniques of Research in Home Economics. (3:3:0)

Methods and techniques of research in home economics; interpretation of findings and application to selected situations and problems.
536. Problems. (3:3:0)

Individual and group problems according to special interests and needs of the class. May be repeated for credit.

53\%. Techniques of Supervision in Home Economics. (3:3:0) Philosophy, responsibilities, and techniques of supervision in home economics. Designed for experienced home economists.
630. Master's Report. (3)
631. Master's Thesis. (3)

Enrollment required at least twice.

# Department of Home and Family Life 

Estelle H. Wallace, Acting Head of the Department<br>Office: H.E. 202<br>Professor:<br>Tinsley<br>Associate Professors:<br>Drake, Drew, E. H. Wallace<br>Assistant Professors:<br>C. B. Camp, Gifford, Sides, Wolfe Instructors:<br>Bell, W. B. Edwards, Hildebrand, King, Wood*<br>Part-time Instructor:<br>J. D. Jenkins<br>* Jointly with Food and Nutrition

The Department of Home and Family Life is a combination of two former departments, child development and family relations, and home management. The curriculum of the department is designed to provide a sound academic foundation for home and family life and to prepare graduates for professional careers in business, government, and teaching.

Emphasis is given to the various stages in the family life cycle beginning with the personal and family adjustments of the college student toward dating, courtship, and marriage; followed by a study of childbearing, child-rearing, and child launching; then concluding with a consideration of aging members in the family. The availability and management of family resources are stressed, since these are basic to satisfactory adjustments at all stages of life.

Students majoring in the Department of Home and Family Life may choose one of three options leading to the Bachelor of Science in Home Economics.

## Child Development and Family Relations Option

As its name suggests, this option offers opportunities to study all phases of the child from conception to maturity and to investigate various aspects of family relations. Laboratory experiences with
children of different ages help the students learn how children mature, assist in developing skills in child guidance, and aid college students in understanding their own development and behavior. Work in the family relations area provides students with opportunities to gain information and to examine attitudes about such mature personal and interpersonal relationships in the college and the home as courtship, marriage, and relations between husband and wife and other members of the family.

Students selecting this option are prepared for homemaking or for such professional work as: teaching in private or community preschools, working with school age children in groups such as Scouts and Campfire Girls, directing parent education and child welfare work, and occupational therapy.

## Home Management Option

Those electing this option are given preparation for homemaking or for such professional work as agricultural extension, college teaching, and in industries producing goods and services for the home. Students are assisted in setting goals and identifying values as a part of home management and in the solution of personal problems. Attention is paid to the study of the decision-making process as used by individuals and families in reaching their goals.

An important contribution in home management is the opportunity for residence in the Home Management House, located on the campus, where students experience many phases of home living, including the care of an infant. Married students may elect a special problems course in lieu of residence in the Home Management House.

## Double Major Option

A student desiring to combine a major in home and family life with preparation for teaching home economics in the secondary schools may select a double major in home and family life and home economics education.

## Bachelor of Science Degree in Home Economics Home and Family Life Major Child Development and Family Relations Option

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living (20 semester hours).
III. Additional courses in child development and family relations (to total 24 semester hours*);

Ch. D. \& F.R. 233-Child Growth \& Development
Ch. D. \& F.R. 232-Child Guidance, or
Ch. D. \& F.R. 235-Preparation for Success in Marriage

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## HOME AND FAMILY LIFE CURRICULUM <br> Bachelor of Science in Home Economics CHILD DEVELOPMENT AND FAMILY RELATIONS OPTION



* For science requirements, see Page 354.
** Hist. 330 may be substituted for Hist. 231 or 232.

Ch. D. \& F.R. 433-Family Relations
Ch. D. \& F.R. 435-Student Teaching in Preschool, or
Ch. D. \& F.R. 439-Family Life in the Middle and Later Years
Ch. D. \& F.R. Electives- 9 semester hours
IV. Courses in the School of Home Economics and in other schools of the College to support major field ( 18 semester hours):

Ap. A. 337 or 338 -Art in Elementary Education
Cloth. \& Text. 231-Textiles for the Consumer
Educ. 4344 -Children's Literature
Food \& Nutr. 334-Human Nutrition
H. Mgt. 432-Home Management Residence
H. Mgt. Elective- 3 semester hours
V. Electives in any school of the College to complete 127 semester hours.

## Bachelor of Science Degree in Home Economics Home and Family Life Major Home Management Option

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living (20 semester hours).
III. Additional courses in home management (to total 24 semester hours*):
H. Mgt. 232-General Home Management
H. Mgt. 331-Housing the Family
H. Mgt. 333-Household Equipment
H. Mgt. 431-Advanced Housing for the Family
H. Mgt. 432-Home Management Residence
H. Mgt. 433-Advanced Household Equipment
H. Mgt. 435-Advanced Consumer Problems
IV. Courses in the School of Home Economics and in other schools of the College to support major field ( 33 semester hours):

Ap. A. 331-Interior Design
Ch. D. \& F.R. 233-Child Growth \& Development
Ch. D. \& F.R. 433-Family Relations
Cloth. \& Text. 231-Textiles for the Consumer
Cloth. \& Text. 232-Dressmaker Tailoring \& Design
Cloth. \& Text. 233-Decorator Fabrics
Food \& Nutr. 331-Meal Management
Food \& Nutr. 334 -Human Nutrition
Food \& Nutr. 435-Food Demonstration
Radio, TV, or Journalism-3 semester hours
Speech 338-Business \& Professional Speech
V. Electives in any school of the College to complete 127 semester hours.

[^55]
## HOME AND FAMILY LIFE CURRICULUM

## Bachelor of Science in Home Economics

 HOME MANAGEMENT OPTION| FRESHMAN YEAR |  | SOPHOMORE YEAR |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Eing. 131-132 Col. Rhet. | 6 | Eng. 231-232 | Mast. of Lit. |  |
| P.E. or Band | 2 | P.E. or Band |  | 2 |
| *Science 131 Deign Applied to Daily Living | ${ }^{6}$ | *Zool. 137 | Anat. \& Phys. | 3 |
| Ap. A. 131 Design Applied to Daily Living | 3 | ${ }^{\text {* Science }}$ |  | 3 |
| Ch. D: \& F.R. 112 Pers. Comp, in Col. | 1 | Spch. 338 | Bus. \& Prof. Spch. | 3 3 3 |
| Food \& Nutr. 131 Nutr. \& Food | 3 | Ch. D. \& F.R. 233 | Child Growth \& Devel. | 3 |
| Cloth. \& Text. 131 Wardrobe Anal., Constr., \& Buying | 3 | Food \& Nutr. 331 | Meal Mgt. | 3 |
| H. Mgt. 131 Mgt. \& Consumer Prob. | 3 | H. Mgt. 232 | Gen. Home Mgt. | 3 |
| Cloth. \& Text. 231 Text. for the Consumer or |  | H. Mgt. 333 | Household Equip. | 3 |
| Elective(s) to complete normal load | 3 | Elective(s) to complete | normal load |  |
| Total credit hours | 33 |  | Total credit hours | 32 |
| JUNIOR YEAR |  | SENTOR YEAR |  |  |
| Govt. 231-232 Amer. Govt. | 6 | **Hist. 231-232 | Hist. of the U.S. | S |
| Radio, TV or Journalism | 3 | *Science |  | 3 |
| *Science 332 Dressmaker Talloring o Des | 3 | Ch. D. \& F.R. 433 | Family Relations | 3 |
| Cloth. \& Text. $332 \quad$ Dressmaker Tailoring \& Des. Food \& Nutr. 334 Human Nutr. | 3 3 3 | Cloth. \& Text. 233 | Decorator Fabrics | 3 |
| Food \& Nutr. 425 Food Demonstration | 2 | H. Mgt. 432 | Home Mgt. Residence | 3 |
| H.E. Ed. 333 Intro. to Research in H.E. | 3 | H. Mgt. 431 | Adv. Housing for the Fam. | 3 |
| H. Mgt. 331 Housing the Family | 3 | H. Mgt. 435 | Adv. Consumer Prob. | 3 |
| H. Mgt. 433 Adv. Household Equip. | 3 | Elective(s) to complete | normal load | 7 |
| Elective(s) to complete normal load |  |  | Total credit hours | 32 |
| Total credit hours | 29 |  |  |  |

* For science requirements, see Page 354.
* Hist. 330 may be substituted for Hist. 231 or 232.


## Courses in Child Development and Family Relations

## FOR UNDERGRADUATES

112. Personal Competence in College. (1:1:0)

Relationship of the student to college; survey of the field of home economics; personal and academic guidance.
113. Child Development and Behavior. (1:1:3)

Child development for nursing students; growth patterns and adjustment problems of children; laboratory experience with children.
131. Personal and Family Relationships. (3:2:3)

Guidance in gaining competence in satisfying personal and family relationships; observation of various age levels.
231. The Infant. (3:3:0)

Physical and psychological development of the family for parenthood, study of growth and development from the prenatal period through the second year; observations of infants at different age levels; interviews with parents.
232. Child Guidance. (3:2:3)

Interpretation of current concepts underlying behavior and methods of working with children.
233. Child Growth and Development. (3:2:3)

The growth and development of young children as a basis for understanding oneself and others.
235. Preparation for Success in Marriage. (3:3:0)

Designed to consider the role which love, maturity, compatibility and conflict have in the interpersonal relationships of dating, courtship, and early phases of marriage.

## FOR UNDERGRADUATES AND GRADUATES

## 331. Later Childhood. (3:2:3)

Development of the older child through pre-adolescence; relationships in the family and with peer groups. Laboratory experience by arrangement with school age children.

## 332. Organization, Methods and Materials in the Preschool Program. (3:2:3)

433. Family Relations. (3:3:0)

Special problems of living together in the family as affected by family composition, family resources, traditions, and practices.
435. Student Teaching in Preschool. ..... (3)

Senior standing in home and family life. Observation and direction of a program
in the preschool laboratory or appropriate organized group.
436. Community and Professional Responsibilities to Children and Families. (3:3:0)
(Formerly Parent Education)
Study of community resources as they relate to welfare of children and families.
438. Exceptional Children in the Family. (3:2:3)

Prerequisite: Junior standing. Personal-social development of exceptional children; family attitudes and responsibilities; utilization of community resources; cooperative laboratory work with related departments.
439. Family Life in the Middle and Later Years. (3:3:0)
(Formerly The Aging in the Family)

Emphasis upon needs that arise from changes in family relationships, living
arrangements, income and employment.

## FOR GRADUATES

## 534. Special Topics in Child Development. (3:3:0) <br> (Formerly Problems in Child Development)

Readings in current research in child development; the role of the family members;
visits to preschool laboratories, clinics, special education classes.

## 350 GENERAL HOME ECONOMICS CURRICULUM

5336. Advanced Interpersonal and Family Relations. (3:3:0) (Formerly Problems of the Family)
Group processes; factors influencing personal family adjustments; methods and techniques of teaching and counseling.

## Courses in Home Management FOR UNDERGRADUATES

131. Management and Consumer Problems. (3:3:0)

Development of an understanding of the use of human and material resources as they relate to the achievement of goals.
232. General Home Management. (3:3:0)

Philosophy of home management; work simplification, planning for family financial security, and general management of all the family's resources.
331. Housing the Family. (3:1:4)

Housing as it relates to satisfying family living; developing an understanding of housing needs and values in relation to family goals.
333. Household Equipment. (3:1:4)

Selection, use and care of household equipment; includes kitchen and laundry planning.

## FOR UNDERGRADUATES AND GRADUATES

431. Advanced Housing for the Family. (3:1:4)

Prerequisite: H. Mgt. 331. New trends in housing, community and city development, emphasis on home ownership, legal procedures and financing.

## 432. Home Management Residence. (3)

Prerequisite: Senior standing in home economics. At least six weeks' residence, with supervised application of skills in all phases of home living, including the care of an infant. Students pay a fixed fee for room and board. In lieu of residence in the Home Management House, married students maintaining a home in the community and mature experienced homemakers may (with the permission of the dean) work on personal managerial problems under supervision.

## 433. Advanced Household Equipment. (3:1:4)

435. Advanced Consumer Problems. (3:3:0)

Emphasis on advertising, labeling, regulations and protection; savings and investments, credit, wills, insurance and social security.

## FOR GRADUATES

511. Studies in Home Management. (1:1:0)

May be repeated for credit.
531. Advanced Home Management. (3:3:0)

Current problems in management, consumption, housing and household equipment.

## General Home Economics

## Bachelor of Science Degree in Home Economics General Home Economics

I. Foundation courses in schools other than Home Economics to provide breadth in liberal education (46-48 semester hours).
II. Courses to provide basic concepts in personal and family living ( 20 semester hours).
III. Additional courses in the School of Home Economics (24 semester hours) :

Ap. A. 331-Interior Design
Ch. D. \& F.R. 233-Child Growth \& Development
Ch. D. \& F.R. 433-Family Relations
Cloth. \& Text. 231-Textiles for the Consumer
Cloth. \& Text. 237-Apparel Selection and Design
Food \& Nutr. 331-Meal Management
H. Mgt. 432-Home Management Residence
H. Mgt. Elective- 3 semester hours
IV. Courses in the School of Home Economics and in other schools of the College to support major field ( 27 semester hours):

Food \& Nutr. 334-Human Nutrition
Cloth. \& Text. 332-Dressmaker Tailoring and Design
Electives in home economics- 6 semester hours
Philosophy or religious education- 3 semester hours
Electives not in home economics- 6 semester hours
Speech, radio, TV, or journalism-3 semester hours
Music, art appreciation, or anthropology-3 semester hours
V. Electives in any school of the College to complete 127 semester hours.

## GENERAL HOME ECONOMICS CURRICULUM

## Bachelor of Science in Home Economics



* For science requirements, see Page 354.
** Hist. 330 may be substituted for Hist. 231 or 232.


## Requirements In the School of Home Economics for the Bachelor of Science Degree in Home Economics 127 SEMESTER HOURS REQUIRED FOR GRADUATION

| Requirements in Home Economics | Curriculum Requirements for the Majors in Home Economics |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Applied Arts | Clothing and Textiles |  |  | Food and Nutrition | Home Economics Education | Home and Family Life |  | General Home Economics |
|  |  | Option: Fashion | Option: <br> Merchandising | Option: Technology |  |  | Option: Child <br> Development and <br> Family Relations | Option: Home Management |  |
| Applied Arts | $\begin{gathered} 112,131,133 \\ 328,331, \text { plus } \\ \text { electives to } \\ \text { complete } 24 \text { hrs. } \end{gathered}$ | $\begin{gathered} 131, ~ 231, ~ \\ 331-11 \text { hrs. } \end{gathered}$ | 131, 328, elec-tive-8 hrs. | $\begin{aligned} & 131,328, \\ & \text { elective- } 8 \mathrm{hrs} . \end{aligned}$ | 131, 331-6 hrs. | 131, 331-6 hrs. | 131, 337 or 338-6 hrs. | 131, $331-6 \mathrm{hrs}$. | 131, 331-6 hrs. |
| Clothing and Textiles | $\begin{aligned} & \text { 131, } 231,237 \\ & 9 \text { hrs. } \end{aligned}$ | $\begin{gathered} 131,231,332, \\ 237,433,436 \\ \text { plus electives } \\ \text { to complete } \\ 24 \mathrm{hrs} . \end{gathered}$ | 131, 231, 332, <br> 237, 334, 433 <br> plus electives to complete 24 hrs. | $131,231,232$, 237, 431, 433, 438 plus electives to complete 24 hrs. | 131, 231-6 hrs. | $131,231,332 \text {, }$ $237-12 \mathrm{hrs}$ | 131, 231-6 hrs. | $\begin{array}{lll} 131, ~ 231, ~ & 332, \\ 233 & 12 & \text { hrs. } \end{array}$ | $\begin{aligned} & 131,231, \\ & 237-12 \text { hrs. } \end{aligned}$ |
| Food and Nutrition | 131, $334-6 \mathrm{hrs}$. | 131, 334-6 hrs. | 131, 334-6 hrs. | 131, 334-6 hrs. | ```131, 231, 331, 334, 347, plus electives to complete 24 hrs.``` | $\begin{gathered} \text { 131, } 331,334 \\ 9 \text { hrs. } \end{gathered}$ | 131, 334-6 hrs. | $\begin{array}{ccc} 131,331, & 334 \\ 425-11 & \text { hrs. } \end{array}$ | $\begin{gathered} \text { 131, } 331,334 \\ 9 \mathrm{hrs.} \end{gathered}$ |
| Home Economics Education | 333, 411-4 hrs. | 333, 411-4 hrs. | $333,411-4 \mathrm{hrs}$. | 333, 411-4 hrs. | 333, 411-4 hrs. | $\begin{gathered} 331,432,411, \\ \text { 426, 461, plus } \\ \text { electives to } \\ \text { complete } 18 \text { hrs. } \end{gathered}$ | 333, 411-4 hrs. | 333, 411-4 hrs. | $\text { 331, } \underset{\substack{\text { 7-hrg. }}}{411,}$ |
| Home and <br> Family Life <br> Child Develop- <br> ment and <br> Family <br> Reiations | $\begin{gathered} 112, \\ 7 \\ 7 \mathrm{hrs} . \end{gathered}$ | $112,131,$ <br> elective-7 hrs. | 112, 131, <br> elective-7 hrs. | $\begin{aligned} & \text { 112, } 131, \\ & \text { elective-7 hrs. } \end{aligned}$ | $\begin{aligned} & 112,131, \\ & \text { electlve-7 hrs. } \end{aligned}$ | $\begin{gathered} 112,131,233 \\ \text { or } 431,433 \\ 10 \mathrm{hrs} . \end{gathered}$ | 112, 131, 233 232 or 235 , 433,435 or 439 plus electives to complete 24 hrs. | $\begin{aligned} & 112,131,233 \\ & 433-10 \mathrm{hrs} . \end{aligned}$ | 112, 131, 233, $433-10 \mathrm{hrs}$. |
| Home Management | 131, elective 6 hrs . | 131, elective 6 hrs . | 131, elective 6 hrs . | 131, 432-6 hrs. | 131, elective 6 hrs . | 131, 432, elective - 9 hrs . (Elective in either area to complete 22 hrs.) | 131, 432, elective - 9 hrs . | $\begin{gathered} 131,232,331, \\ 333,431,432, \\ 433,435 \\ 24 \mathrm{hrs} . \end{gathered}$ | 131, 432, elective - 9 hrs . |
| Total Hours <br> Required in <br> Home Economles | 56 | 58 | 55 | 58 | 53 | 67 | 55 | 67 | 53 |

Titles and descriptions of the courses listed above, as well as for all other home economic courses are given in the departmental section beginning on Page 326. The chart on the next page shows the requirements outside the School of Home Economics.

