

**BULLETIN  
OF  
TEXAS TECH UNIVERSITY**

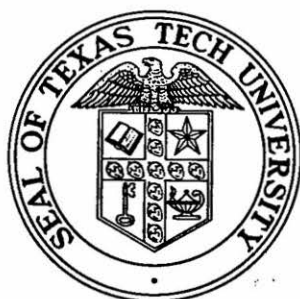
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*Forty-fifth Annual*  
***General Catalog***

*With Announcements for 1970-1971*



"This institution is an integrated institution of higher learning at all levels."—*Policy Statements of the Board of Regents of Texas Tech University.*

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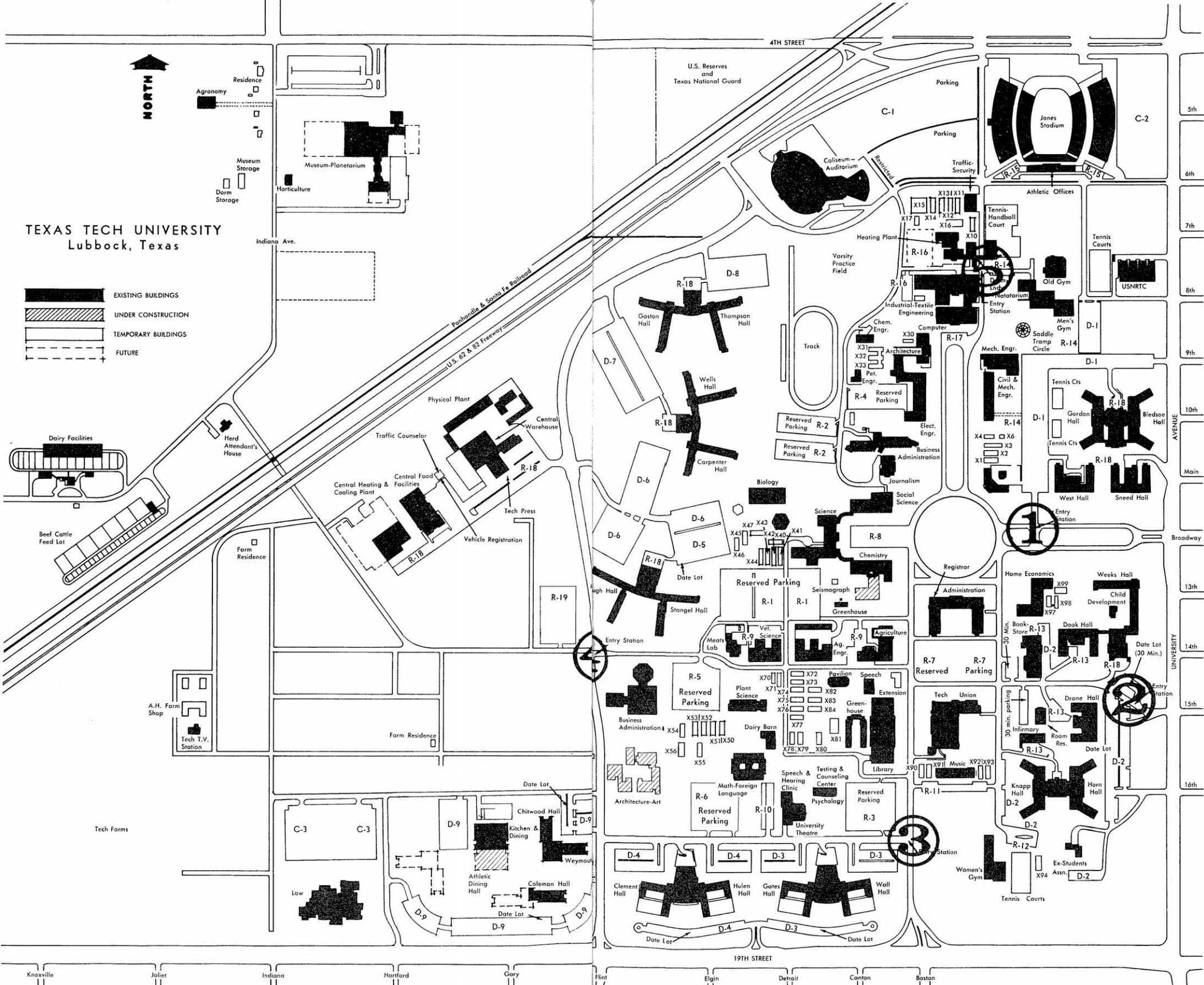
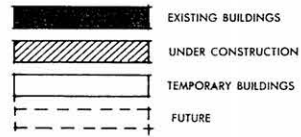
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TEXAS TECH UNIVERSITY  
Lubbock, Texas



# University Calendar, 1970 - 1971

## *Forty-sixth Annual Session*

### Fall Semester 1970

- Aug. 25 Tuesday. Fall semester begins.  
10 a.m., residence halls open for occupancy. First meal, breakfast, Wednesday, Aug. 26.
- Aug. 26-29 Wednesday-Saturday noon. Registration for the fall semester.
- Aug. 31 Monday. 7:30 a.m., classes begin.
- Sept. 7 Monday. Labor Day. Day of no classes.
- Sept. 29 Tuesday. Grade of W will be given for all courses dropped on or before this date.
- Oct. 20 Tuesday. Midsemester grade reports due in the Registrar's office.
- Oct. 24 Saturday. Homecoming.
- Nov. 25 Wednesday. 12:30 p.m., classes dismissed for Thanksgiving holidays.
- Nov. 30 Monday. 7:30 a.m., classes resume.
- Dec. 4 Friday. Last day to drop a course.
- Last day to file a statement of intention to graduate in December in the academic dean's office.
- Last day to pay graduation fee in the Comptroller's office.
- Dec. 14-21 Monday-Monday. Final examinations for the fall semester.
- Dec. 22 Tuesday. 10 a.m., residence halls close. Fall semester ends.
- Dec. 28 Monday. Final grade reports due in the Registrar's office.

### Spring Semester 1971

- Jan. 12 Tuesday. Spring semester begins.  
10 a.m., residence halls open for occupancy. First meal, breakfast, Wednesday, Jan. 13.
- Jan. 13-16 Wednesday-Saturday noon. Registration for spring semester.
- Jan. 18 Monday. 7:30 a.m., classes begin.
- Feb. 15 Monday. Grade of W will be given for all courses dropped on or before this date.
- March 8 Monday. Midsemester grade reports due in the Registrar's office.
- March 14 Sunday. All-University Recognition Service.
- March 15 Monday. Last day for May degree candidates to order academic regalia and invitations at the Bookstore.
- March 20 Saturday. 12:30 p.m., classes dismissed for Spring Vacation.
- March 29 Monday. 7:30 a.m., classes resume.
- April 22 Thursday. Last day for May degree candidates to complete correspondence courses.

Last day for May degree candidates to remove grades of I and P.

Last day for May degree candidates to submit to the Graduate Dean the final copy of theses and dissertations and to pay binding fee.

Last day for May degree candidates to file statement of intention to graduate in the academic dean's office and to pay graduation fee in the Comptroller's office.

April 23	Friday. Last day to drop a course.
May 3-10	Monday-Monday. Final examinations for the spring semester.
May 11	Tuesday. 10 a.m., residence halls close. Degree candidates may occupy rooms until 10 a.m., Sunday, May 16.
May 12	Wednesday. Final grade reports due in the Registrar's office.
May 15	Saturday. 8 p.m., Commencement exercises. Spring semester ends.

### **Summer Session 1971**

May 31	Monday. First summer terms begins.
July 10	Saturday. First summer term ends.
July 12	Monday. Second summer term begins.
Aug. 21	Saturday. Second summer term ends.

### **Fall Semester 1971**

Aug. 25	Wednesday. Fall semester begins.
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## General Information

### Texas Tech University

Texas Tech University has been designated as one of the state-supported multidisciplinary universities in Texas. The institution's purposes are to meet the increasing demands for continuing education for all citizens and to provide educational opportunities for the youth of the state at undergraduate, professional, and graduate levels. Furthermore, it strives to create an atmosphere conducive to scholarly and scientific research, with a special emphasis on arid and semi-arid lands.

**History.** Created by legislative action on February 10, 1923, Texas Technological College was located in Lubbock, a city with a current population estimated at 170,000. It is situated on the fertile South Plains at an elevation of 3,250 feet above sea level and has a dry, invigorating climate.

Texas Tech opened in the fall of 1925 with six buildings and an enrollment of 910. The subdivisions for instruction (originally called "colleges") were Liberal Arts, Household Economics, Agriculture, and Engineering. These later became "divisions," and in 1956 the designation of "schools" was adopted, with Liberal Arts becoming Arts and Sciences and Household Economics, Home Economics. Graduate instruction was begun in the fall of 1927 within the "College" of Liberal Arts, and in 1935 the Graduate School was established. The School of Business Administration was created (as the "Division" of Commerce) in 1942. Both the School of Law, provided for in 1965, and the School of Education, organized in 1966, began instruction in 1967. The School of Agriculture became the School of Agricultural Sciences in 1968.

By action of the Texas State Legislature, Texas Technological College formally became Texas Tech University on September 1, 1969. At that same time the schools of Agricultural Sciences, Arts and Sciences, Business Administration, Education, Engineering, and Home Economics became known as "colleges."

The 61st Legislature of the state of Texas authorized the creation of Texas Tech University School of Medicine at Lubbock as a separate educational institution under the administration of the President and Board of Regents of Texas Tech University.

Texas Tech's greatest growth came after World War II. Graduate programs in most of the academic areas were instituted, the Library was expanded, and the athletic program was incorporated into the Southwest Athletic Conference. In the fall of 1969 the enrollment was 19,490.

Texas Tech University is one of the youngest major universities in the nation, and a spirit of intellectual growth pervades the campus. Many of the special facilities for research, such as the Computer Center, the Seismological Observatory, and the Southwest Collection, are described on subsequent pages of this catalog. The Library, heart of the academic world, is one of the finest in the Southwest, with strong collections in the humanities and the biological and physical sciences.

Presidents of Texas Tech 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), and Robert Cabaniss Goodwin (1960-1966, Acting President, 1959-1960). Grover E. Murray became President on September 1, 1966, and was formally inaugurated on November 1.

**Physical Plant.** With 1,839 acres in one contiguous tract, the Texas Tech University campus is one of the largest in America. In addition, the University

operates the Texas Tech University Research Center near Amarillo, consisting of 5,822 acres of deeded land, and holds an agricultural use permit on another 8,000 acres.

In physical appearance the campus buildings are predominantly in the architectural style of the Spanish Southwest. Newer buildings have been designed to harmonize with the original Spanish Renaissance motif. There are 207 buildings on the campus, 106 of which are considered permanent. The plant value has been set at \$112 million with an anticipated additional \$15 million in construction to be added by 1971.

The Texas Tech campus is also noted for its landscaping which presents colorful, well-kept flower beds and tree-dotted lawns to complement its architecture.

**Financial Support.** The University receives the major share of its educational and general operating funds from appropriations by the legislature from general revenue funds of the state. Income from tuition, fees, and services also forms an important part of the University's revenue. For the construction of academic and general buildings, funds are made available from a constitutional building amendment fund, building use fees, Skiles Act, and federal matching funds. The residence halls, intercollegiate athletics, bookstore, student publications, student health center, student union, and press are all self-supporting enterprises.

The Texas Tech University Foundation is a nonprofit corporation which serves as the gift-receiving agency of the University. 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.

**Organization of the University.** Texas Tech University is governed by a Board of Regents whose nine members are appointed to six-year terms by the Governor of the state of Texas; the terms of office of three Regents expire every two years. The Board is legally responsible for the establishment and control of the University's policies; it appoints the President who directs the operations of the institution. Based on the President's recommendations, the Board of Regents appoints all faculty and other employees and fixes their salaries.

The President is responsible for carrying out policies determined by the Regents and for supervising the University's activities.

Upon recommendation of the faculty and under authority vested in him by the Board of Regents, the President also confers all degrees granted by the University. The President is assisted by an Executive Vice President, a Vice President for Academic Affairs who oversees the educational programs of the institution, a Vice President for Financial Affairs who is responsible for the financial activities of the University, a Vice President for Public Affairs who is responsible for coordinating all activities of related groups outside the University, and a Vice President for Student Affairs who is concerned with the general welfare of the students and is responsible for a variety of programs which the University considers appropriate to the total development of the individual.

The Dean of Admissions is responsible for the acceptance of students under the institution's admission policies. The registration process is under the direction of the Registrar who also is responsible for maintaining student records.