Requirements Outside the School of Home Economics for the Bachelor of Science Degree in Home Economics

| Requirements Outalde of Home Economics | Curriculum Requirements for the Majors in Home Eiconomics |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Applled Arts | Clothing and Textiles |  |  | Food and Nutrition | Home Economics Education | Home and Family Life |  | General Home Economics |
|  |  | Option: <br> Fashion | Option: Merchandising | Option: Technology |  |  | Option: Child Development and Family Relations | Option: Home Management |  |
| Finglish | $\begin{gathered} \hline 131-132 ; \underset{\text { hrs. }}{231-232} \\ 12 \end{gathered}$ | $\begin{array}{\|c\|} \hline 131-132 ; \\ 12 \\ \text { hrs. } \end{array}$ | $\begin{array}{\|c\|} \hline 131-132 ; ~ 231-232 \\ 12 \mathrm{hrs} . \end{array}$ | $\begin{gathered} \hline 131-132 ; 231-232 \\ 233 \text { or } 234 \\ 15 \mathrm{hrs} . \end{gathered}$ | $\begin{array}{\|c\|} \hline 131-132 ; 231-232 \\ 12 \mathrm{hrs} . \end{array}$ | $\begin{array}{\|c\|} \hline 131-132 ; \\ 12 \\ \text { hrs. } \end{array}$ | $\begin{array}{\|c\|} \hline 131-132 ; \mathrm{hrs}^{231-232} \\ 12 \mathrm{hrs} \end{array}$ | $\begin{gathered} \hline 131-132 ;{ }_{2}^{231-232} \\ 12 \mathrm{hrs} . \end{gathered}$ | $\begin{array}{\|c} 131-132 ; \\ 12 \mathrm{hrs} . \end{array}$ |
| History | 231-232** 6 hrs . | 231-232*-6 hrs. | 231-232*-6 hrs. | 231-232*-6 hrs. | 231-232*-6 hrs. | 231-232*-6 hrs. | 231-232*-6 hrs. | 231-232*-6 hrs. | 231-232** 6 hrs . |
| Government | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. | 231-232-6 hrs. |
| Physical Education or Band | 4 hrs . | 4 hrs . | 4 hrs . | 4 hrs . | 4 hrs . | 4 hrs . | 4 hrs . | 4 hrs . | 4 hrs . |
| Accounting |  |  | $234-3 \mathrm{hrs}$. |  |  |  |  |  |  |
| Education |  |  |  |  |  | 332, 334-6 hrs. | $4344-3 \mathrm{hrs}$. |  |  |
| Marketing |  |  | $\begin{gathered} 332, \quad 234,335 \\ 9 \mathrm{hrs.}^{3} . \end{gathered}$ |  |  |  |  |  |  |
| Mathematics |  |  |  | 133, 238-6 hrs. |  |  |  |  |  |
| Music, Art Appreciation or Anthropology |  |  |  |  |  |  |  |  | Elective-3 hrs. |
| Religious Educations or Philosophy |  |  |  |  |  |  |  |  | Elective-3 hrs. |
| Speech, Radio, TV, Journalism |  |  |  |  |  |  |  | Speech 338 Electives-6 hrs. | $\begin{gathered} \text { Electives- } \\ 3 \mathrm{hrs} . \\ \hline \end{gathered}$ |
| Sciences | Elect 18-20 <br> hrs. from at least 2 of the 3 science groups below, Including the courses mark- | Elect 18-20 <br> hrs, from at <br> least 2 of the 3 science groups below, including the courses marked "required' | Elect 18-20 hrs. from at least 2 of the 3 science groups below, Including the courses marked "required' | ```26 hrs. as specified in chart on Page 331``` | $\begin{aligned} & \text { 27-28 hrs. as } \\ & \text { specified in } \\ & \text { chart on } \\ & \text { Page } 337 \end{aligned}$ | Elect 18-20 hrs. from at least 2 of the 3 sclence groups below, including the courses marked ' $r$ required' | Elect 18-20 hrs. from at least 2 of the 3 science groups below, including the courses marked 'required' | Elect $\mathbf{1 8 - 2 0}$ hrs. from at least 2 of the 3 sclence groups below, Including the courses marked "required' | Elect 18-20 hrs. from at least 2 of the 3 science groups below, including the courses marked "required" |
| Total Hours Required Outside Home Eco. | 46-48 | 48-50 | 58-60 | 63 | 55-56 | 52-54 | 49-51 | 52-54 | 55-57 |

## ELECTIVE HOURS AVAILABLE IN ANY SCHOOL OF THE COLLEGE



- Hist, 330 may be substituted for 3 to 6 hours of required history.


## Reserve Officers' Training Corps

All physically fit male students of the freshman and sophomore years, except veterans, are required to elect either band, physical education, or military or air science (ROTC). The Departments of the Army and the Air Force each maintain a senior division ROTC unit at Texas Technological College. The ROTC has the mission of developing officers for the United States Army and Air Force and of providing a corps of well-educated, well-rounded reserve officers to enable the Army and Air Force to expand with lightning speed in a national emergency. Consequently the ROTC program has been designed to "develop the qualities of leadership" in college-trained men. Outstanding ROTC graduates may be recommended for Regular Army or Air Force commissions. The Army offers a general military science curriculum which qualifies graduates for appointment in any one of 14 branches. The Air Force curriculum is a generalized course qualifying graduates for flying or nonflying appointments in the Air Force. Students enrolled in the ROTC program are not active members of the Armed Forces of the United States.

## Requirements for Enrollment and Continuance

Basic Course. To enroll in the ROTC program the student must: be a citizen of the United States, be physically qualified as prescribed by the Department of the Army or Air Force, be accepted by the institution as a regularly enrolled student, be not less than 14 years of age and not over 23 at the time of enrollment, agree to complete the basic course once enrolled unless released by mutual agreement between the student's academic dean and Professor of Military or Air Science. If a student in the basic ROTC program desires, he may be deferred from selective service for as long as he remains in the program, although his obligation to register with his local draft board remains unchanged. Midyear enrollees are accepted in the ROTC programs. Upon completion of the basic course a student may continue in the advanced course ROTC if he so desires, provided he meets the requirements listed in the following paragraph.

Advanced Course. To be eligible to continue in the advanced ROTC program a student must: successfully complete the basic course (veterans and students who have had previous ROTC training may reccive credit, based on length of service or training, for all or part of the basic course; credit for high school ROTC may be granted for 1 year of the Army basic course), be less than 27 years of age, successfully complete such general survey or screening tests as are required, be physically qualified as prescribed by the Department of the Army or Air Force, be a regularly enrolled student with a grade-point average of at least 2.00 , be selected by the Professor of Military Science or Air Science to continue in the program. Upon admission to the advanced course program the student must agree in writing to complete the course of instruction unless released by the Department of the

Army or the Department of the Air Force. He also agrees to accept a commission as a second lieutenant, if tendered, upon completion of ROTC training. Successful completion of the advanced course, once begun, is a requirement for graduation unless the student is officially released by the Professor of Military Science or Air Science.

The ROTC advanced contract student whose attendance at school is interrupted will be discharged from the corps. Upon his return to school, he must apply for re-entry into the corps and, if accepted, complete the program as a requirement for graduation.

Advanced course students are automatically deferred from the draft on signing the advanced-course contract, and agree to serve as follows:

Army: Six months or 2 years on active duty. The length of active duty depends upon the desires of the individual and the needs of the Army at the time of commissioning.

Air Force: Four years on active duty if commissioned in a nonflying capacity or 5 years on active duty if commissioned and accepted for flight training.

## Financial Assistance

Advanced course ROTC students receive pay and allowances that total approximately $\$ 700$ for the 2 -year period. This amount is derived from the ROTC subsistence allowance and summer camp pay. (During the past year this amounted to about $\$ 2.50$ per hour of military or air science instruction plus summer camp pay.)

## Uniforms and Equipment

All ROTC students are furnished officer-type uniforms, including overcoat or raincoat and shoes, without cost to the student. This uniform and other property remain the property of the United States or the College. Each student is required to maintain his uniform by cleaning and proper care and to return it to the ROTC supply office in the event he leaves school or becomes separated from the ROTC for other reasons. All advanced students who receive a commission will receive a $\$ 300$ uniform allowance when called to active duty. Air Force students will retain their ROTC uniforms as personal property.

The federal government provides the necessary texts and equipment to carry out the ROTC program at no cost to the student.

## Discipline

Texas Technological College is not a military school. Discipline in the Military and Air Science Departments is achieved by instilling pride in the individual student and by a system of demerits for minor offenses, such as failure to properly maintain equipment and personal appearance. These demerits may be removed by constructive study or other work in the department. Unremoved demerits will lower the student's final grades.

## Summer Camp

Members of advanced ROTC are required to attend one summer camp, normally between their junior and senior years. All students going to summer camp receive mileage at the rate of 5 cents per mile for the round trip from the College or their homes; are furnished food, housing, uniforms, and medical attention at govemment expense; and are paid at the rate of $\$ 78$ per month while attending camp. Army ROTC summer camp begins about June 15 each year and is of six weeks' duration. Air Force ROTC has two summer camps, each of four weeks' duration. The first camp begins early in June and the second early in August. Students are required to attend only one camp. The military training at camp will consist of both practical and theoretical instruction.

## Academic Credit

Credit toward a degree is granted as follows for completion of the course:

| In Military Science: |  |  |  |
| :---: | :---: | :---: | :---: |
| Basic | Fall Sem. | Spring Sem. | Total |
| Fredit Hours |  |  |  |
| Second year | 2 hour | 1 hours | 2 hours |

In Air Science:

| Basic | Fall Sem. | Spring Sem. | Total Credit Hours |
| :---: | :---: | :---: | :---: |
| First year | 1 hour | 2 hours | 3 |
| Second year | 2 hours | 1 hour | $\mathbf{3}$ |
| Advanced |  |  |  |
| First year | 3 hours | 3 hours | 6 |
| Second year | 1 hour | 1 hour | 2 |
|  |  |  | 14 |

## Awards and Recognition

Army. Awards presented by the Department of Military Science during the school year are:

Military Excellence Ribbon. Awarded to the outstanding basic cadet in each company.

The President's Award. Awarded to a fourth year ROTC student based on academic standing and demonstrated leadership ability as evidenced by his contributions to cadet activities and student life during his college career. The award is presented by the President of the College.

Academic Achievement Ribbon. Awarded each semester to cadets who are scholastically in the upper 10 percent of their military class.

Student Pilot's Badge. Half wing awarded to cadets enrolled in ROTC flight training program. Full wings are awarded to cadets successfully completing the program.

## 358 ROTC AWARDS

Distinguished Military Students. Students possessing outstanding qualities of leadership, high moral character, and definite aptitude for the military service, whose academic standing is in the upper half of their college class and the upper third of ROTC, are considered for designation as Distinguished Military Students. Official designation and award of the DMS badge is made early in the senior year.

Distinguished Military Graduates. Distinguished Military Students who maintain their high standard of performance until graduation are designated Distinguished Military Graduates and are eligible to apply for Regular Army commissions.

In addition to the above, Army cadets are eligible for the following awards:

Texas Sons of the American Revolution Medal of Honor
Society of American Military Engineers Award of Merit
National Defense Transportation Association Medal
National Defense Supply Association Award
Dr. Ralph Mershon Memorial Award
Superior Cadet Ribbon
American Ordnance Association Scholarship Key
Association of the United States Army Medal
Armed Forces Communications and Electronics Medal
The Army and Navy Legion of Valor of the United States of America Bronze Cross

The Reserve Officers Association Medal
Air Force. The Professor of Air Science annually identifies those students in Air Science IV who have distinguished themselves in both academics and leadership. Those selected are awarded the Air Force ROTC Distinguished Cadet Badge. This is considered the highest honor that can be won by an Air Force ROTC cadet and in many cases leads directly to a Regular Air Force commission. The College President annually awards the President's Trophy to the outstanding fourthyear ROTC student based on academic standing and his contribution to student life. In addition, the following awards are presented: the Professor of Air Science Leadership Award (1 per semester), Air Force Association Award, the Chicago Tribune Gold and Silver Medals (1 of each), the Convair Award, Reserve Officers Association Medal, Sons of the American Revolution Medal, Society of American Military Engineers Gold Medal, and the Armed Forces Communications and Electronics Association Award.

A number of other awards are given by such companies as North American Aviation, McDonnell Aviation, and General Dynamics Corporation.

The Professor of Air Science also presents an annual award to the outstanding member of the Angel Flight.

Participation awards are given for active membership in Sabres, Rifle Team, and Arnold Air Society.

## Flight Training

During their final year in Army or Air Force ROTC, selected advanced course students may receive flight training in a standardized
flight instruction program approved by the Federal Aviation Agency. The course consists of 35 hours of ground instruction and $361 / 2$ hours of flight instruction, both given on an extracurricular basis. No academic credit is received, but students completing the course are given the opportunity to qualify for a Federal Aviation Agency private pilot's certificate.

## Band

The Army ROTC maintains a band. The band is trained by the College Music Department and is an integral part of the Army ROTC program. Those students with prior band experience will be assigned to the band and will maintain practice periods and play during the normal drill period. A large number of band instruments are furnished by the federal government; however, students owning instruments are encouraged to use them.

## Military Science

(Army ROTC)

Professor:<br>Col. Brown, Infantry<br>Associate Professors:<br>Lt. Col. Buechler, Artillery; Maj. Pender, Engineers<br>Assistant Professors:<br>Capt. Kampschror, Signal Corps;<br>Capt. Turain, Armor<br>Non-Commissioned Officer-Instructors:<br>SFC Tinker; S/Sgt. Alderman<br>Administrative Assistants:<br>SFC Sharp; S/Sgt. Mabray;<br>Sgt. Stroud

## Program

The Army ROTC program consists of two parts:
Basic Course. A two-year course consisting of 1 hour of classroom instruction and 1 hour of drill per week during the freshman year, and 2 hours of classroom instruction and 1 hour of drill per week during one semester of the sophomore year. A college-related course, History of Military Affairs (History 3317), is substituted for one semester of military science academics during the sophomore year.

Advanced Course. Consists of 3 hours of classroom instruction and 1 hour of drill per week during the first semester of the junior and senior years, and 2 hours of classroom instruction and 1 hour of drill per week during the second semester of the junior and senior
years. In addition to the classroom instruction and drill, each advanced course student will attend one six-week summer camp.

Upon graduation the student who has successfully completed the advanced course may be tendered a commission as a second lieutenant in the United States Army Reserve. Outstanding military science students who are selected as Distinguished Military Graduates may, like West Point graduates, be offered commissions as second lieutenants in the Regular Army. Students may be commissioned in one of the following 14 branches of the Army: Infantry, Armor, Artillery, Corps of Engineers, Signal Corps, Medical Service Corps, Finance Corps, Ordnance Corps, Military Police Corps, Adjutant General Corps, Transportation Corps, Quartermaster Corps, Chemical Corps, and Army Intelligence and Security. Branch assignment is based on the student's preference, his academic training, and the needs of the service at the time of commissioning.

## Army ROTC Military Science Curriculum

The Military Science curriculum is designed to prepare students for commissions as officers in the various arms and services of the United States Army, both regular and reserve. There is no specialization during the ROTC course; all students pursue the same subjects. The student receives specialized training in the techniques and duties of the various branches at the branch schools when ordered to active duty after graduation and commission.

The basic purpose of Army ROTC is to develop a cadet's qualities of leadership. This principle lies behind every hour of ROTC training. Specifically the training gives the cadet:

1. An understanding of human behavior, together with proved methods for motivating others.
2. Indoctrination in the techniques of leadership-tested practices and devices which tend to make him an effective leader.
3. Opportunity to apply the principles of leadership to everyday problems.

## 111. Organization of the Army and Individual Weapons Training.

Prerequisite: U.S. citizenship, physical, mental, and moral qualifications as prescribed by the Department of the Army. Organization of the Army and ROTC; small arms characteristics, functioning, and employment; marksmanship training on the rifle range.

## 112. The U.S. Army and National Security. (1)

Prerequisite: Same as for M.S. 111. National defense policy; missions, capabilities, and role of the Army in conceivable types of warfare.

## 221.

Leadership Laboratory.
Prerequisite: M.S. 111-112 or equivalent. School of the soldier and exercise of command.
222. Map and Aerial Photography and Introduction to Operations and Basic Tactics. (2)
Prerequisite: M.S. 111-112 or equivalent. Reading and employment of maps and aerial photographs; principles of offensive and defensive combat.
321. Leadership, Military Teaching, and Branches of the Army. (2)

Prerequisite: M.S. 221-222 or equivalent. Basic psychology of leadership and its application; methods and techniques of military instruction and familiarization with the missions and organizations of the various combat and technical branches of the U.S. Army.
322. Small Unit Tactics and Communications
(2)

Prerequisite: Same as for M.S. 321. Principles of offensive and defensive combat operations and their application to the units of the Infantry division battalion; principles of communications and communications systems used in the battalion to include use of radio equipment, wire equipment, and field messages.
421. Military Operations, Logistics, and Administration. (2)

Prerequisite: M.S. 321-322. Military staff organization and function; principles and uses of military intelligence; mission of supply, supply doctrine, and classes of supply; the Army system of motor transportation and preventive maintenance; fundamentals of Army administration.

## 422. Military Law, Role of the U.S. in World Affairs, and Service Orientation.

Prerequisite: Same as for M.S. 421. Fundamental concepts of military justice in the armed forces; basic principles and methods of procedures for pretrial investigations, conduct of trials, and the principles of nonjudicial punishment; analysis of the United States as to its economic power, war potential, and its aptitude for conduct of war; effect of U.S. power and policy on the present world situation; orientation on service life for future officers.

## Air Science

## (Air Force ROTC)

Professor:<br>Lt. Col. Hull<br>Associate Professor:<br>Maj. Rives<br>Assistant Professors:<br>Maj. Gantz, Capt. Jones,<br>Capt. Webb, Capt. Wilson Administrative Assistants:<br>T/Sgt. Mize, S/Sgt. Davis,<br>S/Sgt. Finchum, S/Sgt. Lee,<br>$\mathrm{S} / \mathrm{Sgt}$. Oman.

The mission of the Air Force ROTC is to develop in selected college students those qualities of leadership and other attributes essential to their progressive advancement to positions of increasing responsibility as commissioned officers in the United States Air Force.

The purposes and specific objectives of the Air Force ROTC program are:
a. To select and motivate cadets to serve as career Air Force officers in fields as specifically required by the United States Air Force.
b. To develop in cadets by precept, example, and participation the attributes of character, personality, and attitudes essential for leadership.
c. To develop in cadets an interest in, and understanding of, the Air Force mission, organization, operations, problems, and techniques.
d. To provide that military education and training which will give cadets a general background and sound foundation on which to build an officer career.

The Air Force ROTC program consists of two parts, the basic course and the advanced course. Courses are taught by Air Force officers on active duty who are assigned to the College as faculty members.

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## The Basic Air Force ROTC Program

The basic program is titled Air Age Citizenship Education and introduces the student to the principles of leadership, the evolution of aerial warfare, principles of flight, organization and mission of the Air Force, and aerospace missiles and vehicles. In the fall semester of his freshman year the student includes in his schedule an ROTC course in leadership laboratory and an elective drawn from the College curriculum. In the spring semester he attends air science classes and a leadership laboratory period. In the fall semester of his sophomore year the student attends air science classes and a leadership laboratory and in the spring takes leadership laboratory and another elective. Electives may be chosen from almost any department of the College, subject to approval by the Professor of Air Science, but courses in the sciences or social sciences which will broaden the background of the future officer are especially recommended.

## The Advanced Air Force ROTC Program

The advanced program is titled Air Force Officer Development. In both semesters of his junior year the student takes 4 hours in the classroom and one leadership laboratory period. In both semesters of their senior year students take 1 hour of classroom work and one leadership laboratory period per week. During their senior year students enrolled in the advanced program are required to take Government 3361 and 4362. Attendance at a four-week summer camp at an Air Force base is also required at the end of the junior year. Under exceptional circumstances summer camp may be delayed until completion of the senior year.

Entrance to the advanced course is limited to those who are regularly enrolled in the College, who have completed the necessary screening and testing, and who have completed the basic course or receive credit for prior service. Students who have had honorable active service in the Army, Navy, Marine Corps, Air Force, or Coast Guard may request a waiver of the basic course as a requirement for entrance into the advanced course.

Students who complete the advanced course are tendered commissions as second lieutenants in the United States Air Force Reserve. Commissions in the Regular Air Force are offered each year to those cadets in the ROTC who complete the advanced course with outstanding records.

## Air Science Curriculum

## 111. Air Science Leadership. (1)

Prerequisite: Physical and mental qualifications prescribed by the Department of the Air Force. Introduction to leadership principles and techniques through participation and study of the basic elements of military discipline.
122. Foundations of Air Power. (2)

Prerequisite: Physical and mental qualifications prescribed by the Department of the Air Force. An introductory examination of the factors of aerospace power, major ideological conflicts, requirements for military forces in being, responsibilities of citizenship, development and traditions of the military profession, role and attributes of the professional officer in American democracy, organization of the armed forces as factors in the preservation of national security, and the United States Air Force as a major factor in the security of the free world.

## 223. World Military Systems.

Prerequisite: A. S. 122 or equivalent. A comparative study of world military forces to include free world land and naval forces, free world air forces, Communist milltary systems, and trends in the development and employment of military power.

## 212. Air Science Leadership. (1)

Prerequisite: A. S. 122-223 or equivalent. Intermediate principles and practices of leadership involved in controlling units; introduction to supervisory problems of the leader.
335. Growth and Development of Aerospace Power. (3)

Prerequisite: A. S. 122-223 or equivalent. A course concerning the nature of war; development of air power in the United States; mission and organization of the Defense Department; Air Force concepts, doctrine, and employment.
336. Growth and Development of Aerospace Power. (3)

Prerequisite: A. S. 335. Astronautics and space operations; and the future development of aerospace power. Includes the United States space programs, vehicles, systems, and problems in space exploration.

## 411. Weather and Navigation. (1)

Prerequisite: A. S. 335-336. Weather and navigational aspects of airmanship, such as temperature, pressure air masses, precipitation, weather charts, navigation; for advanced cadets enrolled in the flight instruction program.

## 4111. Staff Organization and Principles of Staff Work.

Prerequisite: A. S. 335-336. Theory and application of the principles of staff work; includes both classroom lecture and field work in preparing a senior cadet for duty with the Air Force as a junior officer; for advanced cadets not enrolled in the flight instruction program.
412. Air Force Officer Development. (1)

Prerequisite: A. S. $335-336$ and 411 or 4111. A study of materials that assist senior cadets to make the transition rapidly from students to effective Air Force active duty officers.

Two college courses, Government 4362 (Political Geography) during the fall semester and Government 3361 (International Politics) during the spring semester, complete the Air Science IV requirements.

# Division of Extension 

Jacob H. Millikin, Director

For those who cannot attend regularly scheduled classes the Texas Technological College Division of Extension offers approximately 200 courses by correspondence. Correspondence and extension class study courses have been approved by the Association of Texas Colleges and Universities. The Division of Extension is a member of the National University Extension Association.

## Correspondence Department

The following general regulations govern correspondence courses:
The control of a student's program by his academic dean includes correspondence and extension work, and a student in residence at this college may begin or continue correspondence or extension work only with the approval of his academic dean.

Correspondence courses taken for college credit are equivalent in content to corresponding residence courses and require a comparable amount of work. Each such correspondence course for which college credit is received must be concluded by a final examination taken under the supervision of a designated examiner at an approved college.

A student at Texas Technological College may do 18 semester hours of his work for a bachelor's degree through correspondence courses. No student may register for or complete a correspondence course during the last semester or summer term before graduation, unless registration is approved by his academic dean because of schedule conflict or the absence of the needed course in the residence schedule. In any event, a maximum of 6 hours of the final semester's work may be completed by correspondence, providing the work does not constitute a part of the major or minor requirements toward the degree.

If he is enrolled full time in both long and summer sessions, and carries a normal course load, a student pursuing a degree program at Texas Technological College may not complete more than 6 semester hours by correspondence study during any 12 -month period beginning Sept. 15. If his course load is more than 15 hours per semester, or 6 hours each summer term, the dean of the student's school may reduce the above maximum of 6 hours by correspondence. If the student should not be enrolled during any semester, or during either or both terms of the summer session, the dean may permit a proportionate increase in the amount of correspondence work to be completed in any 12month period beginning Sept. 15.

If a student receives a grade of $F$ in a course taken in residence at this college, he may not subsequently take that course by correspondence. Failure in residence of a course for which there are alternate choices in meeting degree requirements precludes the taking of the alternate course, or courses, by correspondence.

The registration fee for each semester hour is $\$ 10$, and thus a course carrying 3 semester hours' credit costs $\$ 30$. All fees are payable in advance and are not refundable. A correspondence course may not be exchanged for another course or transferred to another person.

If a course carries 2 semester hours' credit, it may not be completed until 30 days or more from the date of registration; a course carrying 3 semester hours' credit may not be completed earlier than 45 days from the date of registration.

Correspondence study courses are available in the following schools and departments:

## AGRICULTURE

Agricultural Economics.

## ARTS AND SCIENCES

Biblical Literature; Biology; Education and Philosophy; English; Foreign Languages (French, German, Greek, Latin, and Spanish); Government; Health, Physical Education, and Recreation; History and Anthropology; Mathematics; Psychology; Sociology.

## BUSINESS ADMINISTRATION

Accounting; Finance; Management; Marketing; Business Administration and Secretarial Administration.

## High School

College entrance (or high school credit) courses are available in the following fields: agriculture, business, English, foreign languages (French, German, Latin, and Spanish), history and social sciences, mathematics, and science.

## Extension Department

At the request of a sufficient number of students, extension classes may be organized in convenient centers. The number of students required to justify the organization of such a class increases with the distance from the campus. Both graduate and undergraduate work is available.

Registration fees for extension class courses are $\$ 10$ per semester hour credit. Laboratory fees may be required for courses entailing laboratory work. All fees are paid in advance and are not refundable after a course is started.

A maximum of 6 semester hours of extension class credit will be allowed toward a master's degree. One-fourth of the work for a bachelor's degree may be earned through extension class and/or correspondence study work (provided not more than 18 semester hours are done through correspondence study alone).

Inquiries concerning specific courses should be addressed to the Division of Extension, Texas Technological College, Lubbock, Texas.

# Official Directory 

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## Officers of Administration

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121 Administration Building.
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21 Social Science Building.
RAY CURTIS JANEWAY, B.A., B.S. in L.S., M.S., Librarian. Library Office.

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LEWIS NORTEN JONES, B.S., M.A., Dean of Men. 163 Administration Building.
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CLAUDE ADRIAN VAUGHAN, B.A., M.J., Director of Public Information. 117 Journalism Building.
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## Assistant Officers of Administration

JAMES WAYLAND BENNETT, B.S.. M.S., Ph.D., Associate Dean of Agriculture. 201-A Agriculture Building.
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JESSE EARL CRAWFORD, B.S., Central Stores and Property Manager. Physical Plant Building.
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D. M. McELROY, Director of Educational Television. Television Station.
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[^56]DONALD LEE RENNER, B.B.A., M.B.A., Assistant Dean of Admissions and Registrar. 160 Administration Building.
HOLLIS ROYCE SMITH, B.B.A., Chief Accountant. 111 Administration Building.
VIRGINIA TINER SNELLING, B.A., Head of Payroll Department and Employee Benefits. 110 Administration Building.
THOMAS PAUL STOVER, B.A., M.S., Adviser to Fraternities, to Foreign Students, and on Student Loans. 163 Administration Building.
JAMES RICHARD TARTER, B.S., M.S., Director of Undergraduate Admissions. 158 Administration Building.
FRANK MILLETT TEMPLE, B.S., B.S. in L.S., M.A., Associate Librarian. Library.
WELBORN KIEFER WILLINGHAM, B.A., M.Ed., Assistant Dean of Men in Charge of Residence Hall Supervision for Men.
147 Bledsoe Hall.

## Emeritus Officers of Administration and Faculty

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SETH THOMAS CUMMINGS, Purchasing Agent, Emeritus.*
WILLIAM THOMAS GASTON, Business Manager, Emeritus.
WILLIAM BRYAN GATES, Dean of the Graduate School, Emeritus, 1925, 1963.
B.S., Millsaps College, 1918, M.A., Vanderbilt University, 1921; M.A., University of Michigan, 1927; Ph.D., University of Pennsylvania, 1932.
WENZEL LOUIS STANGEL, Dean of Agriculture, Emeritus, 1925, 1958.
B.S., Texas A \& M University, 1915; M.S., University of Missouri, 1916; LL.D., Texas A \& M University, 1956.
MARGARET WATSON WEEKS, Dean of Home Economics, Emeritus, 1925, 1953.
B.S., Teachers College, Columbia University, 1922; M.S., 1925.

OTTO VINCENT ADAMS, Professor of Civil Engineering, Emeritus, 1927, 1955; Dean of Engineering, 1932-1949.
B.S. in C. and I.E., Colorado State University, 1918; M.S.E., University of Michigan, 1924; D.S., Colorado State University, 1945; Reg. Prof. Engr. (Texas).
VIVIAN JOHNSON ADAMS, Professor of Home Economics Education, Emeritus, 1928, 1962.
B.S., Southwest Texas State College, 1924; M.A., Columbia University, 1927. LOUISE CRAWFORD ALLEN, Associate Professor of Journalism, Emeritus, 1928, 1963. B.A., Southern Methodist Universtity, 1924; M.A., University of Missouri, 1940.

CHARLES VICTOR BULLEN, Professor of Electrical Engineering, Emeritus, 1932, 1960. B.S. in E.E., The University of Texas, 1920; M.S. in E.E., Massachusetts Institute of Technology, 1927; Reg. Prof. Engr. (Texas).
WILLIAM MOORE CRAIG, Professor of Chemistry, Emeritus, 1926, 1958.
B.A., Southwestern University, 1906; M.A., 1907; M.A., The University of Texas, 1916; Ph.D., Harvard University, 1927; Reg. Prof. Engr. (Texas).
CHARLES DUDLEY EAVES, Professor of History, Emeritus, 1925, 1959.
B.A., The University of Texas, 1916; M.A., University of Chicago, 1923; Ph.D., The University of Texas, 1943.
MABEL DEANE ERWIN, Professor of Clothing and Textiles, Emeritus, 1926, 1955.
B.S., Purdue University, 1913; M.A., Teachers College, Columbia University, 1925. EUNICE JOINER GATES, Professor of Foreign Languages, Emeritus, 1925, 1963.
B.A., Southwestern University, 1921; M.A., 1924; M.A., University of Michigan, 1927; Ph.D. University of Pennsylvania, 1933.
CARL HENNINGER, Associate Professor of Foreign Languages, Emeritus, 1926, 1954. B.A., Indiana University, 1907; M.A., University of Illinois, 1908.

CECIL HORNE, Professor and Head of the Department of Journalism, Emeritus, 1926, 1951.
B.A., Baylor University, 1908; B.A., Yale University, 1911.

JOHNNYE GILKERSON LANGFORD, Professor of Physical Education, Emeritus, 1925, 1955.
B.B.A., The University of Texas, 1924; M.A., University of Southern California, 1929 .
JONNIE MCCRERY MICHIE, Professor of Food and Nutrition, Emeritus, 1925, 1955. B.S., Columbia University, 1920; M.A., 1923.

RUFUS ARTHUR MILLS, Professor of English, Emeritus, 1926, 1951.
B.A., The University of Texas, 1914; M.A., 1923.

[^57]JAMES HAROLD MURDOUGH, Professor of Civil Engineering, Emeritus, 1925, 1962. B.S., Massachusetts Institute of Technology, 1916; M.S.E., University of Michigan, 1930; Reg. Prof. Engr. (Texas).
ANNAH JOE PENDLETON, Professor of Speech, Emeritus, 1927, 1961.
B.A., Texas Christian University, 1918; M.A., University of Iowa, 1931.

CHARLES BLAISE QUALIA, Professor of Foreign Languages, Emeritus, 1925, 1961. B.A., The University of Texas, 1916; M.A., 1921; Ph.D., 1932.

OSCAR ALLEN ST. CLAIR, Professor of Industrial Engineering, Emeritus, 1934, 1959. B.S., Illinois Institute of Technology, 1905; Reg. Prof. Engr. (Texas).

WILLIAM MACKEY SLAGLE, Professor of Chemistry, Emeritus, 1926, 1960.
B.A., Southwestern Universtity, 1916; M.A., The University of Texas, 1928.

FRED WINCHELL SPARKS, Professor of Mathematics, Emeritus, 1926, 1961.
B.A., Southwestern University, 1920; M.A., 1922; M.S., University of Chicago, 1924 ; Ph.D., 1931.
aLAN LANG STROUT, Professor of English, Emeritus, 1928, 1961.
B.A., Dartmouth College, 1918; M.A., University of Chicago, 1920; M.A. University of Wisconsin, 1923; Ph.D., Yale University, 1925.
EARL L. THOMPSON, Professor of Mathematics, Emeritus, 1928, 1951.
B.A., Kansas State Teachers College, 1908; M.A., University of Kansas, 1914; Ph.D., University of Chicago, 1928.
RALPH SYLVESTER UNDERWOOD, Professor of Mathematics, Emeritus, 1927, 1961.
B.A., University of Minnesota, 1916; M.A., 1917; Ph.D., University of Chicago, 1930.