In the traditional pattern of a university, Texas Tech University consists of six colleges and two schools: the College of Agricultural Sciences, the College of Arts and Sciences, the College of Business Administration, the College of Education, the College of Engineering, the College of Home Economics, the School of Law, and the Graduate School. All undergraduate degree programs are conducted by the six instructional colleges; all graduate degree programs, by the Graduate School; and the law degree program, by the School of Law. Each college is administered by a dean and his staff, and each consists of a number of instructional departments which offer the courses taught at Texas Tech.

**Ex-Students Association.** The Ex-Students Association is an independent organization cooperating with and serving the University and providing an



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

**ICASALS.** The Board of Regents has adopted as the unique mission of this institution the study of those arid and semi-arid lands which comprise approximately half of the exposed surface of the earth. The International Center for Arid and Semi-Arid Land Studies (ICASALS) was officially established in August 1966 as an integral part of Texas Tech, with its foundation in the entire undergraduate and graduate academic structure of the University.

ICASALS is the medium of coordination and implementation of research activities of faculty and staff pertaining to arid and semi-arid lands. Its ultimate goal is the development of a world-wide center of multidisciplinary knowledge of these lands. To this end plans are now being effected for a new ICASALS Institute and Museum which will be devoted to continuing education and dynamic displays and exhibits. A library and documentation center is also envisioned which will make available holdings of all types of recorded knowledge, including books, periodicals, manuscripts, photographs, films, tapes, and computerized information.

ICASALS will be directly concerned, also, with the application of these data and techniques to human needs. It will serve as a laboratory as well as a library and to the best of its abilities and resources will encourage and assist projects of all types, wherever a useful function may be performed. ICASALS hopes by this means to render a significant contribution towards the social, technological, and economic advancement of arid and semi-arid regions throughout the world.

It is expected that in the future Texas Tech will be known not only as a university of the first class but also as the home of an international endeavor designed to enrich the lives and increase the knowledge of all peoples.

## **Campus Facilities**

**University Bookstore.** The University 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 University Bookstore is a modern self-service enterprise. It is self-supporting and is owned and operated by the University. All profits from its operation are returned to student welfare and recreation uses.

**Computer Center.** The Computer Center is a service organization for the rest of the campus. The organization provides computer services to the students, the faculty, and the administration. The building, located on the Engineering Mall, houses three digital computers—an IBM S/360 Model 50, a CDC 1604, and an IBM 1401. In addition to machine services, the Computer Center provides consulting service on problems related to the operation and use of the machines. Information regarding these offerings and use of the equipment is available at the Computer Center.

**Food Services.** The Tech Union has three separate dining areas in the building to serve the students, faculty, and guests on the campus. The informal snack bar, serving breakfasts, hot and cold drinks, sandwiches, and a la carte orders, is open approximately 14 hours a day during the week and from 2 p.m. to 10:30 p.m. on Sundays. The cafeteria provides a variety of foods at reasonable prices during the lunch period, and assorted drinks and snacks are also available in this area from 8 a.m. to 2 p.m., five days a week. The faculty club serves coffee and rolls during the day and a cafeteria-style lunch five days a week to club members and their guests. The Union also provides a catering service for campus organizations and groups and is prepared to serve from 5 to 500 in one or more of the special dining areas in the building. Arrangements can be made at the Union office for buffets, banquets, luncheons, teas, coffees, and picnic orders.

All students who live in the residence halls on the campus are provided meals by Residence Halls Food Service in food service areas. Three meals per day are served except on Sundays when no evening meal is served.

In order to minimize the cost to the student, Texas Tech Residence Halls Food Service maintains a Central Food Facility for warehousing of canned food, staple groceries, and frozen food; for preliminary processing of produce; and for preparation of baked goods. The facility also houses the offices of Residence Halls Food Service and an experimental kitchen for recipe standardization and testing of foods for purchase.

There are food and soft drink concession machines in most buildings on the campus which are owned and serviced by contract vendors under the direction of the Business Manager.

**Jones Stadium.** Clifford B. and Audrey Jones Stadium, named for Texas Tech's President Emeritus and his wife who provided the initial funds to make possible its construction, was built in 1947 on the north side of the campus. In 1960 it was enlarged to a capacity of 41,500 permanent seats. About 15,000 more seats can be placed on the north slope, which is usually utilized by overflow crowds. Since state tax money is not used for intercollegiate athletics at Texas Tech, bonds were issued to help finance the stadium expansion.

Precedent-setting methods were used in this expansion. First, the entire east stands—more than 10 million pounds of concrete and steel—were moved 226 feet eastward. Then the area between the east and west stands was excavated to a depth of 30 feet—259,000 cubic yards of earth being removed. At the bottom of the man-made bowl, a new gridiron was laid out and new turf planted. Along the slopes created by the excavation new seats were constructed, bringing the stadium to its present capacity.

Although other stadiums are larger, few have more seating between the goal lines, since only 4,500 permanent seats are in the south end zone, and few are as well lighted for night games.

Synthetic turf is being installed in the stadium preparatory to the opening of the 1970 football season.

**KTXT-FM.** KTXT-FM is the University-owned radio station with studios in the Speech Building. Operating on a frequency of 91.9 mc with a power of 10 watts, the station provides a service of music, news, and special programs complementary to that provided by local commercial stations and provides a channel of communication within the Texas Tech community and from the University to the Lubbock community. KTXT-FM is financed by the Student Association, administered by the Speech Department, and managed and staffed by Texas Tech students. Station facilities are also used by students enrolled in telecommunications.

**KTXT Television.** Station KTXT-TV (channel 5) is an open-channel, non-commercial educational television station owned and operated by Texas Tech through the Division of Continuing Education. The studio, transmitter, and 450-foot tower of KTXT-TV are located on the campus. Broadcasts can be received over a 50-55 mile radius on conventional residential sets.

The station is equipped with the most modern and finest monochrome facilities available, and it is staffed and operated by professional personnel. KTXT-TV is a member of a 170-station noncommercial network which regularly broadcasts programs originating from N.E.T., E.T.S., and P.B.S. Fifteen hours per week of these programs are broadcast in color. These 170 stations comprise P.B.S. (the Public Broadcast Service).

**Library.** The University Library houses 635,000 volumes, 215,000 units of microforms, and 260,000 items in the Documents collection. The Library is one of the two Regional Depositories for U.S. Government Documents in Texas and is a depository of the Atomic Energy Commission. The total figure of well over 1,000,000 items includes annual subscriptions to 6,500 periodicals. The titles have been carefully chosen by subject specialists in the University to support its academic programs and plans. The above figures indicate adequate basic materials in the humanities and social sciences as well as in the sciences and engineering. All materials are housed in a modern, well-equipped building with an open stack arrangement, with study tables conveniently placed throughout the subject areas.



Twenty-seven professional, experienced librarians are on duty to give assistance to the Library user, and these professional librarians are assisted by 37 subprofessionals and over one hundred students. The Library is open to students and faculty until 12 midnight most of the year, according to the following schedule: 7:20 a.m. to 12 midnight, Monday through Friday; 7:20 a.m. to 5 p.m., Saturday; 2 p.m. to 12 midnight, Sunday. Closed holidays. Summer terms: 7:20 a.m. to 10 p.m., Monday through Friday; 7:20 a.m. to 5 p.m., Saturday; 2 p.m. to 10 p.m., Sunday.

The Library has seven rapid copy machines in use at the nominal price of five cents a page. The Library is a member of the Texas Information Exchange, which instantly links the Library with 30 other Texas libraries and some libraries outside the state with teletype equipment.

**Municipal Auditorium-Coliseum.** The Municipal Auditorium-Coliseum is located on the north edge of the campus near Jones Stadium. The Auditorium will seat approximately 3,200 persons and the Coliseum approximately 10,000 persons. Although they are operated by the City of Lubbock, both are used frequently on a rental basis by the University for such occasions as convocations, registration, graduation exercises, cultural events, basketball games, rodeos, and other special events.

**Museum.** The Texas Tech University Museum is chiefly financed by legislative appropriations handled through the University. Sponsorship and additional financial aid come from the West Texas Museum Association. Membership in this association is open to all persons interested in the Museum's objectives. The association publishes the *Museum Journal* annually for distribution to all members. Museum exhibits include three permanent galleries treating history, ethnology, archaeology, and geology, and one gallery, plus wall space, for rotating and temporary exhibits. A Spitz planetarium, located in a building behind the Museum, is used in demonstrations for school children on weekdays and for the public at regular intervals. The Museum is open to students, faculty, school classes, and all interested visitors to Lubbock. A new air-conditioned museum building is under construction on a 76 acre site on the campus at 4th Street and Indiana. A special gallery will serve as a "showcase" for ICASALS. It is planned to move to these larger quarters in the near future, making the present building in the heart of the campus available for classrooms and faculty offices.

**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 University 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 where positions with Lubbock business firms or with the University are listed.

Degree candidates are urged 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 University to complete its files of valuable biographical material on each of its graduates. Such information has potential value for the graduate, himself, whether or not he seeks employment at the time of graduation.

**Preschool Laboratories.** The Department of Home and Family Life in the College of Home Economics maintains four Preschool Laboratories as observation centers for the program in child development and family relations. The children are divided into different age groups ranging from two and one-half through five years of age. These laboratories provide varied opportunities for University students to study young children at different ages and, at the same time, assist them in the understanding of their own development and behavior. The laboratories meet the professional and physical standards of the National Association for the Education of Young Children. Applications for enrolling children in the Preschool Laboratories should be made through the Department of Home and Family Life.

**Research Farms.** In addition to the 1,400-acre farm laboratory adjoining the main campus, the College of Agricultural Sciences operates the Texas Tech University Research Center at Pantex, Texas, northeast of Amarillo. This farm consists of approximately 5,822 acres of deeded land and an agricultural use permit on an additional 8,000 acres now controlled by the Atomic Energy Commission.

The Research Center serves as a valuable facility for agricultural research and education, adding strength, flexibility, and prestige to the academic programs at Texas Tech. Opportunities are provided there for studies in livestock, crops, soils, range management, entomology, agricultural economics, and water use.

A new center for scientific research in beef cattle improvement has been constructed at the Research Center with a \$530,000 grant from the Florence Lee and C. L. Killgore Foundation. Known as the Killgore Beef Cattle Center, this facility serves as the headquarters for all studies in the Panhandle area originating from the Research Center.

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

**Residence Halls.** The residence halls system consists of 20 halls, 10 dining rooms, 9 kitchens, a central food processing and storage facility, and administrative offices. The residence halls house 3,575 single men and 4,654 single women students.

In the fall of 1970, Texas Tech's residence halls for women will be Doak, Horn, Knapp, Weeks, Wall, Gates, Hulen, Clement, Stangel, Coleman, and Chitwood. Men students will be housed in Sneed, Gordon, Bledsoe, Gaston, Thompson, Wells, Carpenter, Murdough, and Weymouth halls.

The following services and facilities are provided in all residence halls: direct telephone lines to each room, mail service to each hall (except the Wiggins Complex — Chitwood, Coleman, and Weymouth halls — which has a central mail distribution center), storage rooms for trunks and luggage, color TV lounges, elevators, quiet study areas, and public lounges. Most halls have laundry rooms with automatic washers and dryers, and laundry and dry cleaning service is available in the men's residence halls. In addition, each hall has its own special features, and the newer halls are fully air-conditioned.

Each residence hall is organized into a student association which assists in the government of the hall and sponsors such activities as dances, mixers, movies, weekly devotionals, recognition dinners, open houses, and tutoring services.

**Seismological Observatory.** The Seismological Observatory is located adjacent to the Science and Chemistry buildings. The observatory has been in continuous operation since 1956 and since 1961 has been one of the stations of the World-Wide Standard Seismograph Network. It serves as the center of research in seismology and as a laboratory for graduate students in geophysics.

**Southwest Collection.** The Southwest Collection is both the University archives and a repository for historical materials pertaining to the American Southwest.

Its quarters in the Social Science Building provide facilities for study and research, as well as space for storage of personal papers, biographical data, noncurrent business records, maps, microfilms, tape recordings, periodicals, photographs, newspapers, and a special library of Southwestern books.

Manuscript holdings alone total four million leaves, and data pertaining to cataloged collections are published by the Library of Congress in the *National Union Catalog of Manuscript Collections*.

All materials may be used by both students and the general public for research or reference. Service is provided during the following hours: 8 a.m. to 5 p.m., Monday through Friday (open until 7 p.m., Tuesday); 8 a.m. to 12 noon, Saturday. Inquiries are welcomed.

**Speech and Hearing Clinic.** The Speech and Hearing Clinic, located in the University Theater Building, is designed primarily to provide clinical practicum for student speech pathologists and audiologists. Clinical cases of all ages are accepted upon referral from physicians, social agencies, and public or private schools.

In addition the clinic aids Texas Tech students who have speech and/or hearing disorders. Some possibilities for therapy include articulation disorders, voice disorders, and speech disorders resulting from cerebral palsy, cleft palate, or brain injury. The clinic can assist in the selection of a hearing aid and provide the training necessary for its proper use.