THOMAS FERDINAND WIESEN, Professor of Economics, Emeritus, 1940, 1962.
B.S., Texas A \& M University, 1920; M.B.A., University of Pennsylvania, 1935.

WARREN WATSON YOCUM, Professor of Horticulture, Emeritus, 1937, 1963.
B.S., Northeast Missouri State Teachers College, 1923; M.A., University of Missouri, 1927; Ph.D., University of Nebraska, 1937.

## Faculty

First date indicates year of original appointment; second date, year of appointment to present position and rank.

ROBERT CABANISS GOODWIN, President, 1930, 1959.
B.A., Howard Payne College, 1917; M.A., The University of Texas, 1923; Ph.D., Harvard University, 1928.
BURL MONROE ABEL, Associate Professor of Finance, 1955.
B.S., University of Oklahoma, 1929; M.B.A., 1931; C.L.U.

JOE ALFRED ADAMCIK, Associate Professor of Chemistry, 1957, 1961.
B.S. in Chem., The University of Texas, 1951; M.A., 1954; Ph.D., University of Illinois, 1958.
ALONZO FRANKLIN ADKINS, Instructor in Electrical Engineering, 1963.
B.S., Texas Technological College, 1961; M.S., 1963.

MEREDITH EUGENE AKER, Instructor in English, 1962.
B.A., University of Tulsa, 1960; M.A., 1962.

SUZANNE SCRUGGS AKER, Instructor in Health, Physical Education, and Recreation for Women, 1962.
B.A., University of Tulsa, 1962.

HOWARD B. ALDERMAN, Staff Sergeant, United States Army, Instructor in Military Science, 1962.
BEATRICE WITTE ALEXANDER, Assistant Professor of Foreign Languages, 1945, 1961. B.A., Texas Woman's University, 1942; M.A., The University of Texas, 1946.

THEODOR WALTER ALEXANDER, Associate Professor of Foreign Languages, 1947, 1959. B.S., Texas Technological College, 1946; M.S., 1947.

ARCHIE CORNELICUS ALLEN, Assistant Professor of Biology, 1963.
B.A., University of North Carolina, 1955; M.A., 1958; Ph.D., University of Pittsburgh, 1961.
BONNIE L. ALLEN, Associate Professor of Agronomy, 1959.
B.S., Texas Technological College, 1948; M.S., Michigan State University of of Agriculture and Applied Science, 1951; Ph.D., 1960.
JAMES GEORGE ALLEN, Professor of English and Dean of Student Life, 1927, 1950. B.A., Southern Methodist University, 1924; M.A., Harvard University, 1928.

ROBERT DANIEL AMASON, Asssociate Professor of Marketing, 1963.
B.B.A., Texas A \& M University, 1951; M.B.A., 1958; Ph.D., University of Arkansas, 1963.
DIANE ELIZABETH ANDERL, Instructor in Spanish, 1963.
B.A., Wisconsin State College (Eau Claire), 1962; M.A., University of Iowa, 1963.

HUGH ALLEN ANDERSON, Associate Professor of Economics, 1939, 1947.
B.A., Hardin-Simmons University, 1928: M.A., 1929.

JOHN ARTHUR ANDERSON, Assistant Professor of Chemistry, 1961.
B.S., Colorado State University, 1952; M.S., 1954; Ph.D., Oregon State University, 1962.

ROBERT PAUL ANDERSON, Part-time Professor of Psychology, 1955, 1963.
M.A., University of Chicago, 1951; Ph.D., 1954.

THEODORE ANDREYCHUK, Professor and Head of the Department of Psychology, 1962. B.M., Michigan State University of Agriculture and Applied Science, 1943 ; M.A., University of Redlands, 1951; Ph.D., The University of Texas, 1954.

WILLIAM BURNSIDE ARPER, Professor of Geosciences, 1953, 1960.
B.S. in Geol., University of Oklahoma, 1940; M.S., 1942; Ph.D., University of Kansas, 1953.
CLIFFORD ASHBY, Associate Professor of Speech, 1963.
B.A., University of Iowa, 1950; M.A., University of Hawaii, 1953; Ph.D., Stanford University, 1963.
DONALD ASHDOWN, Professor of Entomology, 1952, 1956.
B.S., Utah State University of Agriculture and Applied Science, 1942; Ph.D., Cornell University, 1948.
THOMAS ANDREW ATCHISON, Assistant Professor of Mathematics, 1963.
B.A., The University of Texas, 1959; M.A., 1960; Ph.D., 1963.

CECIL IRVY AYERS, Professor of Agronomy, 1942, 1960.
B.S., Texas Technological College, 1936; M.s., 1944; Registered Plant Breeder (Texas).
MOHAMED MOHAMED AXOUB, Assistant Professor of Industrial Engineering, 1961. B.S., University of Cairo (Egypt), 1953; M.S., University of Iowa, 1955.

MARGUERITE SIVELLS BAILEY, Assistant Professor of Mathematics, 1942, 1959. B.S., Southeastern State College, 1930; M.A., The University of Texas, 1936.

TOD ATKINS BAKER, Instructor in Government, 1961.*
B.A., University of Alabama, 1957; M.A., University of Tennessee, 1959.

KENNETH SYE BALLEW, Instructor in Architecture and Allied Arts, 1961.*
B.Arch., Texas Technological College, 1960.

ALBERT BARNETT, Profeseor of Education, 1933, 1957.
B.S., George Peabody College for Teachers, 1916; M.A., 1917; Ph.D., 1926.

NOLAN ELLMORE BARRICK, Professor and Head of the Department of Architecture and Allied Arts, and Supervising Architect, 1953.
B.A., Rice University, 1935; B.S. in Arch., 1936; M.A., 1937; Reg. Arch. (Texas).

OLIVER LOYD BASFORD, Assistant Professor of Physics, 1956. **
B.A., The University of Texas, 1919; M.A., 1926.

MOHAMMED ALI AL-BASSAM, Professor of Mathematics, 1960, 1962.
Licensee in Science (B.S. equiv.), University of Baghdad (Iraq), 1944; M.A., The University of Texas, 1948; Ph.D., 1951.
JOHN HENRY BAUMGARDNER, Professor of Animal Husbandry, 1945, 1961.
B.S., Texas Technological College, 1939; M.S., 1940.

ETHEL JANE BEITLER, Associate Professor of Applied Arts, 1947, 1961.
B.S., Iowa State University of Science and Technology, 1929; M.Ed., Marquette University, 1943.
JEAN CAMILLE GRAVES BELL, Instructor in Home Economics Education and Home Management, 1963.
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JAMES WAYLAND BENNETT, Professor of Agricultural Economics, and Associate Dean of Agriculture, 1948, 1963.
B.S., Texas Technological College, 1948; M.S., Louisiana State University and Agricultural and Mechanical College, 1951; Ph.D., 1955.
RICHARD ANTHONY BERGER, Assistant Professor of Health, Physical Education, and Recreation for Men, 1962.
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CONSTANTINOS LOUIS BEROS, Instructor in Government, 1962.*
B.A., Indiana University, 1952; M.A., University of California (Berkeley), 1959.

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B.S., Lafayette College, 1954; M.A., Princeton University, 1956; Ph.D., 1958.

MILDRED LUCILE BETTENCOURT, Assistant Professor of Education, 1950, 1959.
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LOWELL LAWRENCE BLAISDELL, Professor of History, 1957, 1963.
B.A., Elmhurst College, 1941; M.A., University of Rochester, 1944; Ph.D., University of Wisconsin, 1949.
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THADIS WAYNE BOX, Professor of Range Management, 1962, 1964.
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DIXIE BOYD, Instructor in Psychology, 1960.
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FLOYD D. BOZE, Associate Professor of Education, and Dean of Admissions and Registrar, 1958, 1962.
B.S., East Texas State College, 1938; M.S., 1938; Ed.D., University of Tennessee, 1955.

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WELDON LEROY BRADSHAW, Professor of Architecture, 1938, 1943.
B.S., Texas A \& M University, 1924; Reg. Arch. (Texas).

JOHN PAUL BRAND, Professor of Geosciences, 1948, 1957.*
B.A., Miami University, 1942; M.A., 1947; Ph.D., The University of Texas, 1954.

MARY LOUISE BREEDLOVE BREWER, Assistant Professor of Engilish, 1941, 1962.
B.A., Oklahoma College for Women, 1928; M.A., Üniversity of Illinois, 1929; Ph.D., The University of Texas, 1941.
BEVERLY DIANNE BRIAN, Instructor in English, 1961.
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THOMAS E. BRIDGE, Visiting Assistant Professor of Geosciences, 1963.
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ANTHONY NORMAN BRITTIN, Instructor in Music, 1963.
B.M.E., Florida State University, 1959; M.M., Manhattan School of Music, 1963.

ROGER LEON BROOKS, Associate Professor of English, and Associate Dean of the Graduate School, 1960, 1964.**
B.A., Baylor University, 1949; M.A., University of milinols, 1950; Ph.D., University of Colorado, 1959.
CHARLES W. BROWN, Captain United States Army, Assistant Professor of Military Science, 1960.***
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B.S., Davidson College, 1934.

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B.S., University of Michigan, 1952; M.A., 1953.

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B.S., University of Kansas, 1960; M.Arch., 1963.

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## 372 FACULTY

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B.S., Texas Technological College, 1941; M.S., University of New Mexico, 1943; Ph.D., University of Iowa, 1952.
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GERALINE PATTERSON CARAWAY, Part-time Instructor in Mathematics, 1956.
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MARY SUE CARLOCK, Associate Professor of English, 1952, 1962.
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ILA MAE CARPENTER, Instructor in Mathematics, 1956.
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WALTER JOSEPH CARTWRIGHT, Assistant Professor of Sociology, 1962.
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B.M., The University of Texas, 1944.

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RAYMOND LEON DAVIDSON, Professor of Education, 1949, 1962.
B.A., Clarendon College, 1927; M.A., Texas Technological College, 1935; Ed.D., The University of Texas, 1951.
LEWIS JAMES DAVIES, Associate Professor of Sociology, 1962.
B.A., The University of Texas, 1947; M.A., 1950; Ph.D., University of Illinois, 1960.

JAMES WILLIAM DAVIS, Professor and Head of the Department of Government, 1938. 1944.
B.A., Texas A \& M University, 1928; M.A., The University of Texas, 1931; Ph.D., 1940.
KENNETH WALDRON DAVIS, Assistant Professor of English, 1955, 1963.
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HARRY DE LA RUE, Assistant Professor of History, 1956.
B.A., Ohio University, 1913; M.A., University of Chicago, 1919.

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B.A., Austin College, 1933; M.A., The University of Texas, 1937; Ph.D., 1942.

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CHARLES E. DOELL, Visiting Professor of Park Administration, 1964.*
B.S., University of Minnesota, 1916; C.E.. 1917.

TIMOTHY PAUL DONOVAN, Associate Professor of History, 1960, 1963.
B.A., University of Oklahoma, 1949; M.A., 1950; Ph.D., 1960.

JOHNNY LA RUE DORSEY, Instructor in Clothing and Textiles, 1962.
B.S., Texas Woman's University, 1939; M.S., Texas Technological College, 1963.

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B.S., Texas Technological College, 1936; M.S., 1943.

ARTHUR LINCOLN DRAPER, Associate Professor of Chemistry, 1959, 1961.
B.A., Rice University, 1948; M.A., 1949; Ph.D., 1951.

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B.A., Texas Woman's University, 1928; M.A., Teachers College, Columbia University, 1941.
WILLIAM LYON DUCKER, Professor and Head of the Department of Petroleum Engineering, 1948.
B.S., University of Oklahoma, 1930; Reg. Prof. Engr. (Oklahoma, Texas).

RICHARD ALBERT DUDEK, Professor and Head of the Department of Industrial Engineering and Engineering Drawing, 1958.
B.S. in M.E., University of Nebraska, $1950 ;$ M.S. in I.E., University of Iowa, 1951 ; Ph.D., 1956; Reg. Prof. Engr. (Iowa).
JOHN WALTER DUKE, Instructor in Mathematics, 1961.
B.A., North Texas State University, 1959; M.S., Texas Technological College, 1961.

ROY SYLVAN DUNN, Associate Professor of Sociology, and Director of the Southwest Collection, 1956, 1963.
B.A., The University of Texas, 1948; M.A., 1951.

RICHARD DURAN, Associate Professor of Architecture, 1951, 1956.
B.A., University of Florida, 1948; M.S., Illinois Institute of Technology, 1951; Reg. Arch. (Texas).
RALPH MARION DURHAM, Professor and Head of the Department of Animal Husbandry, 1959.
B.S., Colorado State University, 1948; M.S., University of Wisconsin, 1949; Ph.D., 1951.

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GEORGE EDWARD DYER, Instructor in Government, 1963.
B.S., Anderson College, 1958; M.A., Texas Technological College, 1960.

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LUTA PELHAM EAVES, Assistant Professor of Accounting, 1942.
B.B.A., Texas Technological College, 1934; M.B.A., 1941.

FLOYD EUGENE EDDLEMAN, Assistant Professor of English, 1958, 1962.
B.S.E., Arkansas State Teachers College, 1951; M.A., University of Arkansas, 1955; Ph.D., 1961.
THOMAS JEFFERSON EDWARDS, Part-time Instructor in Accounting, 1951.
B.B.A., Texas Technological College, 1947; M.B.A., The University of Texas, 1949.

WILDRING SHERROD EDWARDS, Instructor in Home and Family Life, 1962.
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ZONA MAXINE EDWARDS, Catalog Librarian, 1963, 1964.
B.S. In Ed., Oklahoma State University of Agriculture and Applied Science, 1939; M.A. in L.S., University of Denver, 1948.

ULRICH LEWIS EGGENBERGER, Assistant Professor of Agricultural Education, 1961. B.S., Kansas State University of Agriculture and Applied Science, 1952; M.S., 1956.
george oliver elle, Protessor of Horticulture, and Assistant Dean of Agriculture, 1938, 1956.*
B.S., Oregon State University, 1938; M.S., Texas Technological College, 1941; Ph.D., Cornell University, 1951.
ARTHUR MCAULEY ELLIOT, Assistant Professor of Biology, 1961.
B.S., University of Minnesota, 1953; M.S., 1960; Ph.D., 1961.

RAYMOND PRUITT ELLIOTT, Professor of Music, 1950, 1960.
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B.S., New Mexico State University, 1955; Ph.D., Texas A \& M University, 1963.

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B.S., Texas Woman's University, 1940; B.A., 1940; M.Ed., Texas Technological College, 1954; Ed.D., 1963.
BERLIE JOSEPH FALLON, Professor of Education, and Executive Secretary of the West Texas School Study Council, 1955, 1962.
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DON EARLE FARE, Instructor in Education, 1963.
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MOHAMED ZUHDI TAJI FARUKI, Assistant Professor of Philosophy, 1963.
B.A., American University of Beirut (Lebanon), 1946; M.A., Indiana University, 1952; Ph.D., 1957.
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B.A., Baylor University, 1942; M.A., Colorado State College, 1950.

GORDON FULLER, Professor of Mathematics, 1950.
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STERLING HALE FULLER, Professor of Government, 1950, 1957.
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MARY AGNES GERLACH, Assistant Professor of Clothing and Textiles, 1955.
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EVERETT ALDENE GILLIS, Professor of English, 1949, 1956.
B.A., Texas Christian University, 1936; M.A., 1939; Ph.D., The University of Texas, 1948.
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HOWARD ELDON GOLDEN. Associate Professor of Marketing, 1946.
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FRANCIS EARL GREEN, Assistant Professor of Anthropology and Curator of Collections, The Museum, 1952, 1964.
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ALAN MURRAY FINLAY GUINN, Professor of English, 1939, 1949.
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KATHERINE FISHER OSBORNE, Part-time Instructor in Music, 1962.
B.M., Indiana University, 1960; M.M., 1962.

ROBERT LEWIS PACKARD, Assistant Professor of Biology, 1962.
B.S., University of Nebraska, 1951; M.A., University of Kansas, 1955; Ph.D., 1960.

ROBERT MARSHALL PARKER, Associate Professor of Mathematics, 1946, 1957.
B.A., Texas Technological College, 1930; M.A., 1933.

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B.S., University of Utah, 1957; M.S., 1959; Ph.D., 1961.
L. E. PARSONS, Professor and Acting Head of the Department of Textile Engineering, 1942, 1961.
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WILLIAM ROBERT PASEWARK, Professor and Head of the Department of Business Education and Secretarial Administration, 1956, 1957.
B.S., New York University, 1949; M.A., 1950; Ph.D., 1956.

WILLIAM TAYLOR PATTERSON, Assistant Professor of French, 1961.
B.A., University of Kansas, 1954; Certlficat, University of Montpellier (France), 1955; M.Ed., The Pennsylvania State University, 1961.
WILLIAM MARTIN PEARCE, Professor of History, and Vice President for Academic Affairs, 1936, 1960.
B.A., Southern Methodist University, 1935; M.A., Texas Technological College, 1937; Ph.D., The University of Texas, 1952.
MILTON LESTER PEEPLES, Associate Professor of Dairy Industry, 1951, 1960.
B.S., Texas Technological College, 1949; M.S. in Agri., 1954; Ph.D., The Ohio State University, 1960.
FRANK M. PENDER, Major, United States Army, Associate Professor of Military Science, 1960.
B.S., Louisiana State University and Agricultural and Mechanical College, 1950. HUGH PENDEXTER III, Associate Professor of Engllish, 1962
B.A., Bowdoin College, 1947; M.A., Northwestern University, 1951; Ph. D., University of Pennsylvania, 1954.
CONNER COLUMBUS PERRYMAN, Professor of Engineering Drawing, 1929, 1947.
B.S., North Texas State University, 1926; Reg. Prof. Engr. (Texas).