**Student Health Center.** The Student Health Center, staffed by licensed medical doctors and other professional personnel, consists of an in-patient

department (hospital) and an out-patient department (clinic). The services of the University physicians and nurses are restricted to the hospital and clinic; dormitory and house calls are not made.

The 32-bed hospital accommodates students who become ill enough to require constant supervision as in-patients. Students are admitted to the hospital by a University physician and are under the care of a physician and registered nurse 24 hours a day. Students are entitled to the maximum of seven days per semester without charge, except for the cost of special medications, examinations, treatments, x-ray examinations, and special laboratory tests. For each day beyond the seven-day period, patients are charged a modest fee to cover the cost of food, drugs, supplies, and special services.

For students not requiring hospitalization, the clinic is open 8 a.m. to 4:30 p.m., Monday through Friday, and 8 a.m. to 12 noon, Saturday. Students may receive emergency treatment at other times by reporting to the nurse on duty in the hospital.

The Student Health Center cannot care for students requiring treatment by specialists or admission to a general hospital. However, the staff will provide emergency treatment and assist in transferring student-patients to a general hospital. The staff will notify the parents, guardians, or nearest relative of the patient believed to be threatened with a serious illness or thought to be in need of an emergency surgical operation.

The Student Health Center cannot be responsible for the continued medical care of students suffering from chronic diseases. The University physicians will be glad to recommend private doctors and specialists to give special care to students who need it and who are unacquainted with the physicians of Lubbock. A continuation of a student's allergy desensitization program is available as prescribed by his private doctor. A letter of authorization from his parents and a letter of authorization-instructions from his private doctor are required and will expedite this program. A service charge is made for these injections, and all the injectables are furnished by the student. Hours for these injections are 10 a.m. to 12 noon and 12:30 to 3:30 p.m., Monday through Friday.

The Student Health Center 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, immunizations, and skin tests before registration. Immunizations required are smallpox, tetanus, and poliomyelitis. All of these must have been received within five years before registration. The University 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 the state. The University physicians may recommend the dismissal of any student who refuses medical advice or who willfully exposes his associates to a contagious disease.

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

A supplementary student accident and sickness insurance plan is available for those students desiring more coverage. Details of this insurance plan are explained in the Student Life section of this bulletin.

**Tech Union.** The University has invested over a million and a half dollars to create a Union with 88,000 square feet of floor space for the leisure time activities of the campus community. This space is divided into two ballrooms, used for social functions and banquets, a snack bar that will seat 316, a cafeteria with a capacity of over 200, a games area with billiards and table tennis, a faculty club, and seven meeting rooms of various sizes and decor that are used for meetings and catered meals. Along with the divided areas the building has several attractive lounge areas, two newsstands, and two check rooms for the convenience of all persons on the campus. The Union also provides such services as check cashing, mimeographing, poster making, lost and found department, food catering, and information.

Besides providing many facilities for student and faculty use, the Union sponsors programs to supplement the student's classroom education. To accomplish this the Union Program Council, made up of student committees, plans and presents various cultural, social, educational, and recreational programs which range from dances to fine arts festivals. All students, including

freshmen, are eligible to work on the various Union committees and are urged to sign up for the committee of their choice each semester at registration.

Hours of operation of the Union are 7:00 a.m. to 10:30 p.m. weekdays, and 7:00 a.m. to 11:30 p.m., Friday and Saturday. The Union is open from 2 until 10:30 p.m., Sunday. The Director of the Tech Union is on the staff of the Vice President for Student Affairs.

**Texas Tech Press.** Since its activation, the Texas Tech Press has done the printing and publishing for the University. This service includes books, magazines, booklets, catalogs, bulletins, programs, reports, announcements, letterheads, envelopes, office forms, and registration material. The Press also binds and rebinds books, periodicals, and magazines for the Library and for other departments. It is among the most modern and best equipped plants in the state.

**Textile Research Center.** The objectives of the Textile Research Center are to improve textile processing techniques and products utilizing the natural fibers, cotton, wool, and mohair, and blends of these fibers with other textile materials, including man-made fibers; to evaluate characteristics of fibers; to provide facilities and skilled personnel to help train students in textile science and engineering; and to assist the textile industry in solving problems from the processing of raw materials through the finishing of fabrics.

The facilities include a Physical Measurements Laboratory for determining the properties of fibers, yarn, and fabrics; a modern 1,000 spindle pilot plant for studying the relationships between fiber properties and variables in yarn manufacturing operations; a Structures Laboratory incorporating knitting and weaving equipment for the creation of experimental fabrics; and a Chemical Processes Laboratory with laboratory-scale and production-scale equipment available for preparing, dyeing, and finishing of fabrics.

The Textile Research Center has a continuing history of service in aiding the fiber and textile interests of Texas. The broadened scope of the Textile Research Center includes expanded activities in research on cotton, research on wool, and research on mohair, plus the added dimension of research on blends of natural and man-made fibers.

**Traffic-Security Department.** This branch of physical plant operations is under the supervision of the Assistant Vice President for Administrative Services. It provides security for the entire University plant and community (which is much larger than many towns in Texas) in addition to handling campus traffic and parking problems.

**University Counseling Center.** Texas Tech maintains the Counseling Center to help its students in resolving academic problems, in selecting careers, in deciding on major fields of study, and in working through personal or emotional problems. Under the auspices of the center, a reading improvement-study skills course is available to Texas Tech students and staff. High school graduates and others who definitely plan to enter the University are also eligible to use the services of the Counseling Center.

**University Theater.** An educational facility of the Department of Speech and Theatre Arts, the modern, air-conditioned University Theater was completed in 1964. Designed for flexibility in production as well as enjoyment of performance, the theater contains 395 seats in aisleless, "continental" arrangement. The stage is adaptable to a variety of styles of production and, in addition to facilities for proscenium staging, has two side stages and a flexible forestage. Well-equipped and fully soundproof backstage areas include a scene shop, a costume shop, a makeup laboratory, dressing rooms, offices, and the Ruth Pirtle Green Room, a multipurpose room providing space for receptions, meetings, classes, rehearsals, and intimate arena theater productions.

A regular schedule of major dramatic productions is presented each school year under the direction of professionally qualified members of the faculty of the Department of Speech and Theatre Arts. Plays are chosen so that each student generation has an opportunity to see a representative selection of the great plays of the past and the experimental works of modern playwrights. In addition there is a repertory season each summer. Participation in productions affords laboratory experience for students in theatre arts, but all students of the University are eligible to take part.



## Admission and Registration

Texas Tech University seeks to admit mature students who will benefit most from its programs, and evidence of satisfactory preparation for college work must therefore be presented. As a state-supported institution, the University recognizes its responsibility to provide educational opportunities to those who show ability and desire to benefit therefrom. Prospective students are advised that persons of marginal ability stand little likelihood of making satisfactory progress in this institution. Extensive records of past performances indicate that students who either ranked in the lower half of their high school graduating classes or received a score below 800 on the Scholastic Aptitude Test of the College Entrance Examination Board will, in all likelihood, find it difficult to make satisfactory progress toward a degree at Texas Tech.

The Dean of Admissions controls admission to the instructional colleges of the University; correspondence concerning such matters should be directed to him at Texas Tech University, Lubbock, Texas 79409. His office is located in the northwest corner of the ground floor of the Administration Building.

**Freshman Admission Procedure.** To enter the University 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.

The deadline for applying for admission is August 15, but new students are urged to submit their applications and transcripts to the Admissions office by June 15. If a person desiring admission waits until after August 1 to file his application, it will not be possible for the Admissions office to notify him by mail of his admission status. A student desiring early notification of tentative 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 and returned by a physician to the Dean of Admissions.

4. Furnishes scores on the Scholastic Aptitude Test of the College Entrance Examination Board.

5. Decides which college or degree program he wishes to enter. A student needing advice or counseling may come to the campus before registration begins and consult with any of the academic deans or the Counseling Center.

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 application will be evaluated. Normally the applicant will be notified of his acceptance or rejection before he reaches the campus.

6. Reports to the University campus on the day indicated 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 University for a period of orientation prior to actual registration. This program has been developed to assist the student in selecting a course 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 1025, Berkeley, California 94701. 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 the University to take these tests during his senior year in high school or during the following summer. They may be taken at the University 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 University:

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 colleges of Agricultural Sciences, Business Administration, Education, and Home Economics there are no further admission requirements beyond those listed above.

Students applying for entrance to the College of Arts and Sciences will be accepted if they meet the uniform requirements listed above. 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 Mathematics, Level I (Standard), Test (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 the first two semesters of attendance at the University.

Acceptance of freshmen by the College of Engineering is based upon the general requirements for admission to the University; 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 .....	1
4. Trigonometry .....	$\frac{1}{2}$
5. Physics .....	1

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

In order that those applicants displaying clear evidence of intellectual competence and professional promise may be accepted, even though they do not meet the above recommendations, special provisions have been made for their entrance.

Students planning to major in any of the engineering programs or the architecture-construction option are advised to take, in addition to the Scholastic Aptitude Test (SAT) required of all students admitted to the University, the Mathematics, Level I (Standard), Test, which is also offered by the College Entrance Examination Board. This test is required of students wishing to begin their first year of mathematics with analytics and calculus. Those who make low scores or who do not take the test will follow a special program for their first year in the College of Engineering. The Mathematics Level I (Standard), Test should not be taken until the student has completed, or nearly completed, the second year of high school algebra and trigonometry, since both are included in this test.

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

**Credit by Advanced Placement and Achievement Examinations.** Students who demonstrate by examination that they have gained a competent know-

\* Related Math I and II may be accepted to satisfy the mathematics requirement in the nonscience, nonengineering majors. One unit in general mathematics may be accepted as a substitute for one of the required units in mathematics in the nonscience, nonengineering majors. Courses falling under the description of arithmetic are not accepted as one of the uniform required units in mathematics.

ledge of the content of certain courses at this University, either in high school or by independent study, may be granted credit for this proficiency. The examinations used for credit placement of entering freshmen are provided by the College Entrance Examination Board (CEEB) and are taken in high school. Exceptions are to be noted in the cases of the departments of Chemistry and Music which use locally developed tests.

**Chemistry:** Upon request by a student, the Department of Chemistry will give an examination in any course offered by the department. Satisfactory achievement on this examination or these examinations permits the student to receive credit for the course or courses involved. Requests for such examinations should reach the office of the Chairman of the Department of Chemistry no later than August 15 prior to the opening of the fall semester or January 6 prior to the opening of the spring semester. Application forms may be secured from that office.

**English:** Entering freshmen who (1) receive a rank of 4 or 5 on the CEEB Advanced Placement Examination or (2) make a score of 650 or above on the Achievement Examination and submit a writing sample judged superior will receive credit for 6 hours of freshman English.

Entering freshmen who take the CEEB Advanced Placement Examination and receive a rank of 3 may elect (1) to receive credit without grade for 3 hours of freshman English and enroll in English 134 to complete their requirements in freshman English, or (2) to enroll in proficiency sections of sophomore English in lieu of freshman English and complete their required hours of English in advanced courses. Entering freshmen who make a score of 575 or above on the Achievement Examination and submit a writing sample judged superior may elect either of the options mentioned above.

**Foreign Languages:** Students who satisfactorily complete a high school program of advanced study in French, German, Latin, or Spanish under the CEEB Advanced Placement Program may take the Advanced Placement Examination and may receive 3 to 6 hours of college credit. Such students should request that the results of their examination be sent to the Department of Classical and Romance Languages or the Department of Germanic and Slavonic Languages where they will be reviewed and where credit will be granted according to the following criteria:

1. Students making scores of 2 and 3 will receive 3 hours of credit equivalent to the 331 course in the language presented.
2. Students making scores of 4 and 5 will receive 6 hours of credit equivalent to the 331 and 332 courses in the language presented.

**History:** Credit will be given for History 131 and 132 and/or History 231 and 232 to students who make scores of 4 or 5 on the CEEB Advanced Placement Examinations in European and/or American History. Examinations with scores of 3 will be reviewed by the departmental faculty. Students receiving such credit for History 231 and 232 must present an advanced course in American or Texas history for graduation.

**Mathematics:** Competence necessary to secure credit in mathematics may be demonstrated by a score of 3, 4, or 5 on the CEEB Advanced Placement Examinations in those areas for which such examinations are nationally available.

**Music:** Credit is given for grades of B or better on examinations prepared and administered by the Music faculty in the fields of applied music and music theory. These examinations are available during the first semester of the freshman year.

**Physics:** Credit will be given for either Physics 141 and 142 or Physics 143 and 241 to students who make a score of 3 or better on the CEEB Advanced Placement Examination.