FLORENCE ELOISE PETZEL, Professor of Clothing and Textiles, 1963.
Ph.B., University of Chicago, 1931; M.A., 1934; Ph. D., University of Minnesota, 1954.

GEORGE REX PHILBRICK, Professor of Health, Physical Education, and Recreation for Men, and Tennis Coach, 1947, 1961.
B.S., Texas Technological College, 1939; M.Ed. in P.E., The Universtiy of Texas 1950.

FLORENCE LOUISE PHILLIPS, Dean of Women, 1954.
B.A., Marshall University, 1944; M.A., Michigan State University of Agriculture and Applied Science, 1946; Ed.D., Indiana University, 1958.
WILLIE EDWARD PHILLIPS, Associate Professor of Electrical Engineering, 1958, 1963.
B.S., Mississippi State University, 1949; B.D., Emory University, 1951; M.S., Mississippi State University, 1955; Ph.D., Vanderbilt University, 1959.
PAULINE DAWN PITTS, Assistant Catalog Iibrarian, 1956.
B.A., Southeastern State College, 1930; B.A. in L.S., University of Oklahoma, 1936; M.S., University of Illinois, 1951.
GEORGES JOSEPH PLANEL, Associate Professor of French, 1962.
Licence es Lettres, University of Montpellier (France), 1942; Diplome d'Etudes Superieures, University of Aix (France), 1953.
JAMES EDWARD PLATZ, Associate Librarian, 1949, 1955.
B.A., Lawrence College, 1929 ; B.S. in L.S., University of Illinois, 1940.

NORBERT JOSEPH POINTNER II, Instructor in Architecture, 1962.
B.S. in Arch., Illinois Institute of Technology, 1961; M.S. in City and Regional Planning, 1962.
CHARLES WILLIAM POST, Assistant Professor of Music, 1957, 1961.
B.M., Colorado State University, 1942; B.S., 1947; M.A., University of Denver 1960.

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B.S., Texas Technological College, 1947; M.S., Massachusetts Institute of Technology, 1950.
RUBY STEWART POWER, Instructor in Mathematics, 1956, 1957.
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MARGOT MARIE PURDY, Instructor in Health, Physical Education, and Recreation for Women, and Director of Intramural Sports for Women, 1962.
B.S., Texas Woman's University, 1953; M.S., Eastern New Mexico University,
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B.A., University of Iowa, 1946; M.S., 1947; Ph.D., 1954.

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B.A., University of Missouri, 1950; M.A., 1951; Ph.D., 1955.

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B.A., The University of Texas, 1949; B.B.A., 1951; LL.B., 1953.
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B.S., George Peabody College for Teachers, 1922; M.A., Columbla University, 1926.

LEOMA HUTCHESON RASOR, Order Librarian, 1958.
B.A., The University of Texas, 1929; M.A., 1941.

JOSEPH BLAND BOB RAY, Associate Professor of Psychology, 1963.
B.A., University of Oklahoma, 1948; M.S., 1949; Ph.D., 1954.

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B.S., The Pennsylvania State University, 1954.

ROBERT BALDRIDGE REEDY, Part-time Instructor in Management, 1954.
B.A., University of Illinois, 1943.

JAMES VERDO REESE, Instructor in History, 1962.
B.A., Rice University, 1957; M.A., The University of Texas, 1961.

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B.B.A., Southern Methodist University, 1954; LL.B., 1954.

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B.S., University of Oklahoma, 1955; M.S., 1957.

EMMA BARRETT REEVES, Instructor in English, 1953.
B.A., Hardin-Simmons University, 1924; M.A., Texas Technological College, 1949.

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Ph.D., Ludoviciana, University of Giessen (Germany), 1912; Honorary Renewal Diploma of Ph.D., Justus Liebig Universitat, University of Giessen (Germany), 1962.

FRED DURNFORD RIGBY, Professor of Mathematics, and Dean of the Graduate School, 1940, 1963.
B.A., Reed College, 1935; M.S., University of Iowa, 1938; Ph.D., 1940.

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B.A., Texas Christian University, 1944; M.A., University of Michigan, 1945; Ph.D., University of Kentucky, 1949.
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B.A., Indiana University, 1919; M.A., 1922; M.D., 1941.

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B.A., Coe College, 1943; M.A., University of Iowa, 1949; Ph.D., 1950.

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ANNIE NORMAN ROWLAND, Assistant Professor of Mathematics, 1942, 1957.
B.S., Texas Technological College, 1939; M.S., 1942.

GEORGE ROSS ROY, Professor of English, 1963.
B.A., Sir George Williams University (Montreal, Canada), 1950; M.A., University of Montreal (Canada), 1951; Diplome d'Etudes Superieures, University of Strasbourg (France), 1954; Ph.D., University of Montreal (Canada), 1959; Doctorate d'Universite, University of Paris (France), 1958.
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B.Arch., University of Nebraska, 1958; Reg. Arch. (Nebraska).

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REGINALD RUSHING, Professor and Head of the Department of Accounting, 1939, 1948.
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B.S., University of Oklahoma, 1932; M.A., 1936.

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B.S., University of Southern California, 1946; M.B.A., The University of Texas, 1948; Ph.D., 1957.
WALEED ABDULLA AL-SALAM, Associate Professor of Mathematics, 1963.****
B.S., University of California (Berkeley), 1950; M.A., 1951; Ph.D., Duke University, 1958.
BILLY JOE SANDLIN, Associate Professor of Physics, 1955, 1959.
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ALBERT JOSEPH SANGER, Associate Professor of Civil Engineering, 1956, 1957.
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B.S., Central Methodist College, 1950; M.A., University of Wyoming, 1955; Ph.D., University of Iowa, 1963.
CLARENCE CARL SCHMIDT, Professor of Physics, 1927, 1943.
B.A., Cornell College, 1917; M.A., University of Illinois, 1922; Ph.D., 1927.

MORRIS HENRY SCHNEIDER, Assistant Professor of Industrial Engineering, 1962.
B.S. in Ed., University of Nebraska, 1951; B.S. in M.E., 1959; M.S. in I.E., Kansas State University of Agriculture and Applied Science, 1961.
RONALD EDWARD SCHULZ, Associate Professor of Speech, 1952, 1959.
B.S., Northwestern University, 1947; M.A., 1948.

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JOSEPH LAWRENCE SCHUSTER, Assistant Professor of Range Management, 1964.***** B.S., Texas A \& M University, 1954; M.S., Colorado State University, 1959; Ph.D., Texas A \& M University, 1962.
WILLIAM FREDERICK SCHWIESOW, Associate Professor of Agricultural Engineering, 1957.*
B.S., South Dakota State College of Agriculture and Mechanic Arts, 1950; M.S., University of Illinois, 1957; Reg. Prof. Engr. (Illinois, Texas).

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B.A., Ouachita Baptist College, 1924; M.S., Oklahoma State University of Agriculture and Applied Science, 1933.
RUSSELL HOLLAND SEACAT, JR., Associate Professor of Electrical Engineering, 1959.
B.S., Texas A \& M University, 1948; Ma.E., 1958; Ph.D., 1963; Reg. Prof. Engr. (Texas).
A. B. SEGARS, Part-time Instructor in Accounting, 1953.*
B.B.A., The University of Texas, 1941; M.B.A., 1948; C.P.A.
herman brazill segrest, Associate Professor of Health, Physical Education, and Recreation for Men, 1963.
B.S., North Texas State University, 1937; M.S., 1946; M.Ed., Texas A \& M University, 1955; Ed.D., Baylor University, 1962.
JESSE Q. SEALEY, Professor of Biology, 1928, 1955.
B.A., The University of Texas, 1928; M.A., 1928; Ph.D., 1951.

RALPH LOUIS SELLMEYER, Assistant Professor of Journalism, 1960.
B.J., University of Missouri, 1950; M.A., University of Missouri at Kansas City, 1951.

ROY F. SHARP, Sergeant First Class, United States Army, Instructor in Military Sclence, 1962.

MARTHA GENE SHELDEN, Professor and Head of the Department of Clothing and Textiles, 1955.
B.A., University of Wichita, 1933; M.S., Kansas State University of Agriculture and Applied Science, 1941; Ph.D., Texas Woman's University, 1955.
HENRY JOSEPH SHINE, Professor of Chemistry, 1954, 1960.
B.S., University of London (England), 1944; Ph.D., 1947; A.R.I.C.

MARY JANE GUINN SHIPLEY, Part-time Instructor in Mathematics, 1961.
B.A., Baylor University, 1945; M.A., Texas Technological College, 1961.

HAROLD DEAN SHUMAN, Part-time Instructor in Finance, 1959.
B.A., Washburn Unlversity of Topeka, 1954; LL.B., 1954.

DESKIN HUNT SHURBET, JR., Professor of Geosciences, and Director of the Seismological Observatory, 1956, 1961.
B.S., The University of Texas, 1950; M.A., 1951.

GERALD LYNN SHURBET, Assistant Professor of Mathematics, 1956, 1960.
B.A., The University of Texas, 1949; M.S., Texas Technological College, 1957.

FLOY GLENN SIDES, Assistant Professor of Home and Family Life, 1954, 1963.
B.S., Texas Technological College, 1939; M.Ed., 1955.

EARL ROLAND SIFERT, Visiting Professor of Education, 1959.
B.A., Des Moines University, 1913; M.A., University of Iowa, 1926; Ph.D., University of Minnesota, 1942.
HAROLD LESTER SIMPSON, Associate Professor of Foreign Languages, 1962.
B.S., College of Charleston, 1951; M.A., Princeton University, 1953; Ph.D., 1957.

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B.S., North Texas State University, 1949; M.Ed., Southwest Texas State College, 1953.

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B.S., Texas A \& M University, 1957.

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B.S. in Arch., University of Houston, 1949; B.Arch., 1950.

BENJAMIN NEAL SMITH, Assistant Professor of Music, 1960, 1963.
B.M., Eastman School of Music, University of Rochester, 1958; M.M., 1959.

BURNETT T. SMITH, Assistant Professor of Mathematics, 1948, 1959.
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B.A., The University of Texas, 1939; M.A., 1940; Ph.D., 1949.

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B.S., The Ohio State University, 1934; R.N., 1934; M.S., University of Michigan, 1938; R.P.T., Harvard University, 1944; Ed.D., Stanford University, 1949.
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B.S., Texas Wesleyan College, 1952.

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B.S., Texas Technological College, 1948; M.S., Massachusetts Institute of Technology, 1950 ; Ph.D., University of Illinois, 1960.

[^72]WINFRED GEORGE STEGLICH, Professor and Head of the Department of Sociology, 1957, 1960.
B.A., Concordia Seminary, 1942; Dip.Th., 1946; M.A., The University of Texas, 1945 ; Ph.D., 1951.
TOM BASIL STENIS, Associate Professor of Electrical Engineering, 1947, 1956.
B.S., The University of Texas, 1943; M.S., 1947; Reg. Prof. Engr. (Texas). HUGH WADDELL STEPHENS, Assistant Professor of Government, 1963.
B.A., Washington and Lee University, 1956; M.A., University of North Carolina, 1960.

LEWIS MOORE STEWART, Instructor in Economics and Finance, 1957, 1963.
B.S., Harding College, 1957; M.B.A., Texas Technological College, 1960.

MICKEY FAY STORY, Instructor in Applied Arts, 1962.
B.S., Texas Technological College, 1961; M.Ed., The Pennsylvania State University, 1962.
MARY RUTH CHANCE STRANDTMANN, Assistant Professor of Mathematics, 1951, 1959.
B.A., Southwest Texas State College, 1936; M.A., Texas Technological College, 1952.

RUSSELL WILLIAM STRANDTMANN, Professor of Biology, 1948.
B.S., Southwest Texas State College, 1935; M.S., Texas A \& M University, 1937; Ph.D., The Ohio State University, 1944.
ALFRED BELL STREHLI, Professor of Foreign Languages, 1928, 1961.
B.A., The Ohio State University, 1925 ; B.S., 1925; M.A., 1926.

PASCHAL NEILSON STRONG, JR., Associate Professor of Psychology, 1960, 1961.
B.A., Washington University, 1950; Ph.D., University of Tennessee, 1955.
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B.A., Dartmouth College, 1918; M.A., University of Chicago, 1920; M.A., University of Wisconsin, 1923; Ph.D., Yale University, 1925.
MARY GRAVES STROUT, Assistant Professor of English, 1942, 1961.
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B.A., Sterling College, 1921; M.S., University of Chicago, 1925; Ph.D., 1931; D.S., Sterling College, 1960.
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B.A., Tulane University of Louisiana, 1957.

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HASKELL GRANT TAYLOR, Professor of Accounting, 1937, 1948.
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DAHLIA JEWELL TERRELL, Instructor in English, 1956.**
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GERALD WAYLETT THOMAS, Professor of Range Management and Dean of Agriculture, 1958.***
B.S., University of Idaho, 1941; M.S., Texas A \& M University, 1951; Ph.D., 1954.

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ARTHUR DUDLEY THOMPSON, Assistant Professor of Architecture, 1959, 1964.**** B.Arch., Texas Technological College, 1954; M.S. in Urban Planning, Columbla University, 1963.
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ERWIN RUDOLPH TICHAUER, Visiting Associate Professor of Industrial Engineering. 1963.*****

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JOE WAYNE TIDROW, Associate Professor of Education, 1962.
B.S., Central State College (Oklahoma), 1947; M.S., Oklahoma State University of Agriculture and Applied Science, 1954; Ed.D., 1957.
POLLY COOK TILTON, Instructor in Biology, 1947, 1955. B.S., Texas Technological College, 1947; M.S., 1951.

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WILLA VAUGHN TINSLEY, Professor of Home and Family Life, and Dean of Home Economics, 1953.
B.S., Texas Woman's University, 1928; M.S., Colorado State University, 1936; Ph.D., University of Minnesota, 1947.
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FERRRELLINE TUCKER, Documents Librarian, 1942, 1949.
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SCOTTI MAE TUCKER, Associate Professor of Spanish, 1945, 1957.
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B.S., Texas A \& M University, 1943; M.S., 1947; Ph.D., Harvard University, 1951; Reg. Prof. Engr. (Texas).
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B.A., University of Denver, 1948; M.B.A., 1950.

ERNEST WALLACE, Professor of History, 1936, 1945.
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MORRIS SHEPPARD WALLACE, Professor and Head of the Department of Education and Philosophy, and Director of Teacher Education and Certification, 1955, 1958.
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THOMAS BRUCE WATERS, Associate Professor of Philosophy, 1962.
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HOLMES ANDREW WEBB, Associate Professor of Education, 1960.
B.A., Texas Technological College, 1930; M.A., 1935; Ed.D., University of Southern California, 1953.
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B.A.. Michigan State University of Agriculture and Applied Sclence, 1952.

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NORMAN EDWARD WEIR, Associate Professor of Economics and Finance, 1962.
B.A., University of Oklahoma, 1935; M.A., University of Colorado, 1941; Ph.D., University of Southern California, 1962.
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JAMES HOWARD WELBORN, Part-time Instructor in Marketing, 1959.** B.A., Texas Technological College, 1949.

ROBERT GODFREY WELCH, Assistant Professor of Agricultural Economics, 1963.
B.S., University of Wyoming, 1957; M.S., 1958; Ph. D., Oregon State University, 1962.

GRACE PLEASANT WELLBORN, Assistant Professor of English, 1947, 1959.
B.A., Hardin-Simmons University, 1928; M.A., 1934; B.S., Howard Payne College, 1947.

WESLEY WILLIAM WENDLANDT, Professor of Chemistry, 1954, 1960.
B.S., Wisconsin State College (River Falls), 1950; M.S., University of Iowa, 1952; Ph.D., 1954.
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OLIVE BOONE WHEELER, Associate Professor of Education, 1953, 1959.
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B.S. in I.E., Texas Technological College, 1963.

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B.S., Oregon State University, 1947; M.S., University of California, 1948; Ph.D., Purdue University, 1952.
billie frances williamson, Associate Professor of Home Economics Education and Assistant to the Dean of Home Economics, 1956, 1961.
B.S., Texas Woman's University, 1934; M.A., 1936.

CARL HAMMEL WILLINGHAM, Assistant Professor of Mathematics, 1955, 1957.
B.A., Texas Technological College, 1928; M.A., 1932.

JUDDIE JOHNSON WILLINGHAM, Professor and Head of the Department of Dairy Industry, 1948, 1949.
B.S., Texas A \& M University, 1931; M.S., Iowa State University of Science and Technology, 1937; Ph.D., 1942.

[^74]WELBORN KIEFER WILLINGHAM, Instructor in Psychology, and Assistant Dean of Men in Charge of Residence Hall Supervision for Men, 1963.
B.A., Texas Technological College, 1949; M.Ed., The University of Texas, 1958.

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B.A., Texas Technological College, 1948; M.A., 1956.

JOHN WITTMAN, JR., Assistant Professor of Economics, 1960.
B.S. in B.C., Southern State College, 1957; M.B.A., University of Arkansas, 1959.

LAWRENCE MICHAEL WODEHOUSE, Assistant Professor of Architecture and Alled Arts, 1963.
Dip.Arch., University of Durham (England), 1959; Dip.T.P., University of London (England), 1962; M.Arch., Cornell University, 1963; A.R.I.B.A.; Reg. Arch. (United Kingdom).
WILLIE MAY WOLFE, Assistant Professor of Home Management, 1955.
B.S., The University of Texas, 1937; M.S., 1938.
'OPAL LANIER WOOD, Instructor in Food and Nutrition, and Home and Family Life, 1945, 1955.
B.S., Texas Woman's University, 1926.

HEATHER GRAHAM WOODALL, Instructor in Music, 1963.
B.M.. Oberlin College, 1963

PAUL RAY WOODRUFF, JR., Instructor in Government, 1962, 1964.*
B.S., University of Oklahoma, 1953.

PAUL JOSEPH WOODS, Associate Professor of History, 1960.
B.A., University of Illinois, 193s; M.A., 1940; Ph.D., 1941.

HORACE EUGENE WOODWARD, JR., Associate Professor of Mathematics, 1937, 1956. B.A., Texas Technological College, 1936; M.A., 1937.

JIA-HSI WU, Assistant Professor of Biology, 1963.
B.S., Taiwan University, 1950; M.S., Cornell University, 1952; Ph.D., Washington University, 1958.
VESTAL LIARLY YEATS, Instructor in Geosciences, 1960.
B.S., The University of Texas, 1958; M.S., Texas Technological College, 1960.

ARTHUR WESLEY YOUNG, Professor and Head of the Department of Agronomy and Range Management, 1935, 1938.
B.S., Iowa State University of Science and Technology, 1929; M.S., 1930; Ph.D., 1932.

GEORGE ARTHUR YOUNG, Instructor in English, 1956, 1958.
B.A., Texas Technological College, 1952; B.D., Austin Presbyterian Theological Seminary, 1955; M.A., The University of Texas, 1955.
VERA BERG YOUNG, Part-time Instructor in Mathematics, 1952. B.8., Iowa State University of Science and Technology, 1928; M.S., 1930.

BARBARA JEAN ZECHES, Assistant Professor of Food and Nutrition. 1962.
B.S., The University of Texas, 1954; M.S., University of Arizona, 1963.

DALE WENDELL ZINN, Associate Professor of Animal Husbandry, 1961.**
B.S., West Virginia University, 1952; M.S., 1956.

EDWARD WILLIAM ZUKAUCKAS, JR., Associate Professor of Horticulture and Greenhouse Manager, 1952, 1961.
B.S., Rutgers, The State University, 1950; M.S., 1952.

WOLODYMYR TARAS ZYLA, Assistant Professor of Foreign Languages, 1963.*** B.S., University of Manitoba (Canada), 1959; M. A., 1962.

## Biblical Literature

CROMWELL COOK CLEVELAND, B.A., B.D., Biblical Literature, United Bible Chair under auspices of the Christian, Episcopal, Lutheran, and Presbyterian Churches.
LEON CROUCH, B.S., M.A., Biblical Literature, under auspices of The Churches of Christ. Christ.
WILLIAM PETER HANLY, Ph.B., L.Ph., S.T.B., S.T.L., M.A., Biblical Literature, under auspices of the Roman Catholic Church.
SIDNEY LEWIS HARRIS, B.A., B.D., M.A., Biblical Literature, under auspices of the Baptist General Convention of Texas.
JAMES HOUSTON HODGES, B.A., B.D., Biblical Literature, United Bible Chair under auspices of the Christian, Episcopal, Lutheran, and Presbyterian Churches.
RALPH EDWARD MACY, B.S., B.D., Biblical Literature, United Bible Chair under auspices of the Christian, Episcopal, Lutheran, and Presbyterian Churches.
CECIL RAYMOND MATTHEWS, B.A., B.D., Biblical Literature, under auspices of the Northwest Texas Conference of the Methodist Church.

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## Teaching Assistants

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WILLIAM GERALD AMBROSE, B.S., Mathematics.
ADRIAN NORRIS ANDERSON, B.S., M.A., History and Anthropology.
JAMES ALAN ANDERSON, B.S., Mathematics.
SYLVIA ANN ASHBY, B.A., English.
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JUDITH ANTHONY AVINGER, B.A., English.
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LAVERNE DAVIS BADGLEY, B.S., Speech**
RAYMOND HAMBY BAILEY, B.A., Speech.
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VICTOR HERBERT BOND, B.S. in I.E., Industrial Engineering and Enginering Drawing.
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JOHN OVERTON BURFORD, B.B.A., Economics.**
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## 392 TEACHING ASSISTANTS

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THOMAS EDWARD JOHNSON, B.B.A., Economics.
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KAY KELTNER, B.S., Economics.
CAGLE KENNETH KENDRICK, B.S., Mathematics.
EUELL DWAYNE KEY, B.S., Economics.
JUDITH COWGER KEY, B.S., Clothing and Textiles.
PANZE BUTLER KIMMEL, B.S. in Ed., M.M., Education and Phllosophy.
ALVY LEON KING, B.S., M.A., History and Anthropology.
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DENIS DEAN OLSOVSKY, B.S., Civll Engineering.**
JAMES SAMUEL OSBORN, B.S., Management.
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BERNADYNE WEATHERFORD TURPEN, B.S., Government.
JERRY DON VANN, B.A., M.A., English.*
Gilbert lynn varnell, B.S., Physics.
ZENOBIA BROWN VERNER, B.A., M.A., Education and Philosophy.
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FERNANDO C. VIDAURRI, JR., B.S., Chemical Engineering.
BENJAMIN THOMAS WAAK, B.S., Physics.
KENNETH J. WALLACE, B.B.A., Economics.*
KOU-LING WANG, B.S., Physics.
JESSE EDGAR WEBB, B.A., Speech.
Frederick william Weidmann, Jr., B.S., Physics.
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JOHN ROBERT WHEELOCK, B.A., Physics.
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KIRK LEROY WHITESIDE, B.S., Biology.*
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## Textile Research Laboratories

JOHN ROSS BRADFORD, Director. BILLY BYRD CRUMLEY, Associate Director. HARRY EDWARD ARTHUR, Research Assistant. REVA E. WHITT, Fiber Technologist. ROY CORTEZ WHITT, Textile Technologist.

## Student Health Service

FREDERICK PAUL KALLINA, Director of Student Health Service, and Physician, 1948. 1959.
B.S., Texas A \& M University, 1942; M.D., Baylor University School of Medicine, 1945.

EMBREE RECTOR ROSE, Professor, and Physician, 1947, 1959.
B.A., Indiana University, 1919; M.A., 1922; M.D., Indiana University School of Medicine, 1941.
NORMA ESTEVEZ PORRES, Physician, 1963.
B.A., Institute No. 3 (Havana, Cuba), 1943; B.S., 1943; M.D., Havana University School of Medicine, 1950.
IRIS JANE NORMAN, R.N., Superintendent, 1951.
BERTHA NELL ADAIR, R.N., 1960.
HATTIE M. CHILDRESS, R.N., 1953.
MARY GLADYS DUVALL, R.N., 1960.
BARBARA RUTH GRAY, R.N., 1962.
EDITH A. KUHNLEY, R.N., 1959.
HELEN LOWE, R.N., 1963.*
ANN PENDLEY ROBERTS, R.N., 1963.
JUDY ANN SANDERS, R.N., 1964.**
NELL HEFNER, Medical Technologist, 1952.

## Museum

WILLIAM CURRY HOLDEN, Director, 1949.
B.A., The University of Texas, 1923; M.A., 1924; Ph.D., 1928.

DOROTHY JANE RYLANDER, Administrative Assistant, 1953, 1958.
B.A., Texas Technological College, 1930; M.A., 1931.

FRANCIS EARL GREEN, Curator of Collections, 1952, 1958.
B.S., Texas Technological College, 1950; M.S., 1951; Ph.D., 1954.

MARGARET SPOON SANDY, Museum Services Coordinator, 1960.
B.A., University of Wisconsin, 1927; M.A., University of Illinois, 1934.

Len Longino wilson, Museum Field Representative, 1963.
B.S., Texas Technological College, 1962.

## Public Information

CLAUDE ADRIAN VAUGHAN, Director, 1955, 1957.
B.A., Baylor University, 1945; M.J., The University of Texas, 1950.

## Southwest Collection

ROY SYLVAN DUNN, Director, 1956, 1963.
B.A., The University of Texas, 1948; M.A., 1951.

DORIS SCHOSTAL BLAISDELL, Associate Archivist, 1960, 1963.

## Staffs in Special Departments

LOUISE CRAWFORD ALLEN, Editor of the College Bulletin, 1928, 1963.
B.A., Southern Methodist University, 1924; M.A., University of Missouri, 1940.

NOLAN ELIMORE BARRICK, Supervising Architect, 1953.
B.A., Rice University, 1935; B.S., in Arch., 1936; M.A., 1937; Reg. Arch. (Texas).

[^80]DALLAS GUYRON BIGGERS, Assistant Director, Student Union, 1962.
B.S., University of Southern Mississippi, 1956; M.S., 1959.

JOSEPH SIMPSON BLAYLOCK, Assistant Football Coach, 1962. B.S., University of Southern Mississippi, 1950.

HARRY WEBSTER BUFFINGTON, Assistant Football Coach, 1963.
B.A., Oklahoma State University of Agriculture and Applied Science, 1942; M.A., 1948.

WILLIAM CONNER COLE, General Manager of the Texas Tech College Bookstore, 1927. B.B.A., The University of Texas, 1924.

JOHN FRANCIS CONLEY, JR., Assistant Football Coach, 1961.
B.S., Kansas State University of Agriculture and Applied Science, 1949; M.S., 1953.

GEORGINA CONNER, Administrative Assistant to the Dean of Engineering, 1932. B.A., University of New Mexico, 1929.

BENGE ROBERT DANIEL, Manager of the Texas Tech Press, 1951. B.S., North Texas State University, 1936; M.S., 1940.

BILLIE GENE DANIELS, Chief Security Officer, 1959.
CHARLOTTE L. DOUGHTIE, Secretary, Office of the Dean of Agriculture, 1951.
OLAN RAY DOWNING, Director of Building Maintenance and Utilities, 1936, 1961.
KATHRYN STALLINGS DURHAM, Administrative Assistant to the Dean of Arts and Sciences, 1942, 1957.
B.A., Texas Technological College, 1934.

GEORGE FORBES ELLIS, JR., Manager and Animal Husbandman, Texas Technological College Research Farm, Pantex, Texas, 1963.
B.S. New Mexico State University, 1955; Ph.D., Texas A \& M University, 1963.

BILLY WELDON FELTY, Assistant Supervising Architect, 1958, 1959.
B.Arch., Texas Technological College, 1952.

ELLIS RAY FORMAN, Assistant Manager of the Texas Tech College Bookstore, 1934, 1939.
B.A., Texas Technological College, 1932.

BILLIE RAE ROGERS FRASER, Secretary, Office of the President, 1963.
ANNA BURT STEELE GIBSON, Administrative Assistant to the Vice President for Business Affairs, 1933, 1958.
EUGENE F. GIBSON, Head Basketball Coach, 1954, 1961.
B.S., Texas Technological College, 1950.

WILLIAM MARCUS GOSDIN, Superintendent of Grounds, 1949.*
B.S., Texas Technological College, 1949; M.S., 1955.

MERRILL L. GREEN, Assistant Football Coach, 1961.
B.S., University of Oklahoma, 1954.

WILLIAM WALKER HOLMES, JR., Sports News Director, 1951.
B.A., Texas College of Arts and Industries, 1944; M.A., University of Colorado, 1949.

GEORGE BERL HUFFMAN, Freshman Football Coach, and Varsity Baseball Coach, 1961 B.A., Trinity University, 1928.

RUSSELL BRIGGS IRVIN, Consultant, 1951, 1953.
B.A., Hardin-Simmons University, 1929; M.A., The University of Texas, 1933; LL.B., 1938.
J T KING, Head Football Coach, 1958, 1961.
B.S., The University of Texas, 1938.

LILLIAN JOSEPHINE KIRK KING, Secretary, Office of the President, 1963.
JAMES WILLIAM KITCHEN, Superintendent of Grounds, 1964.**
B.S., Texas Technological College, 1951; M.S., 1952; Ph.D., Texas A \& M University, 1964.
CHARLES F. LIBBY, Director of Building Operations, 1949, 1950.
SHARLYN DOROTHY LININGER, Administrative Assistant to the Dean of Business Administration, 1962.
B.A., Rice University, 1951; M.Ed., University of Houston, 1955.

NELSON HENRY LONGLEY, Director, Student Union, 1955, 1958.

$$
\text { B.A., Southeastern Louisiana College, } 1954 .
$$

CHARLES DEWAIN LYNCH, Assistant Basketball Coach, 1961.
B.B.A., Texas Technological College, 1959.

ROBERT LOUIS MASON, Supervising Engineer, 1942, 1961.
B.S., Texas Technological College, 1939; M.S., Kansas State University of Agriculture and Applied Science, 1951; Reg. Prof. Engr. (Texas).
JAY McCLURE, Golf Coach, 1959.
KAREN FRACK MOORE, Program Director, Student Union, 1961.
B.A., Texas Technological College, 1960.

CAROLYN EDWARDS MOSS, Secretary, Office of the Dean of Arts and Sciences, 1960, 1963.

[^81]EMORY ERNEST POWITZKY, JR., Farm and Livestock Superintendent, 1964.* B.S., Texas Technological College, 1964.

CLYDE LEE PRESTWOOD, Athletic Counselor, 1961.
B.S., The University of Texas, 1940; M.Ed., Texas A \& M University, 1950.

MARY ELIZABETH RANDAL, Administrative Assistant to the Vice President for Academic Affairs, 1928, 1950.
PETE SELLERS, Supervisor of Computer Operations, 1949, 1963.
JOHN ROBERT STOVELL, Farm and Livestock Superintendent, 1960, 1962.**
IRENE NEALE TEMPLE, Administrative Assistant to the Dean of the Graduate School. 1953, 1959.
JAMES MORRIS THOMAS, Supervisor of Programming, 1963.
WANDA ATNIP TOLBERT, Secretary, Office of the Dean of Home Economics, 1962.
JAMES WRIGHT, JR., Assistant Football Coach, 1961.
B.B.A., Texas A \& M University, 1958.

## Residence Hall Staff

GUY JUNIOR MOORE, Director of Residence Halls, 1963.***
B.S., Southern Illinois University, 1957; M.S., 1963.

## Food Service

SHIRLEY SCHULZ BATES, Director of Food Service, 1948, 1951. B.S., Southwest Texas State College, 1940.

MARGARET RAGSDALE BIRKMAN, Assistant Director of Food Service, 1948, 1956. B.S., Texas Technological College, 1940.

BESS ARNALL BANKS, Administrative Assistant to the Director of Food Service, 1950. 1951.

PATSY ANDERSON, Assistant Food Service Manager, 1963.
OPAL JOHNSON DENMAN, Assistant Food Service Manager, 1963.****
MARY ELIZABETH ELLIOTT, Dietitian, 1950, 1957.
B.S., Texas Technological College, 1939; M.S., 1950.

MYRTLE WARNER FORRESTER, Assistant to the Dietitian, 1960.
PAULINE DUNCAN GALLOWAY, Assistant Dietitian, 1963.****
B.S., Texas Woman's Unlversity, 1938.

GWENDOLYN GOWEN GENTRY, Assistant Food Service Manager, 1957, 1963.*****
ALICE R. GRAF, Relief Food Service Manager, 1962.*******
RUBY R. HEATH, Food Service Manager, 1959.
LUTIE VALE KOISTRA, Assistant Food Service Manager, 1963.******* B.S., Texas Technological College, 1941; M.Ed., 1956.

Lillian jo bledsoe lewis, Food Service Manager, 1960. B.S., Texas Woman's University, 1930.

SHIRLEY LARSEN MCDONALD, Dietitian, 1960, 1961. B.S., Texas Technological College, 1957.

MATtie nola Mcleod, Assistant Food Service Manager, 1959, 1960.
LAVERNE CHRON MEACHAM, Food Service Manager, 1958.
JOYCE VARNER MOODY, Relief Dietitian, 1962.
B.S., North Texas State University, 1952.

STELLA EDNA PEEKS, Dietitian, 1955, 1960.
B.S., Texas College of Arts and Industries, 1944; M.S., Texas Technological College, 1949.
FLORENCE STONE PIERCE, Assistant Food Service Manager, 1962.
B.S., Texas Technological College, 1949.

ERIS MANNEY PORTER, Relief Food Service Manager, 1961.
VIRGINIA SIMPSON ROBERSON, Food Service Manager, 1961, 1963.
HAZEL GLOSSON ROBERTS, Food Service Manager, 1960.
MARY LUCILLE ROBERTS, Assistant Food Service Manager, 1963.
DELMA BAINS SCOTT, Dletitian, 1962, 1963.
B.S., Howard Payne College, 1940.

[^82]GORDY MAXINE THATCHER, Rellef Dietitian, 1963.*
B.S., New Mexico State University, 1961.

MYRTIS COLTHARP THOMPSON, Assistant Dietitian, 1962.
B.S., Texas Technological College, 1962.

ELIZABETH MARIE PETTISS TOLES, Assistant Food Service Manager, 1963, 1964.** B.A., Loulsiana Polytechnic Institute, 1962.

MAURINE HAGINS USSERY, Assistant to the Dietitian, 1963.
CLAIR DEAN RAY WESTBROOK, Relief Food Service Manager, 1959, 1963.