**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 who 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 recom-

mended 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 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 program 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 International 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 University by writing to the Dean of Admissions. With the official application form, international 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 an English language to enable him to pursue a regular program of study in an American university. Following admission but prior to enrollment, all students whose native language is not English will be tested on their English language proficiency when they arrive on campus as a basis for academic placement recommendations.

International students who are not in the United States at the time of application should apply a year in advance. An international student will not be admitted to the University 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.** Undergraduate 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 Tech University 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. Admission as a transfer student is based upon the student's performance in the last long semester he attended. Admission as a transfer student will not be based upon summer school performance. A student who has been enrolled for only a summer term or session will be admitted on the basis of his high school record. A student who is not eligible to continue enrollment at Texas Tech may not gain readmission by attending a summer session at another institution.

A transfer student who registered for less than 12 semester hours during his last long semester of attendance must have passed at least one-half of those in academic courses with a minimum grade of C in each course counted. This does not mean a C average, nor may it include 1- or 2-hour courses in band, choir, orientation, physical education, ROTC, etc.

A transfer student who registered for 12 or more semester hours in his last long semester of attendance, even though he may have dropped one or more courses after registration, must have passed at least 9 hours of academic courses (as described above) with a minimum grade of C in each course if he has enrolled for 2, 3, or 4 semesters, and at least 12 hours if he has enrolled for 5 or more semesters. A summer term or a summer session of two terms will count for this purpose as one enrollment.

**Transfer of Credits From Other Colleges and Universities.** In general credit hours earned at another accredited institution with grades of C or better are accepted for transfer to Texas Tech. Transcripts are evaluated by the Admissions office to determine eligibility to enter Texas Tech and by the dean of the college in which the student seeks admission to determine which courses completed at another institution can be accepted toward the degree sought at Texas Tech.

\* The official transcript must have the signature of the proper college official and the impression of the raised college seal.



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 university. 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 Tech. Students inadmissible to this university at the time they were admitted to a nonaccredited institution must pass required testing before being admitted here.

A former student of the University who has afterward attended another institution will be considered as a transfer student when applying for re-admission 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 Tech are published in the *Graduate Catalog*, 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 Examinations. This may be done before enrollment or at the first examination date thereafter.

**Concurrent Registration at Texas Tech and Other Institutions.** A student registered at Texas Tech who wishes to register concurrently at another institution must obtain written approval from his academic dean at Texas Tech. 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.

A student registered at another institution who wishes to enroll concurrently for credit at Texas Tech must have written approval from his institution and make application for concurrent registration with the Dean of Admissions at Texas Tech University.

In no case will a student at the University 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 Tech.

Concurrent registration is not permitted during the summer session.

**Registration.** Each semester and summer term opens with a registration period during which the formal process of enrollment in the University is completed. Prior to registering for each semester or summer term, each student who completes the admission process is furnished preregistration materials with his notice of admission. These materials include the application for a registration permit 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 have a Permit to Register processed and be assigned a registration time. If time permits, the student will be notified by mail when to report for registration. Duplicate permits are not processed until the last day of registration, regardless of the registration time on the original permit.

**Scholastic Order for Registration.** Priority for time of registration is based upon the total number of hours a student has passed plus the total number of grade points he has acquired. These data, accumulated each spring, determine the student's "Registration Number" for both the following fall and spring registrations.

Registration numbers for transfer students are based upon the hours and grade points accepted for transfer, but if transcripts are not on file or other data are delayed, transfer students will not receive scholastic order registration numbers until the following academic year.

Graduate students are assigned registration times in the order that registration materials are returned. Freshmen—students with less than 32 semester hours—are assigned registration times by random selection. This means that each freshman has an equal chance of being assigned any of the scheduled

times to register. Exceptions to any of the assigned registration times cannot be made.

**Matriculation Number.** The Matriculation Number is the student's Social Security number. This number must be furnished on all forms where it is requested. It is the primary means for maintaining a student's academic records. Prospective students who do not have Social Security numbers should apply through their local post offices (or Social Security offices) in time to secure numbers prior to application for admission.

**Stop Enrollment.** Insufficient information or improper information given by the student on any admission or registration form will constitute cause for the student to receive a "Stop Enrollment" card or "Notice of Permit Delay" in lieu of his regular Permit to Register. Suspension or probationary status also constitutes cause for the same action.

**Name Change.** Students who have a change in name after their last registration must provide a certified copy of the marriage certificate or copy of court order which substantiates the legal name change. These documents must be submitted to the Registrar prior to the ensuing registration to be effective for that semester of enrollment. Registration under a name different from the student's last enrollment cannot be accomplished without the above documents, which become a part of the student's permanent record file. All grade reports and transcripts are issued under the student's legal name as recorded in the Registrar's office.

**Transcript Service.** Copies of a student's transcript are available upon written request to the Registrar's office. A copy of the transcript includes only the academic record accumulated at Texas Tech University; copies of transcripts furnished from other institutions become the property of Texas Tech and will not be furnished by the University. The first copy of the transcript is free of charge; thereafter, the cost is \$1 per copy, payable in advance. All transcript requests must be made by the student and must be in writing. Adequate advance notice, normally one week, is required for transcript processing.

**Registration of Undergraduate Students in 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 college 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.

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 credit without obtaining proper approval will be dropped from that course.

**Change of Schedule.** A student who wishes to request a change in his schedule after it has been approved at registration must originate the request in the office of his academic dean who must approve the change. No course may be dropped during the last two weeks of a semester or the last week of a summer term. A fee of \$3 will be charged for each approved request. The University reserves the right to make changes in a student's schedule, for which no fee is charged.

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.

**Enrollment Without Credit.** Persons who wish to audit a course for no grade must obtain written permission from the dean of the college in which

the course is offered. Permission may be denied if the classroom is crowded. Those who audit a course do so for the purpose of hearing or seeing only; they do not have the privilege of participating in class discussions or laboratory or field work, of turning in papers, or of receiving a grade or credit in the course. Students who audit a course will not be listed on the class roll, and no notation of the audit will be made on the student's transcript.

Students who are enrolled for 12 semester hours or more may audit a course without paying an additional fee. Persons who are enrolled for fewer than 12 hours must pay a \$10 fee for auditing a course.

## Finances

The principal business offices of the University are those of the Vice President for Financial Affairs, the Comptroller, and the Purchasing Agent.

The Vice President for Financial Affairs is the chief executive of all the fiscal operations of the University.

The Comptroller is responsible for collecting, depositing, and disbursing all funds received by the University. The collections and deposits are handled by the Cashier and her staff, and funds are disbursed through the Payroll and Accounting departments.

The Purchasing Agent handles purchases of all University equipment, most of which are channeled through the State Board of Control.

**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, checks printed with the magnetic ink characters, or money orders, but all checks or money orders are accepted subject to final payment. Texas Tech University reserves the right to change fees in keeping with acts of the Texas State Legislature or the Board of Regents.

**Summary of Student Expenses.** Every student is necessarily concerned about expenses while attending college. In a large student body such as that at Texas Tech University, 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 in the life of the college community on a modest budget. University 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.

Each student should have approximately \$400 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	\$ 50
Laboratory Fees (estimated)	4	4
Student Services Fee	23	23
Student Union Fee	5	5
General Property Deposit (new student)	7	
Books and Incidentals (estimated)	65	50
Building Use Fee	25	25
Total (estimated)	\$179	\$157

For estimated costs, including residence hall room and board, add charges for the proper residence hall as shown in the section entitled "Charges for Room and Board in University 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 University. Engineering students are required to purchase their own drawing equipment, slide rules, etc., which cost approximately \$100 the first year, or an average of \$50 per semester.

**Registration Fee for Texas 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	6 semester hours—\$27
10 semester hours— 43	5 semester hours— 23
9 semester hours— 39	4 semester hours— 19
8 semester hours— 35	3 semester hours
7 semester hours— 31	or less— 15

**Registration Fee for Non-Texas Students.** Each nonresident (out-of-state) student is required by an act of the Texas Legislature 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	6 semester hours—\$100
10 semester hours— 167	5 semester hours— 84
9 semester hours— 150	4 semester hours— 67
8 semester hours— 134	3 semester hours
7 semester hours— 117	or less— 50

**Interpretations of Residence.** It is the duty of each student to register under the proper residence and pay the correct tuition fees. The explanation below of what constitutes 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 in addition to the proper fee. A copy of the law defining nonresidents is available in the Registrar's office. There can be no change in residence status except upon express authorization by the Dean of Admissions.

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. An individual 21 years of age or under whose parents were formerly residents of Texas is entitled to pay the resident tuition fee for the 12-month period immediately following the parents' change of legal residence to another state.

3. If his parents are divorced, a minor has the same residence status as the parent with whom he is making his home at the time of registration. If he has not lived with either parent, and if 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; provided, however, that such grant of custody was not ordered during or within a year prior to the minor's enrollment in an institution of higher education and was granted under circumstances indicating that such guardianship was not for the purpose of obtaining status as a resident student.

4. 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.

5. 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 by taking out a Texas

driver's license or paying personal property taxes.

6. 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.

7. A nonresident who marries and remains married to a resident of Texas, classified as such under this act at the time of the marriage and at the time the nonresident registers, is entitled to pay the resident tuition fee regardless of the length of time he has lived in Texas, and any student who is a resident of Texas who marries a nonresident is entitled to pay the resident tuition fee as long as he does not adopt the legal residence of the spouse in another state.

8. 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 to qualify 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.

9. 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 the University, the wife or child of military personnel must have on file in the Registrar's office a form 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 or retains his permanent home or residence in the state of Texas as indicated in his personnel records. The spouse and children of a member of the armed forces assigned to duty outside the state of Texas immediately after assignment in Texas may be entitled to pay the resident tuition as long as they reside continuously

in Texas. The spouse and children of a member of the armed forces who is assigned to duty outside the state of Texas and sends his family to the state of Texas may be entitled to pay the resident tuition if they file with the institution of higher education at which the student intends to register a letter of intent, an affidavit, or other evidence satisfactory to the institution stating that they intend to become permanent residents of Texas. The spouse or children of a member of the armed forces who dies or is killed in action while in military service may qualify to pay the resident tuition if they become resi-

dents of Texas within 60 days of the date of death. To qualify under this provision, the student shall submit to the institution of higher education satisfactory evidence establishing the date of death and residence in Texas.

10. Teaching personnel employed at least two-fifths time or nonteaching personnel employed at least one-half time on a regular monthly salary basis shall be permitted to register themselves and members of their immediate family by paying resident tuition without regard to length of time resided within the state.

**Veterans' Exemptions From Fees Under the Hazlewood Act.** Men and women who were legal residents of Texas at the time of entry into the Armed Forces, who have been legal residents of Texas for a period of not less than 12 months immediately preceding their registration in Texas Tech University, 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. These exemptions also apply to the children of members of the United States Armed Forces who were killed in action or died while in the service during World War II or the Korean War. Exemptions are not granted to persons who were discharged from the services 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 Comptroller's office.

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

#### **Miscellaneous General Fees.**

1. *General Property Deposit:* Each student enrolled in the University 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 University. 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.

2. *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.

3. *Student Services Fee:* Every student must pay a \$23 fee each semester of the long session if he is enrolled for 6 semester hours or more.

4. *Student Union Fee:* This is a \$5 fee authorized by state law, to be paid each semester of the long session by every student enrolled for 3 semester hours or more.

5. *Building Use Fee:* This is a fee authorized by state law to be paid each semester by every student enrolled in the University. The charges per semester are as follows:

12 or more Semester Credit Hours	\$25.00
11 Semester Credit Hours	23.50
10 Semester Credit Hours	21.50
9 Semester Credit Hours	19.50
8 Semester Credit Hours	17.50



7 Semester Credit Hours	15.50
6 Semester Credit Hours	13.50
5 Semester Credit Hours	11.50
4 Semester Credit Hours	9.50
3 Semester Credit Hours or less	7.50

6. *Fee for Change in Class Schedule*: Each time a student initiates a change in his previously approved class schedule he must pay a fee of \$3 for each approved request. No charge will be made when the change is made for the convenience of the University. This fee will not be collected after the tenth week of any semester.

7. *Auditing a Course for No Grade*: Students enrolled for 11 semester credit hours or less must pay a fee of \$10 for the privilege of auditing a course.

Students enrolled for 12 semester credit hours or more who have obtained written permission from the dean may audit a course without paying an additional fee. (See section titled "Enrollment Without Credit.")

8. *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.

9. *Replacement of Lost ID-Activity Cards*: Students who lose their ID-Activity Cards may have them replaced by applying at the Comptroller's office and signing a Certification of Lost ID-Activity Card form. A fee of \$5 will be charged any time during the semester for replacement of a lost ID-Activity Card.

10. *Duplicate Receipt Fee*: A fee of 50 cents will be charged for each duplicate registration receipt issued.

11. *Transcript Fee*: Transcript service is provided by the office of the Registrar at a charge of \$1 per copy. For details see section entitled "Transcript Services."