## Room Reservations

HUBERT LEE BURGESS, Supervisor of Residence Hall Room Reservations, 1934, 1947. BILLY DONN HAYNES, Accounting Clerk, Office of Residence Hall Room Reservations, 1960, 1962.
B.A., Wayland Baptist College, 1960.

## Supervisory Staff

## FOR MEN

WELBORN KIEFER WILLINGHAM, Assistant Dean of Men in Charge of Residence Hall Supervision for Men, 1963.
B.A., Texas Technological College, 1949; M.Ed., The University of Texas, 1956.

THOMAS KENNETH ABRAHAM, Supervisor, 1964.***
B.S. in I.E., Texas Technological College, 1963.

ALBERT WAYNE BODKIN, Supervisor, 1962.
B.S., Texas A \& M University, 1960.

FRANK POSEY BROWN, JR., Supervisor, 1963.
B.B.A., Texas Technological College, 1963.

FLOYD COLLINS EVANS, Supervisor, 1963.
B.S., Wayland Baptist College, 1963.

WILLIAM CRAWFORD LATHAM, Supervisor, 1963.
B.S., University of South Carolina, 1960.

WAYNE RAY UNDERWOOD, Supervisor, 1962.****
B.B.A., Texas Technological College, 1962.

RICHARD ELLIS VADEN, Supervisor, 1963.
B.B.A., The University of Texas, 1960.

CHARLES HENRY WALLACE, Supervisor, 1961.
B.S., Texas Technological College, 1958.

SIDNEY LOWE WAYNICK, Supervisor, 1963.*****
B.B.A., Texas Technological College, 1963.

## FOR WOMEN

DOROTHY TAFT GARNER, Assistant Dean of Women in Charge of Residence Hall Supervision for Women, 1956.
B.A., University of Oklahoma, 1928; M.A., 1933; M.Ed., 1956.

MARGARET PATten APPLEGATE, Relief Residence Hostess, 1962, 1963.
CAROLINE MASON BOSWORTH, Counselor, 1958.
B.A., University of Oklahoma, 1932; M.Ed., 1958.

SARAH EMILY Yates BURDEN, Relief Resident Hostess, 1958.
FANNIE CASH LAAS, Counselor, 1962.
B.A., West Texas State University, 1926; M.Ed., Trinity University, 1956.

SHIRLEY MANSELL, Counselor, 1960.
B.A., Goucher College, 1926.

ALICE LAWRENCE MAY, Counselor, 1954, 1957.
MARY BARNETT PATTILLO, Counselor, 1963.
B.S., Texas Technological College, 1934; M.Ed., Sul Ross State College, 1950.

MATTIE HAWKINS POOL, Relief Resident Hostess, 1963.
EMMA MUNCY RECE, Counselor, 1961.
Ph.B., University of Chicago, 1922; M.A., 1929.
GENEVIEVE SIMPSON STINNETT, Counselor, 1963.
B.S. West Texas State University, 1952; M.Ed., 1954.

EVELYN LOVE STOVALL, Counselor, 1957.
B.S., George Peabody College for Teachers, 1926; M.A., 1927.

[^83]
## Testing and Counseling

JAMES EDWARD KUNTZ, Director, 1951, 1959.
B.S., Fort Hays Kansas State College, 1937; M.S., 1938; Ph.D., Purdue University, 1950.
MARJORIE FLORY KUNTZ, Psychometrist, 1958.
B.A., McPherson College, 1938.

## Ex-Students Association

PHILIP WAYNE JAMES, Executive Director, 1957, 1960. B.S. in Ed., Texas Technological College, 1957.

## Audio-Visual Services

ARCHIE BOYD MITCHELL, Executive Secretary, West Texas Cooperative Audio-Visual Services, 1960.
B.S., Texas Technological College, 1951; M.Ed., 1954; Ed.D., 1963.

## Statistics

| Enrollment for the Fall Semester, 1963 |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Freshmen | Sophomores | Juniors | Seniors | Graduates | Totals |
| Agriculture | 230 | 212 | 251 | 244 | 54 | 991 |
| Arts and Sclences | 1,836 | 1,273 | 1,058 | 895 | 694 | 5,756 |
| Business Administration | 761 | 588 | 602 | 530 | 85 | 2,566 |
| Engineering | 582 | 496 | 412 | 494 | 70 | 2,054 |
| Home Economics | 250 | 171 | 121 | 104 | 23 | 669 |
| TOTALS Total Men | $\begin{array}{r} 3,659 \\ -\quad 7,731 \end{array}$ | 2,740 | $\begin{aligned} & 2,444 \\ & \text { Total } \end{aligned}$ | $\begin{gathered} 2,267 \\ \text { Women } \end{gathered}$ | $4,305^{926}$ | 12,036 |

Enrollment for the Spring Semester, 1964

|  | Freshmen | Sophomores | Juniors | Seniors | Graduates | Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Agriculture | 225 | 235 | 243 | 257 | 51 | 1,011 |
| Arts and Sciences | 1,635 | 1,220 | 1,021 | 937 | 802 | 5,615 |
| Business Administration | 702 | 602 | 647 | 522 | 90 | 2,563 |
| Engineering | 483 | 432 | 372 | 491 | 68 | 1,846 |
| Home Economics | 224 | 163 | 127 | 96 | 31 | 641 |
| TOTALS Total Men | $\begin{array}{r} 3,269 \\ -7,598 \end{array}$ | 2,652 | $\begin{aligned} & 2,410 \\ & \text { Total } \end{aligned}$ | $\stackrel{2,303}{\text { omen }-~}$ | $\begin{gathered} 1,042 \\ , 078 \end{gathered}$ | 11,676 |

Enrollment for the Long Session, 1963-1964*

|  | Freshmen | Sophomores | Juniors | Seniors | Graduates | Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Agriculture | 287 | 241 | 281 | 255 | 70 | 1,134 |
| Arts and Sciences | 2,036 | 1,426 | 1,169 | 955 | 977 | 6,563 |
| Business Administration | 908 | 660 | 672 | 559 | 117 | 2,916 |
| Engineering | 657 | 553 | 446 | 506 | 79 | 2,241 |
| Home Economics | 283 | 183 | 136 | 109 | 35 | 746 |
| TOTALS Total Men | $\begin{array}{r} 4,171 \\ -8,752 \end{array}$ | 3,063 | $\begin{aligned} & 2,704 \\ & \text { Total } \end{aligned}$ | $\stackrel{2,384}{\text { omen }-~}$ | ${ }_{1,848}^{1,278}$ | 13,600 |

Enrollment for the Summer, 1963
FIRST TERM

| Agriculture |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Freshmen | Sophomores | Juniors | Seniors | Graduates | Totals |
|  | 35 | 35 | 57 | 107 | 44 | 278 |
| Arts and Sciences | 313 | 333 | 449 | 561 | 912 | 2,568 |
| Business Administration | 97 | 140 | 209 | 318 | 53 | 817 |
| Engineering | 76 | 128 | 168 | 331 | 49 | 752 |
| Home Economics | 543 | 45 | 41 | 59 | 66 | 754 |
| TOTALS Total M | $\begin{gathered} 1,064 \\ -2,926 \end{gathered}$ | 681 | $\begin{aligned} & 924 \\ & \text { Total } \end{aligned}$ | $\begin{gathered} 1,376 \\ \text { Vomen } \end{gathered}$ | $\underset{2,243}{1,124}$ | 5,169 |

SECOND TERM

| Agriculture |  |  |  |  | Graduates | Totals193 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Freshmen | Sophomores | Juniors | Seniors |  |  |
|  | 20 | 30 | 34 | 81 |  |  |
| Arts and Sciences | 216 | 235 | 339 | 479 | 464 | 1,733 |
| Business Administration | 78 | 104 | 171 | 299 | 44 | 696 |
| Engineering | 48 | 101 | 142 | 304 | 45 | 640 |
| Home Economics | 47 | 34 | 30 | 62 | 32 | 205 |
| TOTALS Total Men | $\begin{array}{r} 409 \\ -2,321 \end{array}$ | 504 | $\begin{aligned} & 716 \\ & \text { Total } \end{aligned}$ | $\begin{array}{r} 1,225 \\ \text { fomen } \end{array}$ | $1,146^{613}$ | 3,467 |

Summer Session, 1963
(EXCLUDING DUPLICATES)

|  | Freshmen | Sophomores | Juniors | Seniors | Graduates | Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Agriculture | 43 | 45 | 63 | 122 | 51 | 324 |
| Arts and Sciences | 406 | 397 | 513 | 640 | 1,047 | 3,003 |
| Business Administration | 129 | 170 | 234 | 352 | 57 | 942 |
| Engineering | 96 | 150 | 178 | 352 | 51 | 827 |
| Home Economics | 549 | 51 | 50 | 74 | 53 | 777 |
| TOTALS Total Men | $\begin{array}{r} 1,223 \\ -3,340 \end{array}$ | 813 | $\begin{aligned} & \text { 1,038 } \\ & \text { Total } \end{aligned}$ | $\begin{array}{r} 1,540 \\ \hline \end{array}$ | $\underset{2,533}{1,259}$ | 5,873 |

[^84]
## Attendance, 1925-1963



## SEMCESTERS

| Year |  | Fall | Spring | Long Session* | First Term | $\begin{aligned} & \text { Second } \\ & \text { Term } \end{aligned}$ | Summer <br> Session* | Extension | Totals** |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1933-34 | ... | 1,943 | 2,067 | 2,361 | 1,596 | 1,096 | 1,970 | 1,236 | 5,567 |
| 1934-35 |  | 2,433 | 2,184 | 2,684 | 1,549 | 1,114 | 1,956 | 1,403 | 6,043 |
| 1935-36 |  | 2,441 | 2,338 | 2,748 | 1,470 | 886 | 1,678 | 1,522 | 5,948 |
| 1936-37 |  | 2,703 | 2,591 | 3,010 | 1,459 | 892 | 1,695 | 1,255 | 5,960 |
| 1937-38 |  | 3,154 | 2,998 | 3,494 | 1,580 | 986 | 1,839 | 1,067 | 6,400 |
| 1938-39 |  | 3,507 | 3,335 | 3,896 | 1,647 | 1,069 | 1,932 | 1,137 | 6,965 |
| 1939-40 |  | 3,890 | 3,636 | 4,246 | 1,485 | 1,014 | 1,800 | 1,198 | 7,244 |
| 1940-41 |  | 3,797 | 3,398 | 4,076 | 1,298 | 862 | 1,522 | 1,063 | 6,661 |
| 1941-42 |  | 3,549 | 2,906 | 3,824 | 1,376 | 1,035 | 1,653 | 1,050 | 6,527 |
| 1942-43 |  | 2,860 | 2,166 | 3,079 | 980 | 717 | 1,140 | 1,273 | 5,492 |
| 1943-44 |  | 1,696 | 1,454 | 1,928 | 904 | 705 | 1,060 | 1,354 | 4,342 |
| 1944-45 |  | 1,949 | 1,669 | 2,222 | 913 | 658 | 1,060 | 2,084 | 5,366 |
| 1945-46 |  | 2,443 | 3,220 | 3,744 | 2,310 | 2,011 | 2,670 | 1,791 | 8,205 |
| 1946-47 |  | 5,366 | 5,183 | 6,095 | 2,704 | 2,265 | 3,067 | 2,625 | 11,787 |
| 1947-48 |  | 6,114 | 5,572 | 6,689 | 2,728 | 2,332 | 3,097 | 3,059 | 12,845 |
| 1948-49 |  | 6,145 | 5,760 | 6,750 | 2,839 | 2,315 | 3,189 | 3,006 | 12,945 |
| 1949-50 |  | 5,844 | 5,463 | 6,511 | 2,733 | 2,161 | 3,127 | 4,212 | 13,850 |
| 1950-51 |  | 5,475 | 4,660 | 6,124 | 2,310 | 1,881 | 2,745 | 3,627 | 12,496 |
| 1951-52 |  | 4,906 | 4,554 | 5,634 | 1,957 | 1,547 | 2,389 | 3,282 | 11,305 |
| 1952-53 |  | 5,160 | 4,576 | 5,885 | 1,998 | 1,598 | 2,422 | 2,677 | 10,984 |
| 1953-54 |  | 5,418 | 5,066 | 6,274 | 2,124 | 1,676 | 2,570 | 2,838 | 11,682 |
| 1954-55 |  | 6,257 | 5,859 | 7,229 | 2,480 | 1,947 | 2,900 | 3,467 | 13,596 |
| 1955-58 |  | 7,156 | 6,430 | 7,992 | 2,793 | 2,384 | 3,286 | 3,151 | 14,429 |
| 1956-57 |  | 8,055 | 7,394 | 9,004 | 3,049 | 2,478 | 3,586 | 3,808 | 16,398 |
| 1957-58 |  | 8,566 | 7,739 | 9,524 | 3,004 | 2,472 | 3,563 | 4,218 | 17,305 |
| 1958-59 |  | 8,770 | 7,927 | 9,787 | 3,617 | 2,504 | 3,945 | 4,645 | 18,377 |
| 1959-60 |  | 8,866 | 8,121 | 9,858 | 3,661 | 2,700 | 4,350 | 5,061 | 19,269 |
| 1960-61 |  | 9,178 | 8,682 | 10,297 | 4,152 | 2,774 | 4,743 | 5,413 | 20,453 |
| 1961-62 |  | 10,212 | 9,669 | 11,419 | 4,757 | 3,202 | 5,534 | 4,380 | 21,333 |
| 1962-63 |  | 11,183 | 10,638 | 12,483 | 5,169 | 3,467 | 5,873 | 4,818 | 23,174 |
| 1983-64 |  | 12,036 | 11,676 | 13,600 |  |  |  |  |  |

## Degrees Conferred, 1927-1963

| SCHOOL OF AGRICULTURE Total Degrees conferred | 3,077 |
| :---: | :---: |
| SCHOOL OF ARTS AND SCIENCES <br> Total Degrees conferred | 9,408 |
| SCHOOL OF |  |
| BUSINESS ADMINISTRATION |  |
| Total Degrees conferred | 4,429 |
| SCHOOL OF ENGINEERING |  |
| Degrees conferred | 5,065 |

SCHOOL OF HOME ECONOMICSTotal Degrees conferred1,785
THE GRADUATE SCHOOL
Total Masters' Degrees conferred . 2,970
Total Doctors' Degrees conferred ..... 94
HONORARY
DEGREES CONFERRED ..... 21
TOTAL DEGREES CONFERRED, 1927-1963 ..... 26,849

Summary of Degrees Conferred, 1927-1963

| Total Bachelors' Degrees | 23,764 |
| :---: | :---: |
| Total Masters' Degrees | 2,970 |
| Total Doctors' Degrees | 94 |
| Total Honorary Degrees | 21 |
| TOTAL Degrees Conferred |  |



[^85]
## Appendix

TEXAS TECHNOLOGICAL COLLEGE ESTABLISHING AND PROVIDING FOR THE LOCATION THEREOF.

## S.B. No. 103

Chapter 20
(Page 32)
GENERAL LAWS OF THE STATE OF TEXAS Passed by the THIRTY-EIGHTH LEGISLATURE at the REGULAR SESSION.

An act to establish a State college in Texas, west of the ninety-eighth (98th) meridian and north of the twenty-ninth (29th) parallel, to be known as the Texas Technological College; providing for the location of such college; its government; the control of its finances; defining its leading objects and prescribing generally the nature and scope of instruction to be given; conferring upon the Board of Directors of said College the rights of eminent domain; making the necessary appropriation for the purchase of land, the location, establishing and maintenance of said college, and declaring an emergency.

Be it enacted by the Legislature of the State of Texas:

Section I. There shall be established in this State a college for white students to be known as the Texas Technological College, said college to be located north of the twenty-ninth (29th) parallel, and west of the ninety-eighth (98th) meridian, and shall be a co-educational college giving thorough instruction in technology and textile engineering from which a student may reach the highest degree of education along the lines of manufacturing cotton, wool, leather and other raw materials produced in Texas, including all branches of textile engineering, the chemistry of materials, the technique of weaving, dyeing, tanning, and the doing of any and all other things necessary for the manufacturing of raw materials into finished products; and said college shall also have complete courses in the arts and sciences, physical, social, political, pure and applied, such as are taught in colleges of the first class leading to the degrees of Bachelor of Sclence, Bachelor of Arts, Bachelor of Literature, Bachelor of Technology and any and all other degrees given by colleges of the first class; said college being designated to elevate their ideals, enrich the lives and increase the capacity of the people for democratic selfgovernment and particularly to glve instruction in technological, manufacturing, and agricultural pursuits and domestic husbandry and home economics so that the boys and girls of this State may attain their highest usefulness and greatest happiness and in so doing may prepare themselves for producing from the State its greatest possible wealth.

Sec. 2. The government, control and direction of the policies of said technological college shall be vested in a board of nine (9) directors to be appointed by the Governor who shall hold office for a period of six (6) years, said board of nine (9) directors to be so divided that the terms of three (3) directors shall expire every two years, and it shall be the duty of the Gov-
ernor in making the appointment of the first board of directors, to indicate in hls appointment the name of the director whose term shall expire in two (2) years, the name of the director whose term shall expire in four (4) years, and the name of the director whose term shall expire in six (6) years; all of said directors to hold their office until their successors are qualified, unless a removal is made by the Governor for inefficiency or inattention to their duties as members of such board.

The board of directors of the Texas Technological College shall provide a president therefor who shall devote his entire time to the executive management of said school and who shall be directly accountable to the board of directors for the conduct thereof.