12. *Motor Vehicle Fees*: A fee is required for all motor vehicles to be parked on the campus at any time. A schedule of these fees, together with other vehicle information, is contained in the publication *Campus Traffic and Parking Regulations*, available at the Traffic and Parking Counselor's office or at the Traffic-Security Department.

#### Miscellaneous Special Fees.

1. *Music Fees for Private Instruction*: The University registration fee does not cover the following costs for individual instruction offered by the Department of Music in voice and in 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, 515 .....	\$15.00
Applied Music 125, 126, 145, 146, 225, 226, 235, 236, 245, 246,	
325, 326, 345, 346, 425, 426, 435, 436, 445, 446, 525, 535, 545 .....	\$30.00

The following charges are made for practice room use and piano rentals; they are payable at the Comptroller's office:

One hour per day per semester .....	\$ 5.00
Each additional hour per day per semester .....	\$ 2.50
Musical instrument rental for class strings, woodwinds,	
brasses (each class) .....	\$ 2.50

2. *Fees for Use of Gymnasium Facilities*: Students not enrolled in a physical education laboratory course who wish to use the University gymnasium facilities will pay a fee of \$1 per semester for use of lockers, if they are available. Towel service may be secured by payment of a \$2 laundry fee plus a \$1 deposit which will be refunded upon return of the towel.

Faculty members using the gymnasium-natorium 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 University because of failure to comply with a condition upon which his enrollment was approved, will receive

a refund on registration fees, building use fees, applied music fees, and activity fees according to the following schedule:

1st class day through 14th class day	80 percent
15th class day through 20th class day	60 percent
21st class day through 25th class day	40 percent
26th class day through 30th class day	20 percent
After 30th class day	None
For courses of less than six weeks duration	None

Refunds of tuition and fees will be made according to the above schedule except (1) in no case will fees be refunded to a student suspended from the University by University authorities, and (2) full refund of tuition and fees will be made when the University is at fault. After a student has registered for a laboratory class and has once attended the class, no refund of the laboratory fee will be made unless the University is at fault. If the student is permitted to reenter school during the same semester in which he officially withdrew or was suspended, an additional reentrance fee of \$5 will be charged.

**Charges for Room and Board in University Residence Halls.** All prices indicated below are subject to change without notice prior to registration date and with ten (10) days' notice thereafter. Payments may be made in several ways: (1) for the full nine-month period; (2) August through December; (3) January through April; (4) by the month as outlined below.

Charges for room and board in Bledsoe, Doak, Gordon, Horn, Knapp, and Sneed halls: \$800 for both semesters, or \$145 for August and September plus \$85 per month thereafter; \$400 for spring semester only, or \$145 for January plus \$85 per month thereafter.

Charges for room and board in Carpenter, Gaston, Thompson, Weeks, and Wells halls: \$890 for both semesters, or \$160 for August and September plus \$95 per month thereafter; \$445 for spring semester only, or \$160 for January plus \$95 per month thereafter.

Charges for room and board in air-conditioned Clement, Gates, Hulén, Murdough, Stangel, and Wall halls: \$944 for both semesters, or \$172 for August and September plus \$100 per month thereafter; \$472 for spring semester only, or \$172 for January plus \$100 per month thereafter.

Charges for room and board in air-conditioned Chitwood, Coleman, and Weymouth halls: \$1030 for both semesters, or \$185 for August and September plus \$110 per month thereafter; \$515 for spring semester only, or \$185 for January plus \$110 per month thereafter.

The above charges are for room and board for regular double rooms occupied by two students and include the state sales tax on meals. If facilities are available, a student may sign a single room contract for an additional charge of \$30 per semester or \$60 per academic year. A student in a room alone who has not signed a single room contract will be charged an additional \$15 per month until a consolidation is made with another resident.

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. There will be no statements of account sent to the student or to the parents. A billing of the account will be at the Office of Room Reservations during the dates indicated for payments to be made.

**Residence Hall Reservations.** An application for a room reservation in the residence halls may be secured by sending a request to the Office of Room Reservations. *Do not* send the \$40 deposit with your request. Such deposit should be made when the application is returned to the Office of Room Reservations. Please do not send the checks to the Registrar's office. This only delays the processing of the application. Any questions about residence hall life or furnishings to be brought by the student should also be sent to the Office of Room Reservations. General information on the residence halls will be sent with the application for housing. The \$40 deposit will serve as a reservation fee and will be refunded less any breakage charges unpaid upon fulfillment of the contract.

If the student is unable to enroll in the University, he will receive a refund of his reservation fee *if notice is given in writing to the Office of Room*

**Reservations** on or before July 31 for the fall semester, December 15 for the spring semester, May 31 for the first term of summer school, or June 30 for the second term.

Should the contract be cancelled at the end of the fall semester, a refund of the reservation fee will be made only under the following conditions: if notice is given in writing to the Office of Room Reservations on or before December 15 and (a) the student is graduating, (b) verified physical disability prevents the student from attending class, (c) the student is not reenrolling for the spring semester, or (d) the student is getting married prior to the spring semester.

All unclaimed rooms in the residence halls will be declared vacant at 8 a.m. on the first day of classes, and the deposit will be forfeited. If a student enrolls for the session or the semester, but does not claim his reserved room, he will be subject to room and board charges for the space reserved until notice of release from the office of the Dean of Student Life is received in writing at the Office of Room Reservations. The deposit will also be forfeited if the student moves from his residence hall at any other time during the academic year or summer session for any reason. This includes the student who is dropped from school for disciplinary action.

**Check Cashing Services.** For convenience of the student, personal checks printed with magnetic ink characters may be cashed for limited amounts at the University 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 Part-time Job Opportunities.** In recognition of the worthwhile student who must contribute to his finances through part-time employment, the University has arranged for assistance through the Placement Service.

It is not the policy of the University to encourage an entering freshman to seek employment. If, after careful consideration, a student finds that a part-time job is the best solution, he should consult with the placement office staff. Letters of inquiry should be addressed to the Director of Placement.

**Student Financial Assistance.** The objective of the student financial aid program at Texas Tech University is to provide financial assistance to students who, without such assistance, would not be able to pursue higher education. The financial assistance offered at Texas Tech University is in various forms, including loans, scholarships, grants, and employment, and is awarded to students on the basis of financial need and other qualifications required by the donors of the funds. Need is defined as the difference between the anticipated costs of higher education at Texas Tech University, and the amount of money reasonably available to the student from all other sources. No student or prospective student shall be excluded from participation in or be denied the benefits of any financial aid program at Texas Tech University on the grounds of race, color, national origin, religion, or sex. Although qualifications required for each financial aid fund may differ, the general requirements for financial assistance at Texas Tech University are that the student must be enrolled for at least one-half the normal academic load, be in good academic standing with the University, and be in need of financial assistance.

Texas Tech University participates in the following financial assistance programs:

- Hinson-Hazelwood College Student Loan
- Law Enforcement Education Program
- Federal Guaranteed Loans
- College Work-Study Program
- Educational Opportunity Grants
- Cuban Student Loans
- The Connally-Carrillo Act

In addition to these federal and state supported programs, Texas Tech administers numerous private loan funds and scholarships.

Inquiries concerning student financial assistance should be sent to

Director of Financial Aid  
P. O. Box 4179  
Texas Tech University  
Lubbock, Texas 79409

Although no strict deadlines have been established for applications for most financial aid programs at Texas Tech, preference is given to applications re-



ceived in accordance with the following:

Fall semester	May 1
Spring semester	November 1
Summer session	April 1

Applications received after these dates will be considered, but no guarantee can be given that the funds will be available when needed. Many scholarships have deadlines which are listed in the *Scholarships and Financial Aids* bulletin.

Information about graduate fellowships, traineeships, and scholarships may be secured from the Graduate School.

## Student Life

The Division of Student Life is concerned with the general welfare of the student. Staff members exert their efforts toward seeing that every phase of the college experience represents an opportunity for the growth of the student. They base their 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 offer counseling and guidance service to all students enrolled in the University and are in a position to refer a student to the many University 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.

**Housing.** The determination of the housing of all students, a part of registration, is the responsibility of the Assistant Dean of Students for Administration. The University maintains 20 residence halls which house approximately 8,200 students. The University requires that eligible students live in the University residence halls if there are vacancies. Students who cannot be accommodated in a residence hall at the time of registration and who are not excepted are required to move into a residence hall upon notification by the University. The University feels that its students will have their best opportunity for a well-rounded educational experience while living in a supervised residence hall designed for student living.

**Residence Hall Regulation and Government.** The University maintains its residence halls in the belief that the experience in group living and self-discipline which they afford is wholesome, contributes to academic achievement, and helps materially in the development of the mature person.

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 basis of professional training, experience, and special qualifications for the 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.

**Motor Vehicle Regulations.** Students who operate motor vehicles while attending Texas Tech are required to comply with the traffic and parking regulations as set forth in *Campus Traffic and Parking Regulations*. This publication is available at the Traffic and Parking Counselor's office or at the Traffic-Security Department.

**Student Accident and Sickness Insurance Plan.** Any regularly enrolled student taking 6 semester hours or more may subscribe to a supplemental Student Accident and Sickness Insurance Plan which provides 24-hour coverage on or off campus while in any hospital or under the care of any qualified physician (according to the policy provisions). The 12-month plan covers all vacations and remains in force even though the student graduates or drops out of school. The policy is effective on August 23 (or date applied for, if later) and terminates on August 23 of the following year. A married student may include his spouse and children on the 12-month plan for an additional premium. Students may apply for 9-month coverage which terminates on May 23. The deadline for enrolling is September 23 for the fall semester. New spring students may enroll at a prorated premium with coverage terminating on August 23. The deadline is January 23 for spring enrollees. This insurance is not available to students enrolling for the summer session only.

Complete information on the insurance program is mailed to each student with his permit to enroll.

**Advisement of International Students.** Texas Tech University recognizes the unique problems of adjustment to a new land and culture which face the student from abroad. The University also recognizes that a full and meaningful education and the solution of problems of adjustment for international students depend in part on their association with American students, the American community and family, and the American culture.

The Director of International Student Services at Texas Tech is a member of the staff of the Division of Student Life and is responsible for all nonacademic advisement of international students. The director provides personal counseling, advice on the United States immigration regulations, and liaison between international students and the Community Coordinating Board for International Student Projects.

**Citizenship.** Honesty and integrity in class work, respect for the rights of others, regard for the laws of the nation, the state, and the country, and for city ordinances and campus regulations reflect the ability of the college student to establish sound citizenship values. Hazing of any nature by students or faculty is absolutely prohibited at Texas Tech University.

The students of Texas Tech are given maximum opportunity for citizenship performance. Cooperation with the plan of traffic control on campus, financial responsibility on and off campus, and respect for the privileges offered through the Identification (ID-Activity) Card are significant areas in which each student may demonstrate mature judgment. The *Code of Student Affairs and Rules and Regulations* publication contains the regulations concerning a number of areas of student responsibility and citizenship.

**Participation in Extracurricular Activities.** The broad program of extracurricular activities of Texas Tech University is offered to students in order to provide fellowship, opportunities for leadership, recreation, and co-operative 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 interests suggest.

Any undergraduate student not on disciplinary probation is eligible to become a candidate for or to hold an office in a recognized student organization, or, if otherwise qualified, may represent the University in any extracurricular activity.

Graduate students may participate in extracurricular activities within University policies. They are encouraged to participate in honor societies for which they may be qualified. Graduate students who are satisfactorily pursuing full-time programs of graduate work are eligible to serve as officers in organizations of this type.

There are no eligibility requirements for participation in off-campus trips and activities. Each student participating in an off-campus activity of any type does so on a voluntary basis. Parents and students should understand that each student is responsible for his own safety and welfare while participating in an off-campus activity and that such participation is at the student's own risk. Texas Tech University assumes no responsibility for students participating in off-campus activities. Each student is responsible for making his own individual arrangements with instructors for classwork missed while participating in an off-campus activity.

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 Government.** By enrolling in the University all undergraduate students automatically become members of the Student Association of Texas Tech University. The Student Senate serves as the executive council of the association.

The Student Senate plans, publicizes, and supervises student elections. It supports student enterprises and organizations through funds it receives from student services fees and plays a leading role in the administration of student affairs. It appoints from its membership representatives on University committees including: Admission and Retention; Artists Series Advisory Committee; Athletic Council; Campus Planning; Code of Student Affairs; Courses and Curricula; English Usage; Library; Parking and Traffic Advisory; Parking

Violation Appeals Board; Radio-Television Advisory; Registration; Solicitations; Student Financial Aid; Student Organizations; Student Orientation; Student Publications; Student Service Fee Allocations; University Faculty-Student Discipline; and University Speakers.

The Association of Women Students serves as a coordinating body in all activities concerning women students. Every woman who enrolls in the University 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, the Carol of Lights, training workshops for legislators and officers of the women's residence halls, and other University service projects.

**Clubs and Societies.** The University feels that student organizations compatible with the ends of college education are means toward personal development. The University recognizes some 200 student organizations, whose general supervision is under the staff of the Assistant Dean of Students for Programs.

Recognition of these, and the plan under which they function, is the assignment of the University Committee on Student Organizations, a student-faculty committee appointed by the president of the University. 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 the University faculty and administration and to the use of such University facilities as may be designated for that purpose. The recognition of a club or society on the Texas Tech 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.

A full descriptive list of recognized student organizations, including Greek letter fraternities and sororities, is published in the *Student Handbook*.

**Religious Opportunities.** The churches of Lubbock cordially invite students at Texas Tech to become associated with them, and a number of denominations maintain student centers near the campus.

**Cultural Opportunities.** The students of Texas Tech have a rich and full opportunity for developing cultural interests. The University Speakers Committee and the Artists Course Committee bring a varied schedule of speakers and concerts, dramatic and dance productions.

Students with cultural talent and ability have an ample opportunity for development in the Speech and Theatre Arts Department productions in the University Theater, in the 10 musical organizations sponsored by the Music Department, and in the University Dance Theatre sponsored by the Department of Health, Physical Education, and Recreation for Women. All eligible students, whether enrolled in those departments or not, are invited to participate.

In the city community, Civic Lubbock, Community Concerts, and Lubbock Symphony offer opportunities for students in the University both as participants and spectators. The Lubbock Theater Center, Texas Tech Museum, and the Garden and Arts Center are additional cultural resources for Texas Tech students to enjoy.

**Student Publications.** The *University Daily*, the University newspaper, is published daily, Monday through Friday. *La Ventana* is the University 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 annually by Sigma Tau Delta, the honorary English society.

**Intercollegiate Athletics.** Texas Tech maintains a well-rounded program of intercollegiate athletics in football, basketball, track, baseball, golf, swimming, and tennis. It is the intention of the University 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 University 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. University policy is set by the Athletic Council composed of members from the faculty, the student body, the Ex-Students Association, and two members-at-large who are appointed by the president. 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.** The aim of the Intramural Program is to provide an opportunity for every student at Texas Tech to participate in his or her favorite type of recreational sport activity. The program sponsors a competitive sport division in which students may compete in more than 30 different sport activities. Regular periods of supervised recreational free play are scheduled so that students may participate in informal nonscheduled activities. Selected items of equipment are available to students within the competitive and free play areas. In both areas recreational activities are available on a coeducational basis.

**Musical Organizations.** The University is represented by the following official touring musical organizations: Texas Tech Choir, Concert Band, Marching Band, Music Theater, and Symphony Orchestra. Students may also participate in the Madrigal Singers, Tech Singers, the Stage Bands, Court Jesters, Varsity Bands, and the Chamber Orchestra. 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 University and meets academic requirements. Each group studies 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 P. Merville Larson Debate and Interpretation Society 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 and Theatre Arts Department and in the activities of its related organizations, Sock and Buskin and Alpha Psi Omega. Participation may be in acting, stage makeup, costuming, lighting, scene design and construction, publicity, and other activities connected with play production. There are four major productions, numerous laboratory theater productions, and a summer repertory season each year.

## Academic Information

### Academic Regulations

**Classification of Students.** A student will normally complete one-fourth of the work required for his degree each year; hence, the traditional classifications designate the progress made toward a degree: freshman (a beginning student who has not completed 32 semester hours); sophomore (32 to 63 semester hours); junior (64 to 95 hours); senior (96 hours or more with a minimum grade-point average of 2.00). The two ranks, junior and senior, are often referred to as "upperclass" and "advanced." A student who is enrolled for 12 or more credit hours per semester is considered a full-time student; one enrolled for fewer than 12 hours is considered a part-time student.

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 overall grade-point average of 2.00 or higher.

**Semester Hours and Course Loads.** 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 of the nature of his employment and his working hours.

**Explanation of Course Offerings.** Courses are designated by a name and 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. Thus, Botany 334 is a junior course carrying 3 semester hours of credit.

Courses are listed in the following section of the catalog under the name of the college and department in which they are taught. The departmental lists are divided into two categories: For Undergraduates, and For Graduates. In these categories the courses are arranged numerically by class rank. Thus, Botany 334 is found under the Biology Department listing for undergraduates.

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 334, Taxonomy of the Flowering Plants, 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.

**Enrollment in One of the Colleges or Schools.** Each student accepted for admission will enroll in one of the six colleges or two schools of the University: Agricultural Sciences, Arts and Sciences, Business Administration, Education, Engineering, Home Economics, Law, or Graduate. The student should consult



the dean of his college or 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 University
- Graduation requirements and candidacy for a degree.

**Change of Colleges.** A student who desires to transfer from one college of the University to another must first apply to the dean of the college in which he is then enrolled. A change from one college to another cannot be made effective during the semester in which the student is already enrolled; however, action may be initiated at any time to obtain a change which will be effective at the opening of the next semester.

**Class Attendance.** Responsibility for class attendance rests with the student. Regular and punctual attendance at all scheduled classes is expected, and the University 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 University.

There are no "excused absences." When a student has a legitimate reason for being absent from class, such as illness or participation in an official trip or activity, his instructor has the option of permitting him to make up work missed and may require evidence.

**Academic Integrity.** It is the aim of the faculty of Texas Tech University 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 serious consequences, possibly suspension.

1. **Cheating:** Dishonesty of any kind on examinations and quizzes or on written assignments, illegal possession of examinations, the use of unauthorized notes during an examination or quiz, obtaining information during an examination from the examination paper or otherwise from another student, assisting others to cheat, alteration of grade records, illegal entry or unauthorized presence in an office are instances of cheating.

Complete honesty is required of the student in the presentation of any and all phases of course work as his own. This applies to quizzes of whatever length as well as to final examinations, to daily reports, and to term papers.

2. **Plagiarism:** Offering the work of another as one's own, without proper acknowledgement, is plagiarism; therefore, any student who fails to give credit for quotations or essentially identical expression of material taken from books, encyclopedias, magazines, and other reference works, or from the theses, reports, or other writings of a fellow student, is guilty of plagiarism.

**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 A, B, C, or D.

The grade of 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 of 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. 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 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 and for a course officially dropped after that 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 of 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.

An X is shown on the grade report in those instances where, for any reason, one of the above grades is not reported by the faculty.

**Midsemester Reports.** After the first half of each semester the progress of each student in each undergraduate course for which he is enrolled is evaluated as "Satisfactory" or "Unsatisfactory." Unsatisfactory describes work that would earn a letter grade of D or F. The Registrar mails reports of Unsatisfactory midsemester grades to students who receive such grades and to their parents.

**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. Parents' copies of grade reports are mailed to the address which the student indicates on registration forms at the time of enrollment. Changes in the mailing address for grades must be filed on the proper form provided in the Registrar's office.

**Grade Points.** The grades of 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, exclusive of courses in which a grade of W is received. In the same manner, the overall grade-point average is obtained by dividing the total number of grade points earned in all courses taken at this University by the total number of semester hours of all courses for which the student has registered at this University, including hours of F and WF, but excluding hours for which the grade of W is received. 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 University are used in calculating grade-point averages.

**Honors Studies.** The Honors Studies plan provides a program of enriched study to permit superior students to develop their capabilities. Administered by the deans of the two participating colleges through a Faculty Honors Council and a Director of Honors, it consists of special classes, small sections, and increased counseling. The program is available to qualified freshmen and upperclassmen in the colleges of Arts and Sciences and Business Administration. Entering freshmen may participate in the program on the basis of the Scholastic Aptitude Test or other College Entrance Examination Board scores, high school records, and interviews. Students other than entering freshmen who have achieved outstanding academic records while in college are also eligible for participation. Once a student has entered Honors Studies, his record is reviewed periodically by his major adviser and by his college Honors Council in order to counsel him and to determine whether he should remain in the program. To continue in Honors Studies students must maintain the grade averages and take the minimum number of Honors courses (which are identified on transcripts with the letter H) prescribed by their colleges and departments.

**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 college in which he is enrolled during that semester. Attainment of a place on this roll is indicative of high scholastic achievement.

**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 Texas Tech are counted.

#### **Suspension and Retention.**

**Required Minimum Academic Performance:** Certain principles have been utilized in developing the regulations and governing eligibility to reregister, suspension by the academic dean, and reinstatement following suspension. These principles include:

1. The University'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 University 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.

5. The belief that academic suspension is not viewed as punishment but is based upon the policy that a student should remain eligible for academic work on campus as long as he is progressing satisfactorily and within reasonable time toward the completion of his academic program. When his progress is unsatisfactory, the student is given time to reconsider his goals and career plans outside the academic setting.

In addition, the regulations reflect the University's experience that a student's performance over two semesters 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.

**Student's Responsibility:** Each student is held responsible for knowing his academic status and for knowing whether he is eligible to reenroll in the University. If it is determined that an ineligible student has enrolled, he will be dropped immediately.

**Minimum Academic Requirements:** For students who have registered for and attempted less than 64 hours in any college or university, the minimum grade-point average requirement is 1.50 in each regular semester. Beginning with the regular semester in which the student has attempted 64 or more semester hours, and for each semester thereafter, the minimum grade-point average requirement is 2.00 for work attempted that semester.

Courses in which the grade of W is received are not counted in determining total hours attempted by a student.

**Scholastic Probation:** A student is on scholastic probation at the end of the semester in which his grade-point average for that semester falls below the applicable minimum stated above. A student on scholastic probation who withdraws with grades of W in all courses will be continued on scholastic probation upon his return for the next semester or summer of attendance.

Scholastic probation shall mean that a student may not register for more than 16 hours except by written permission of his academic dean.

**Removal of Scholastic Probation:** A full-time student must take 12 or more hours and achieve the minimum grade-point average for that semester or summer to remove scholastic probation with all hours attempted counting in the average. A part-time student must accumulate at least the same number of hours at the minimum grade-point average or better as he was taking when he incurred scholastic probation. In either case, the requirements outlined under Required Minimum Academic Performance must be met, or the student will be suspended.



**Academic Suspension:** A student will be suspended when he fails to meet minimum academic requirements in his next regular semester (fall and spring) of attendance after being on scholastic probation or suspension.

No student who has attempted less than 64 semester hours will be suspended for academic reasons who has a cumulative grade-point average of 1.50. No student who has attempted 64 or more hours will be suspended for academic reasons who has a cumulative grade-point average of 2.00.

**Readmission of Students Suspended for Academic Reasons:** A student who has been suspended for academic reasons is eligible to apply for readmission after the following time intervals have elapsed: (1) first suspension: 1 regular semester; (2) second suspension: 2 regular semesters. If readmitted, the student will be on scholastic probation.

A student seeking reinstatement must apply to the Dean of Admissions at least 30 days before the opening of a semester for which he desires to register. 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. In the event of a second suspension, approval by the Committee on Admissions must be obtained before the student may reregister. As a condition of reinstatement, the student may be required to undergo such testing and counseling as his academic dean considers necessary.

**Summer School and Readmission:** A student who is placed on suspension at the conclusion of the spring semester is ineligible for enrollment the following fall semester. However, he may enroll in the summer session at this institution, and such work will count toward his degree. Enrollment at this institution for 12 semester hours in the summer session must result in a grade-point average for the full summer of 1.50 or 2.00 for the categories as described previously in order for the student to be reinstated for enrollment for the following fall semester.

## **Division of Continuing Education**

For those who cannot attend regularly scheduled classes the Division of Continuing Education offers approximately 110 courses by correspondence and selected courses by extension classes. Correspondence and extension class study courses have been approved by the Association of Texas Colleges and Universities. The Division of Continuing Education is a member of the National University Extension Association.

**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 may be made available.

Registration fees for extension class courses are \$15 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 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 classes and/or correspondence study work (provided not more than 18 semester hours are done through correspondence study alone).

**Correspondence Department.** The control of a student's program by his academic dean includes correspondence and extension work, and a student in residence at this university 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 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 Tech University 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 no more than 6 hours of the final 30 hours 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 Tech may not complete more than 6 semester hours by correspondence during any 12-month period beginning September 1. If his course load is more than 15 hours per semester, or 6 hours each summer term, the dean of the student's college may reduce the above maximum of 6 hours by correspondence. If the student should not be enrolled during a 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 12-month period beginning September 1.

If a student receives a grade of F in a course taken in residence at this University he may not subsequently take that course by correspondence for credit. 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 \$15. Thus a course carrying 3 semester hours credit costs \$45. 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.

College entrance (or high school credit) courses are available in the following fields: agriculture, Bible, business, English, foreign languages (French, German, Latin, and Spanish), history and social sciences, mathematics, and physics.