Sec. 3. In addition to the courses provided in technology and textile engineering, the said Texas Technological College shall offer the usual college courses given in standard senior colleges of the first class and shall be empowered to confer approprlate degrees to be determined by the board of directors and shall offer four-year courses, two-year courses, or short-term courses in farm and ranch husbandry and economics and the chemistry of solls and the adaption of farm crops to the peculiar soil, climate and condition of that portion of the State in which the college is located, and such other courses and degrees as the board of directors may see fit to provide as a means of supplying the educational facilities necessary for this section of the State, and it shall be the duty of the board of directors to furnish such assistance to the faculty and students of said college as will enable them to do original research work to apply the latest and most approved method of manufacturing and, in general, to afford the facilities of the college for the purpose of originating, developing, supporting and maintaining all of those agencles (physical, mental and moral) for the development of the physical, mental and moral welfare of the students who attend the college and for the further purpose of developing the material resources of the state to their highest point of value and usefulness by teaching the arts of commerce and manufacturing. All male students attending this college shall be required to receive such instruction in military science and tactics as the board of directors may prescribe which shall, at all times, comply in full with the requirements of the United States Government now given as a prerequisite to any ald now extended or hereafter to be extended by the Government of the United States to State institutions of this character and all such white male students shall, during their attendance at such college, be subject to such military discipline and control as the board of directors may prescribe.

Sec. 4. The chairman of the State Board of Control and the State Superintendent of Public Instruction, the President of the University of Texas, the President of the College of Industrial Arts of Texas, and the President of the Agricultural and Mechanical College of Texas shall constitute
a board charged with the responsibility for the location of the Texas Technological College, a majority of whom shall be authorized to act under the terms of this bill in the location of said school; said board being restricted in the choice of the location to the area mentioned in Section 1 of this act and as soon after the passage and approval of this act as practical, said locating board shall make careful investigation of proposed sites for the said institution. Consideration shall be given to climatic conditions, supply of water, accessibility and such other matters as appropriately enter into the selection of the desirable location of an institution of this kind. It is further provided that the said locating board shall not be influenced to any degree in the determination of its selection of a location by offers and promises of bonuses and gifts, directly or indirectly, to the State of Texas, as a consideration for the location of said college at any particular place, but a primary consideration which shall outweigh all others in the minds of the members of the locating board, shall be to locate this college where it can, in the future, render the greatest service to the State and to the section of the United States for which it is especially intended; but this is not to be interpreted to mean that the board of directors shall not have authority to accept gifts of land, money for students' loans, permanent improvement or any other objects of value when tendered for the purpose of more completely carrying out the purpose of this act; said gifts to be made after said school is located and established and if a suitable location for said college is offered by any city or community. The lands bought shall be so located that the administration building will be within convenient distance to the residence section of the town where located, or the place where the students reside.

Sec. 5. The said locating board shall have authority to select approximately two thousand $(2,000)$ acres of land for the site of said college and agree with the owner or owners thereof upon the price to be paid therefor, which said agreement shall be reduced to writing by the said locating board, signed and delivered to the board of directors herein provided for, who shall thereupon have full authority to contract for the purchase of said land for said purpose, and upon the approval of the title thereto by the Attorney General of the State of Texas, to pay for said land and any improvements thereon in any sum not to exceed one hundred and fifty thousand $(\$ 150,000)$ dollars.

Sec. 6. It is further provided that, when said locating board has selected a site for said college, it shall be the duty of said board to make a full and complete report of all details connected with the selection of the site for the said college to the Governor of the State of Texas. The filing of this report with the Secretary of State shall legally constitute the establishing of the college.

Sec. 7. The board of directors of the said Texas Technological College is hereby vested with the power of eminent domain to acquire for the use of said college such land as may be necessary for the purpose of carrying out its purposes by condemnation proceedings such as are now provided for railroad companies under the laws of the State of Texas.

Sec. 8. There is hereby appropriated from the general revenues of the State, not otherwise appropriated, the following sums, or so much thereof as may be necessary:

1. Twenty-five hundred $(\$ 2,500)$ dollars of the available revenue of the state, or so much thereof as may be necessary, to become available upon the passage and approval of this act, for the purpose of paying the expense of the locating board in determining the location of said institution.
2. One hundred and fifty thousand ( $\$ 150,000$ ) dollars of the avallable revenues of this State, or so much thereof as may be necessary, to become available September 1, 1923, for the purchase of the necessary lands for the location and establishment of said school, and any portion of which amount not used for the purchase of lands shall be available for the purposes provided in the following sections thereof.
3. Five hundred thousand $(\$ 500,000)$ dollars for the fiscal year ending August 31, 1924, for the purpose of providing necessary utilities, machinery, permanent improvements, equipment and buildings for said college.
4. Three hundred and fifty thousand ( $\$ 350,000$ ) dollars for the fiscal year ending August 31, 1925, for the purpose of providing necessary utilities, machinery, permanent improvements, equipment and buildings for said college; and
5. In the event any portion of the sums hereby appropriated should not be used for and during the year for which they are hereby appropriated, such sums shall become available for the succeeding year, for the purposes herein provided, and for no other.

Sec. 9. The fact that Texas is producing annually millions of dollars worth of raw materials, which are being shipped to distant factories to be made into finished products together with the fact that Texas has no adequate institution for teaching technology and the art of textile manufacturing and the fact that the needs of that portion of the State where this college shall be located are inadequately supplied with educational institutions, create an emergency and an imperative public necessity for this act to take effect at once and for the suspension of the constitutional rule requiring bills to be read on three separate days, it is therefore enacted that said rule be suspended and this act take effect and be in force on and after its passage.

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[^0]:    * One unit in general mathematics may be accepted as a substitute for one of the required units in mathematics toward entrance to the Schools of Agriculture, Business Administration and Home Economics, and for nonscience majors in Arts and Sciences. Courses falling under the description of arithmetic are not accepted as one of the uniform required units in mathematics.

[^1]:    * Includes 2 \% State Sales Tax on meals.

[^2]:    * In residence.

[^3]:    * At Texas Tech.

[^4]:    - A student in agricultural education or home economics education must consult his department head regarding the proper time to file this certification plan.

[^5]:    235. Fundamentals of Agricultural Economics. (3:3:0)

    Fundamental economic principles and their application to farm and ranch prob-

[^6]:    Prerequisite: Senior standing in agriculture. Methods in building and supervising the vocational agriculture students' farming program. Methods of organizing and administering a high school Future Farmer chapter.

[^7]:    522. Advanced Methods in High School Vocational Agriculture. (2:2:0)
    Advanced methods of teaching vocational agriculture in all-day classes in the high school.
[^8]:    233. Principles of Agricultural Engineering. (3:2:2)

    Prerequisite: Sophomore standing in engineering. Basic principles of farmstead layout and its function as a production plant. Engineering involved in agricultural crop production, conditioning, and storage; feed preparation and processing; and livestock handling systems. Effective use of such utilities and labor-saving devices as water supply; electrical and mechanical power; and disposal of sewage and refuse.

[^9]:    Prerequisite: Chem. 341. Chemical composition of plants and animals. Digestlbility, energy, and manurial value of feeds. Feeding standards and calculation of rations for maintenance, growth, fattening, milk, wool, and egg production.

[^10]:    egg industry. Influence of varieties and strains, environment, feeds, culling and

[^11]:    Hours required for graduation exclusive of P.E., Band, or Basic ROTC-140.

[^12]:    - Blblical Literature is an instructional area, not a department within the College.

[^13]:    * Students must complete 12-14 hours in the same language. Students will be placed at the appropriate level by the Department of Foreign Languages. See Page 169.
    ** If $31 / 2$ units of mathematics including 2 of algebra, 1 of plane geometry, and plane trigonometry are accepted for admission, no further courses in mathematics are required. If 3 units are accepted including 2 units in algebra and 1 in plane geometry, Math 131, 133,135 , or 136 is required.

[^14]:    - If 2 or more units of laboratory science, biological or physical or both, but not including general or applied science, are accepted for admission, one year of a laboratory course in college will satisfy the natural science requirement.

[^15]:     Education, and Recreation for Women.

    * Satisfies one semester of the College physical education requirement.
     physician. Forms may be secured from the Department of Health, Physical Education, and Recreation for Women

[^16]:    - Students taking an all-level certificate must continue to register for Educ. 431 for elementary and Educ. 432 for secondary teaching.
    ** Including Biol. 141-142 and two semesters of physical science.

[^17]:    - May duplicate courses in 1-10 above. Plan I must include 9 hours of advanced courses, and Plan II must include 12 hours of advanced courses.
    ** Both the requirements for the degree and the certificate must be completed at the time of graduation.
    ** May duplicate courses in 1-6 above.
    *** Only 18 hours required for certification program; for degree purposes 6 hours of advanced professional courses in physical education may be used by students majoring in physical education. For certification the student must take Educ. 330, 332, 334. 436.

[^18]:    

[^19]:    * With the consent of the Head of the Department a pre-medical or a pre-dental student may substitute another course offered in the Department of Biology.

[^20]:    Some of the principles and applications of inorganic, organic, and biochemistry.
    Only for nursing students, and some home economics students and applicable only to degrees with these majors. Does not serve as prerequisite for any other course in chemistry.

[^21]:    - Can be used by graduate students for minor credit only.
    ** Normally for graduate minor credit only.

[^22]:    Prerequisite: Eligibility for provisional certificate with elementary endorsement (or Educ. 3345 and 3346 or equivalents), and 6 hours of science. Methods and materials for helping children develop an understanding of their natural and physical environment.

[^23]:    * Normally credit for graduate minors only.

[^24]:    * Graduate courses may be repeated for credit with permission of department as topics vary.

[^25]:    * All courses numbered 100 through 300, except Latin 133, require the completion of the second semester in order to receive credit for the first.

[^26]:    * Approval of these programs is pending.

[^27]:    - Also fulfills physical education requirement.

[^28]:    - Course fee, $\$ 5$.

[^29]:    131. Trigonometry. (3:3:0)

    Prerequisite: One year of high school plane geometry and two years of high school algebra or the equivalent. Trigonometric functions; radians; logarithms and exponential equations; solutions of triangles; functions of composite angles; identities; trigonometric equations; complex numbers; De Moivre's Theorem.

[^30]:    534. Marching Band Direction. (3:3:0)

    Rehearsal routine, instrumentation of and scoring for the marching band. Planning, charting, and producing marching band shows. Preparation for marching band con-

[^31]:    * Instruction in medical areas will be given by members of the faculty of the University of Texas Post-Graduate School of Medicine in Lubbock.

[^32]:    230. Introduction to Sociology. (3:3:0)

    Study of human group behavior, including the forms which group life takes, relationships of groups to other groups, influence of groups on the individual, and relationships of individuals to each other as members of groups.

[^33]:    * Exclusive of freshman and sophomore physical education, band, or basic ROTC. Advanced ROTC credit may be used, up to 12 semester hours in certain curricula, in meeting the total semester-hour degree requirements.

[^34]:    *With approval of the major adviser, 3 semester hours may meet requirement of one humanities field.
    ** A student electing a foreign language should have free elective hours to cover the second course in any hyphenated series selected.

[^35]:    * Only biology, chemistry, geology, or physics may be used to meet the science requirement.
    ** Substitute an approved 3 -hour business administration course if student has not had shorthand.
    ** Or 6 hours of approved courses in accounting, economics, management, or marketing.

[^36]:    437. Principles of Auditing. (3:3:0)

    Prerequisite: Acct. 335. Auditing objectives, procedures, internal control, and working papers pertaining to the various balance sheet and income statement accounts and the presentation of these accounts in the financial statements.

[^37]:    110. Professional Careers in Business. (1:1:1)

    Factors important for career preparation; behavioral factors in successful choice and pursuit of business occupation. Occupational information and labor market data relate requirements, opportunities, and compensation features of business employment and preparation for those who aspire to successful careers in the business world.

[^38]:    * Offered for the last time during 1964-65.

[^39]:    Or atx hourk of approved courses in accounting, oconomics, managomont, or markoting.

[^40]:    - Minimum hours required for graduation-141 and P.E., Band, or Basic ROTC

[^41]:    Minimum hours required for graduation- 140 and P.E., Band, or Basic ROTC

    - See Page 272 for Alternate Freshman Year

[^42]:    Minimum hours required for graduation-140 and P.E., Band, or Basic ROTC.

[^43]:    4351. Energy Conversion I. (3:3:0)

    Prerequisite: Senior standing in electrical engineering. Elements of energy conversion applied to direct current and alternating current static and rotating machinery. Theoretical study of transient and steady state operating characteristics of machines with applications. Symmetrical components.

[^44]:    Minimum hours required for graduation-140 and P.E., Band, or Basic ROTC

    - See Page 272 for Alternate Freshman Year

[^45]:    4121. Mechanical Engineering Seminar. (1:1:0)

    Prerequisite: Advanced standing and approval of Head of Department. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas.

[^46]:    Minimum hours required for graduation - 131 and $P$. E., Band, or Basic ROTC.

[^47]:    Prerequisite: Current registration in Chem. 341. The physical and chemical principles of processes required to prepare yarns and fabrics for dyeing and finishing.

[^48]:    * Ap. A. 131 from Group II applies toward the 24 semester hours.

[^49]:    * Cloth. \& Text. 131 from Group II applies toward the 24 semester hours.

[^50]:    - Cloth. \& Text. 131 from Group II applies toward the 24 semester hours.

[^51]:    * Food \& Nutr. 131 from Group II applies toward the 24 semester hours.

[^52]:    * H.E. Ed. 411 from Group II applies toward the 24 semester hours.

[^53]:    * For science requirements, see Page 354.

[^54]:    - Ch. D. \& F.R. 131 from Group II applies toward the 24 semester hours.

[^55]:    * H. Mgt. 131 from Group II applies toward the 24 semester hours.

[^56]:    * Appointed October 1, 1963.
    ** On leave, February 10, 1964, through August 31, 1964.
    *** Appointed February 1, 1964.
    **** Appointment effective February 10, 1964, through August 31, 1964.

[^57]:    * Deceased, November 2, 1963.

[^58]:    * On leave, 1963-1964.
    $\therefore$ Appointed September 23, 1963.
    ** On military leave, 1963-1964.

[^59]:    * On leave, 1963-1964.
    ** Appointed Associate Dean February 1, 1964.
    *** Transferred November 9, 1963.

[^60]:    * 1964 Spring Semester.

[^61]:    - Appointed Assistant Dean February 10, 1964.

[^62]:    * Appointed September 26, 1963.
    ** Resigned March 31, 1964.

[^63]:    * 1964 Spring Semester.
    * Appointed February 29, 1934.
    *** On leave, 1963-1964.

[^64]:    * On leave, 1963-1964; resigned October 14, 1963.
    *O On leave, 1964 Spring Semester.
    *** 1964 Spring Semester.

[^65]:    * Appointed September 24, 1963.

[^66]:    * On leave, 1963-1964.
    ** Appointed April 1, 1964.
    ** 1964 Spring Semester.

[^67]:    - On leave, 1963-1964.
    ** Appointed November 15, 1963.
    *** Appointed February 1, 1964.

[^68]:    * On leave, 1964 Spring Semester.
    * Appointed October 1, 1963.

[^69]:    * 1964 Spring Semester.
    * Resigned October 5, 1963.

[^70]:    * 1963 Fall Semester.
    ** On leave, 1963-1964.

[^71]:    * On leave, 1963-1964.
    ** On leave, January 1, 1964, through May 31, 1964.
    *** 1963 Fall Semester.
    $* * *$ On leave, 1964 Spring Semester.
    **** 1964 Spring Semester.
    ***** Appointed February 1, 1964.

[^72]:    - 1963 Fall Semester.

[^73]:    * Resigned January 31, 1964.
    ** On leave, 1963-1964.
    ** On leave, February 10, 1964, through August 31, 1964.
    **** Appointed February 1, 1964.
    Appointment effective September 16, 1963, through February 29, 1964.

[^74]:    * Transferred September 10, 1963.
    ** 1963 Fall Semester.
    $\cdots *$ On leave, 1963-1964.
    ***: Appointment effective January 2, 1964, through May 31, 1964.
    **** 1964 Spring Semester.

[^75]:    * 1964 Spring Semester
    ** On leave, 1963-1964.
    ** Appointed November 4, 1963.

[^76]:    * 1964 Spring Semester.
    * 1963 Fall Semester.
    *** Appointed October 15, 1963.
    **** Resigned October 10, 1963.

[^77]:    1964 Spring Semester.

    * 1963 Fall Semester.

[^78]:    * 1964 Spring Semester
    ** 1963 Fall Semester.

[^79]:    * 1964 Spring Semester.
    ** 1963 Fall Semester.

[^80]:    * Resignerl January 31, 1964.
    ** Appointed February 1, 1964.

[^81]:    * Resigned, March 31, 1964.
    ** Appointed April 1, 1964.

[^82]:    * Appointed February 1, 1964.
    ** Resigned January 31, 1964.
    *** Appointed October 1, 1963.
    *** Resigned October 14, 1963.
    ***** Employed November 18, 1963.
    ***** Employed October 1, 1963, through November 30, 1963.
    ****** Resigned October 2, 1963.
    ******* Employed October 18, 1963, through November 30, 1963.

[^83]:    $\therefore$ Employed October 1, 1963.

    * On leave, October 1, 1963, through November 30, 1963.
    $\because$ Appointed February 1, 1964.
    *** Resigned February 7, 1964.
    **** Employed October 25, 1963.

[^84]:    * Excluding duplicates.

[^85]:    * Duplicates excluded.
    ** Totals of Long Session, Summer Session, and Extension.