Inquiries concerning specific courses should be addressed to the Division of Continuing Education, Texas Tech University, P.O. Box 4110, Lubbock, Texas 79409.

**College Level Correspondence Courses.** Some courses for which there is an unusually heavy demand are offered by correspondence through the Division of Continuing Education. These courses are the same as the regular lecture courses in all general particulars, including course number and semester hours of credit, and are taught by regular members of the faculty in the department indicated. Students should note carefully all regulations pertaining to correspondence work described above.

The following are the college courses taught by correspondence:

- |  |   |
|--|---|
| <i>Accounting</i>                            | <i>Biblical Literature</i>                  |
| 231. Industrial Accounting for Engineers.    | 131. Introduction to the Old Testament.     |
| 234. Elementary Accounting I.                | 132. Introduction to the New Testament.     |
| 235. Elementary Accounting II.               | 213. The Book of James.                     |
| 322. Payroll Accounting.                     | 236. The Life and Teachings of Jesus.       |
| 332. Analysis of Financial Statements.       | 323. The Letter to the Romans.              |
| 334. Intermediate Accounting I.              | 422. The Book of Revelation.                |
| 335. Intermediate Accounting II.             | <i>Business Law</i>                         |
| 336. Principles of Cost Accounting.          | 338. Business Law I.                        |
| 430. Income Tax Accounting.                  | 339. Business Law II.                       |
| 432. Governmental Accounting.                | 3313. Oil and Gas Law.                      |
| 434. Advanced Accounting I.                  | <i>Education</i>                            |
| 435. Advanced Accounting II.                 | 430. History and Philosophy of Education.   |
| 437. Principles of Auditing.                 | 4331. Foundations of Educational Sociology. |
| 439. Budgeting.                              | 4344. Children's Literature.                |
| <i>Agricultural Economics</i>                | <i>English</i>                              |
| 235. Fundamentals of Agricultural Economics. | 131. College Rhetoric.                      |
| 325. Farm Laws.                              | 132. College Rhetoric                       |
| <i>Anthropology</i>                          | (Continued).                                |
| 232. Cultural Anthropology.                  |   |

- 231. Masterpieces of Literature.
- 232. Masterpieces of Literature (Continued).
- 233. Technical Writing.
- 331. The Short Story.
- 3325. American Novel.
- 4336. Teaching English in Secondary Schools.
- 4433. Modern American and European Drama.

*Finance*

- 231. Personal Finance.
- 331. Corporation Finance.
- 333. Principles of Money, Banking, and Credit.
- 334. Credits and Collections.
- 336. Life Insurance.
- 432. Real Estate.
- 434. Investments.
- 437. Casualty Insurance.

*Geography*

- 2351. Regional Geography of the World.
- 2352. Geography of the United States and Canada.

*Government*

- 231. American Government, Organization.
- 232. American Government, Functions.

*History*

- 131. Development of Civilizations.
- 132. Development of Civilizations (Continued).
- 231. History of the United States to 1877.
- 232. History of the United States since 1877.
- 330. History of Texas.

*Home and Family Life*

- 235. Preparation for Success in Marriage.

*Management*

- 120. Professional Careers in Business.

*Marketing*

- 246. Introduction to Business Statistics.
- 332. Principles of Marketing.

*Mathematics*

- 131. Trigonometry.
- 133. College Algebra.
- 137. Introduction to Mathematical Analysis.
- 138. Introduction to Mathematical Analysis (Continued).
- 151. Analytical Geometry and Calculus I.
- 152. Analytical Geometry and Calculus II.
- 235. Analytical Geometry and Calculus III.
- 332. Differential Equations I.

*Philosophy*

- 230. Introduction to Philosophy.

*Physical Education*

- 230. Health Education in the Elementary and Secondary Schools.
- 331. Recreational Methods.
- 439. Organization and Administration of Recreational Programs.

*Psychology*

- 230. General Psychology I.
- 331. Child Psychology.
- 332. Mental Health.
- 335. Adolescent Psychology.
- 434. Introduction to Social Psychology.
- 435. Abnormal Psychology.

*Secretarial Administration*

- 333. Business Correspondence.

*Sociology*

- 230. Introduction to Sociology.
- 235. The Sociology of Marriage.
- 331. Rural Sociology.

## Graduate School

Graduate study is much more than a continuation of undergraduate work. Its true spirit is one of inquiry and the desire to add something to human knowledge. Graduate study should therefore be contemplated only by students who have already demonstrated in their undergraduate programs unusual intellectual attainments and the power of independent thought and investigation.

For this reason, practically all graduate schools exercise some type of selectivity in their admission of students. Selective entrance requirements are partly for the maintenance of the high standards that must always characterize graduate study and partly for the benefit of students in helping them decide early whether they should undertake such work.

Because it recognizes its obligations to the citizens of Texas as well as to the standards mentioned above, the Graduate School of Texas Tech University makes a twofold classification of graduate students. In connection with the latter obligation, the Graduate School requires evidence of an applicant's special ability for admission to its degree programs and reserves the right to decline to accept any applicant whose admission would not be to his best interest or that of the University. On the other hand, to fulfill its obligation to the citizens of Texas, the Graduate School makes its facilities available to a wide variety of students who are not eligible or do not wish to become applicants for degrees.

For more particulars and details on courses and degree requirements refer to the *Catalog of the Graduate School*.

**Degrees and Degree Programs.**

- Accounting  
*Master of Business Administration*  
*Master of Science in Accounting*
- Agricultural Economics  
*Master of Science*  
*Doctor of Philosophy*
- Agricultural Education  
*Master of Science*  
*Master of Education*
- Agricultural Engineering  
*Master of Science in Agricultural Engineering*
- Agriculture  
*Doctor of Philosophy*
- Animal Breeding  
*Master of Science*
- Animal Nutrition  
*Master of Science*
- Animal Science  
*Doctor of Philosophy*
- Applied Music  
*Master of Music*
- Art  
*Master of Fine Arts*
- Biology  
*Doctor of Philosophy*
- Botany  
*Master of Science*  
*Doctor of Philosophy*
- Business Administration  
*Master of Business Administration*  
*Doctor of Business Administration*
- Business Education  
*Master of Business Administration*  
*Master of Education*
- Chemical Engineering  
*Master of Science in Chemical Engineering*  
*Doctor of Philosophy*
- Chemistry  
*Master of Science*  
*Doctor of Philosophy*
- Civil Engineering  
*Master of Science in Civil Engineering*  
*Doctor of Philosophy*
- Clothing and Textiles  
*Master of Science in Home Economics*
- Crop Science  
*Master of Science*
- Economics  
*Master of Arts*  
*Master of Business Administration*
- Education  
*Master of Education*  
*Doctor of Education*
- Electrical Engineering  
*Master of Science in Electrical Engineering*  
*Doctor of Philosophy*
- Engineering  
*Master of Engineering*  
*Doctor of Philosophy*
- English  
*Master of Arts*  
*Doctor of Philosophy*
- Entomology  
*Master of Science*
- Finance  
*Master of Business Administration*
- Food and Nutrition  
*Master of Science in Home Economics*
- Food Technology  
*Master of Science*
- French  
*Master of Arts*
- General Home Economics  
*Master of Science in Home Economics*
- Geology  
*Master of Science*  
*Doctor of Philosophy*
- German  
*Master of Arts*
- Government  
*Master of Arts*  
*Doctor of Philosophy*
- History  
*Master of Arts*  
*Doctor of Philosophy*
- Home Economics Education  
*Master of Science in Home Economics*
- Horticulture  
*Master of Science*
- Industrial Engineering  
*Master of Science in Industrial Engineering*  
*Doctor of Philosophy*
- Journalism  
*Master of Arts*
- Management  
*Master of Business Administration*
- Marketing  
*Master of Business Administration*
- Mathematics  
*Master of Arts*  
*Master of Science*  
*Doctor of Philosophy*
- Meat Science  
*Master of Science*
- Mechanical Engineering  
*Master of Science in Mechanical Engineering*  
*Doctor of Philosophy*
- Microbiology  
*Master of Science*  
*Doctor of Philosophy*
- Music Education  
*Master of Music Education*
- Music Theory  
*Master of Music*
- Park Administration  
*Master of Science*
- Physical Education  
*Master of Education*

Physics  
*Master of Science*  
*Doctor of Philosophy*  
 Psychology  
*Master of Arts*  
*Doctor of Philosophy*  
 Public Address and Group  
 Communications  
*Master of Arts*  
 Range Science  
*Master of Science*  
*Doctor of Philosophy*  
 Sociology  
*Master of Arts*

Soil Science  
*Master of Science*  
 Spanish  
*Master of Arts*  
*Doctor of Philosophy*  
 Speech  
*Master of Arts*  
 Speech Pathology and Audiology  
*Master of Science in Speech*  
*Pathology and Audiology*  
 Theatre Arts  
*Master of Arts*  
 Zoology  
*Master of Science*  
*Doctor of Philosophy*

### School of Law

Applicants for admission to the School of Law must possess a baccalaureate degree or an equivalent degree from a college or university of approved standing prior to the time they begin their work in the School of Law. An applicant's record must be of sufficiently high quality to demonstrate that he is qualified for the study of law. In questionable cases, the work of the last two college years will be considered more heavily than that of earlier years.

Applicants must also achieve a satisfactory score on the Law School Admission Test, administered four times a year throughout the United States and in many foreign countries by the Educational Testing Service.

The School of Law does not prescribe a definite prelegal curriculum for its applicants. The wide range of lawyers' tasks and the difference in offerings from school to school preclude such an approach. However, there are certain goals which every prelegal student should keep before him in planning his college program. He should strive to acquire the ability to read, write, and speak the English language well; to gain a critical understanding of human values and institutions, political, economic, and social; and to develop in himself the power to think creatively. His undergraduate training should result not only in a quantity of knowledge, but also in an understanding of the basis of his knowledge, its degrees, and its conditions.

Two items deserve special mention. A student will find it helpful to have some preliminary work in accounting as background for the courses in business associations and taxation. Typing skills will prove useful not only in the preparation of briefs and memoranda, but also for daily preparation and examinations.

Students are admitted only in the fall.

For further details consult the *Catalog of the School of Law*.

### Teacher Education

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

General advisement on specific degree requirements occurs in the office of the academic dean of the college in which the student is enrolled. The student may obtain advisement on certification requirements in the office of the Dean of the College of Education or from the appropriate department chairman in the College of Education. Selection of courses in the student's teaching field or area of specialization is the responsibility of the academic department involved.

**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 teacher's certificates; these are designated as the Provisional Certificate and the Professional Certificate. Each certificate, once issued, is permanent and valid for life unless cancelled by lawful authority.



Such teacher's certificates are issued only to persons who have completed the requirements for a bachelor's degree and an approved certification program and who have been recommended by the Director of Teacher Education and Certification. Teacher certification and degree programs are two distinct programs. A student may qualify for teacher certification by majoring in elementary or secondary education or by majoring in one of his fields of academic specialization and fulfilling all certification requirements. Policies governing certification programs are administered by the Director of Teacher Education and Certification.

**Admission to the Teacher Education Program.** The student expecting to enter a program leading to teacher certification must apply for admission to the teacher education program in the office of the Dean of the College of Education during his sophomore year or, if he is a transfer student, during the first semester of his attendance at Texas Tech University. Failure to qualify for admission to the teacher education program by the close of the sophomore year may result in a delay in the completion of the certification requirements in the usual four-year period.

A student making application to the teacher education program must have a certification plan on file in the office of the Dean of the College of Education.

The following are prerequisites for admission to the teacher education program:

- (1) A scholastic grade-point average of 2.25 on all work taken prior to admission.
- (2) A minimum grade-point average of 2.25 in required English courses or demonstrated proficiency of the fiftieth percentile or above on an English proficiency test administered by the University.
- (3) Competency in speech and hearing. Competency will be determined by tests administered by the Speech and Theatre Arts Department.
- (4) Freedom from physical and health handicaps believed to be detrimental to teaching.
- (5) Good character and high ethical standards.

**Certification Plan.** Any undergraduate student working toward a teacher's certificate must file a certification plan in the Office of Teacher Certification during his sophomore year or during his first semester of attendance at Texas Tech University.\* The student's advisers will assist him in filing the certification plan. Any graduate student working toward a professional certificate should file a certification plan in the Office of Teacher Certification following his admission to the professional certification program. The requirement for filing of a certification plan applies regardless of the degree being sought, the subject which the student expects to teach, or the level (elementary, secondary, special education, or all-level) at which he expects to be certified. Transfer students must prepare a certification plan during the first semester of attendance at Texas Tech. Degree plans and certification plans are not to be confused because they may be two separate documents. The degree plan is to be filed in the office of the student's academic dean, whereas the certification plan must be filed in the Office of Teacher Certification.

Certification plan forms are obtained from the Office of Teacher Certification. Once the form is secured, the student is responsible for seeing that the proper entries are made and that the forms are properly filed in the Office 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, including student teaching and correspondence courses, while he is performing his student teaching.

The following are prerequisites 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 student in agricultural education or home economics education must consult his department chairman regarding the proper time to file this certification plan.

(a) 24 semester hours of the 36 semester hours in the academic specialization area, and (b) the completion of Education 332 and Elementary Education 3331, 3344, and 3345, or their approved equivalents.

(2) Each student, unless he is in agricultural education or home economics education, must file an application in the office of the Dean of the College of Education to enroll in student teaching and must do so on or before April 15 preceding the school year in which he expects to register for the course.

(3) The student must pass the health examination required of teachers in the school system in which the student teaching is performed. A health certificate must be presented at the time of registration for student teaching. Forms may be secured from the Coordinator of Elementary or Secondary Student Teaching.

(4) The applicant must present evidence that he is free from extreme handicaps that are judged by the Committee on Undergraduate Teacher Education 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) The student must have a grade-point average of 2.25 in required courses in English or demonstrate proficiency at the fiftieth percentile or above on an English test administered by the University.

The Committee on Undergraduate Teacher Education applies the above standards to transfer students on an individual basis. Transfer students must satisfy the requirements above by the beginning of the junior year or during the first semester of attendance at this University, whichever is later.

**Recommendation for Teacher Certification.** A student who has successfully completed an approved program in teacher certification, who has maintained the levels of performance stated as prerequisites for admission to student teaching, and who meets high moral standards is eligible to apply to the office of the Dean of the College of Education for a recommendation to the Texas Education Agency for the appropriate teaching certificate. The student making application under the above conditions will be recommended by the University to the Texas Education Agency, which is the authority for the issuance of the teacher's certificate.

**Provisional Certificate Programs.** Provisional certificate programs have been approved for Texas Tech University 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 and complete approximately two years of course work in "Academic Foundations," a minimum of 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 art, biology, English, French, geography, German, government, health and physical education for men, health and physical education for women, history, mathematics, music, sociology, Spanish, speech, and 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 and 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  
Business Education  
Chemistry  
Drama  
Economics

English  
French  
Geography  
German  
Government

Health and Physical Education  
History  
Journalism  
Latin

Mathematics  
Physics  
Spanish  
Speech

The student following Plan I must consult the chairmen 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 plan requires the completion of 48 semester hours in a broad field. 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  
Business Education  
Music

Science  
Social Science

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 courses required in the composite area. Course work in the broad field of science must be distributed in at least three science departments, with no more than 8 semester hours in the geosciences.

Plan III is restricted to those who are preparing to teach in the vocational fields; at this University, 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 chairman of the appropriate department regarding his course requirements.

To insure the completion of certificate requirements within the time normally required for graduation, students must observe the course sequence in professional education listed in this catalog.

**3. Provisional Certificate—All-Level:** All-level certificate programs are approved at Texas Tech University in the following fields:

Art  
Drama  
Health and Physical Education

Music Education  
Speech

The student qualifying for an all-level certificate must earn a bachelor's degree and must complete the course work prescribed for the certificate. The chairman of the appropriate department must be consulted regarding the details of the student's academic specialization.

**4. Provisional Certificate—Teaching Exceptional Children:** Certificate programs for teaching exceptional children are approved at Texas Tech University in the following fields:

Mentally Retarded  
Physically Handicapped/Minimal  
Brain Injury

Speech and Hearing Therapy  
Deaf

The provisional certificate in mental retardation requires the completion of the Bachelor of Science program in elementary education plus the addition of 12 semester hours of course work in special education. Student teaching is done in both the regular and the special classrooms. Students interested in the provisional certificate in one of the above programs should contact designated personnel in the Department of Special Education, College of Education, and/or the Department of Speech and Theatre Arts, College of Arts and Sciences, for specific information.

**Professional Certificate Programs.** 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, (3) has completed 30 semester hours of graduate course work in an approved program, and (4) is recommended by the Director of Teacher Certification. If properly planned, the graduate work may fulfill the requirements for a master's degree and a professional certificate.

At Texas Tech University, professional certification programs are approved in the following areas:

Elementary	Music
Secondary	Spanish
Biology	Speech
English	Vocational Education
Drama	Agriculture
French	Home Economics
German	Special Services
Government	Administrator
Health and Physical Education	Counselor
History	Supervisor

A student wishing to work toward a professional certificate should first consult the office of the Dean of the College of Education to obtain information regarding the programs available and to make application for admission to graduate study for the certificate.

**Graduate Degrees and Professional Certificates.** A student who wishes to work toward a graduate degree and professional certificate should consult the Dean of the Graduate School regarding degree requirements and the office of the Dean of the College of Education regarding certification requirements.

### Uniform Undergraduate Degree Requirements

All bachelor's degrees conferred by Texas Tech University are based on the satisfactory completion of specific authorized degree programs. A student's major subject is the degree program in which he is working. The degree programs are offered through the six instructional colleges of the University and are usually supervised by the departments in each college. For example, a degree of Bachelor of Science is conferred through the College of Agricultural Sciences upon the successful completion of the program in horticulture, supervised by the Department of Park Administration, Horticulture, and Entomology.

Requirements for undergraduate degrees, therefore, are established at these three different levels: (1) the University as a whole (Uniform Undergraduate Degree Requirements), (2) the college through which the degree is conferred, and (3) the particular degree program in which the student is working. Students should familiarize themselves with all three sets of requirements which must be fulfilled before the degree is granted.

Immediately following are explanations of the Uniform Undergraduate Degree Requirements of the University which apply to all undergraduate degrees conferred.

**Residence Credit.** 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 University, 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.

Course work taken through the Division of Continuing Education at Texas Tech University or at any other institution will not be counted as residence credit.

The term, "residence," as a degree requirement should not be confused with "residence" in the state of Texas for enrollment purposes. Residence credit as used here means credit for work done while enrolled in and attending classes on the campus at Texas Tech University.

**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 University 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 college to another within the University, 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.

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 in Government and History.** Under state law all students who receive bachelor's degrees from Texas Tech University 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.** Completion of four semesters of physical education activity courses is a requirement for all bachelor's degrees, with the exceptions noted below. Normally, students will enroll in and complete these courses during their freshman and sophomore years. 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.

**Exceptions:**

1. When approved by the student's academic dean, band may be substituted for physical education.

2. Male students who qualify for participation in aerospace studies or military science may take the basic courses (four semesters) of the four-year ROTC program or the two-year (four semesters) ROTC program in place of physical education. Once entered upon, the satisfactory completion of these courses becomes a requirement for graduation unless the student is specifically excused by the Department of Aerospace Studies 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 2 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 4 semester hours in physical education normally required. Application for this credit must be made in the first semester of attendance at the University following honorable discharge.

4. A student over 25 years of age may substitute 3 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.

**Graduation Under a Particular Catalog.** A student is expected to complete the degree requirements set forth in a particular University catalog. Normally this will be the catalog in effect at the time the student enters his post-secondary school program, assuming that he has not changed from his original degree objective. For the student who changes his degree objective after beginning his college career, the degree requirements in effect when the student first registers in the college from which he receives his degree will be applicable. Only with the specific approval of his academic dean may a different catalog be selected. In no case may a student complete the requirements set forth in a catalog more than seven years old. When necessary, a catalog 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 University during a summer session is subject to the degree requirements set forth in the catalog effective for the fall semester immediately following his initial enrollment.

**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.

**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.

**Programs and Instructional Departments.** The following table is an alphabetical list of the undergraduate degree programs and a guide to the department directing or administering the program.

PROGRAM	COLLEGE	DEPARTMENT OR ADVISER
ACCOUNTING	Business Administration	Accounting
ADVERTISING ART	Arts and Sciences	Art
AGRICULTURAL ECONOMICS	Agricultural Sciences	Agricultural Economics
AGRICULTURAL EDUCATION	Agricultural Sciences	Agricultural Education
AGRICULTURAL ENGINEERING	Agricultural Sciences	Agricultural Engineering
AGRICULTURAL SCIENCE	Agricultural Sciences	Administered by the Dean's office
ANIMAL BUSINESS	Agricultural Sciences	Animal Science
ANIMAL PRODUCTION	Agricultural Sciences	Animal Science
ANIMAL SCIENCE	Agricultural Sciences	Animal Science
ANTHROPOLOGY	Arts and Sciences	Sociology and Anthropology
APPLIED MUSIC	Arts and Sciences	Music
ARCHITECTURE	Engineering	Architecture
ART	Arts and Sciences	Art
ART EDUCATION	Arts and Sciences	Art
BILINGUAL SECRETARIAL PROGRAM	(1) Arts and Sciences  (2) Business Administration	Classical and Romance Languages  Business Education and Secretarial Administration
BOTANY	Arts and Sciences	Biology
BUSINESS EDUCATION	Business Administration	Business Education and Secretarial Administration
CHEMICAL ENGINEERING	Engineering	Chemical Engineering
CHEMISTRY	Arts and Sciences	Chemistry
CIVIL ENGINEERING	Engineering	Civil Engineering
CLOTHING AND TEXTILES	Home Economics	Clothing and Textiles
CROPS	Agricultural Sciences	Agronomy
DANCE	Arts and Sciences	Health, Physical Education, and Recreation for Women
ECONOMICS	Business Administration	Economics
EDUCATION	Education	Education
ELECTRICAL ENGINEERING	Engineering	Electrical Engineering
ENGINEERING PHYSICS	Engineering	Engineering Physics*
ENGLISH	Arts and Sciences	English
ENTOMOLOGY	Agricultural Sciences	Park Administration, Horticulture, and Entomology
FINANCE	Business Administration	Finance
FOOD AND NUTRITION	Home Economics	Food and Nutrition
FOOD TECHNOLOGY	Agricultural Sciences	Food Technology
FRENCH	Arts and Sciences	Classical and Romance Languages
GENERAL BUSINESS	Business Administration	Special Adviser in College of Business Administration
GENERAL HOME ECONOMICS	Home Economics	Interdepartmental
GEOCHEMISTRY	Arts and Sciences	Geosciences
GEOGRAPHY	Arts and Sciences	Geosciences
GEOLOGY	Arts and Sciences	Geosciences
GEOPHYSICS	Arts and Sciences	Geosciences
GERMAN	Arts and Sciences	Germanic and Slavonic Languages
GOVERNMENT	Arts and Sciences	Government
HISTORY	Arts and Sciences	History

\* Administered by the Department of Physics in the College of Arts and Sciences, but the curriculum is presented in the catalog with other curricula of the College of Engineering.

HOME ECONOMICS EDUCATION	Home Economics	Home Economics Education
HOME AND FAMILY LIFE	Home Economics	Home and Family Life
HORTICULTURE	Agricultural Sciences	Park Administration, Horticulture, and Entomology
INDUSTRIAL ENGINEERING	Engineering	Industrial Engineering
INTERIOR DESIGN	Arts and Sciences	Art
JOURNALISM	Arts and Sciences	Journalism
LATIN	Arts and Sciences	Classical and Romance Languages
LATIN AMERICAN AREA STUDIES	Arts and Sciences	Government, History, and Classical and Romance Languages
MANAGEMENT	Business Administration	Management
MARKETING	Business Administration	Marketing
MATHEMATICS	Arts and Sciences	Mathematics
MECHANICAL ENGINEERING	Engineering	Mechanical Engineering
MECHANIZED AGRICULTURE	Agricultural Sciences	Agricultural Engineering
MEDICAL TECHNOLOGY	Arts and Sciences	Biology
MICROBIOLOGY	Arts and Sciences	Biology
MUSIC EDUCATION	Arts and Sciences	Music
MUSIC HISTORY AND LITERATURE	Arts and Sciences	Music
MUSIC THEORY	Arts and Sciences	Music
PARK ADMINISTRATION	Agricultural Sciences	Park Administration, Horticulture, and Entomology
PETROLEUM ENGINEERING	Engineering	Petroleum Engineering
PHILOSOPHY	Arts and Sciences	Philosophy
PHYSICAL EDUCATION (FOR MEN)	Arts and Sciences	Health, Physical Education, and Recreation for Men
PHYSICAL EDUCATION (FOR WOMEN)	Arts and Sciences	Health, Physical Education, and Recreation for Women
PHYSICS	Arts and Sciences	Physics
PRELAW	(1) Arts and Sciences (2) Business Administration	Special adviser in Department of Government Special adviser in College of Business Administration
PREMEDICAL AND PRENATAL	Arts and Sciences	Premedical adviser in Department of Chemistry
PREVETERINARY MEDICINE	Agricultural Sciences	Animal Science
PSYCHOLOGY	Arts and Sciences	Psychology
PUBLIC ADDRESS AND GROUP COMMUNI- CATIONS	Arts and Sciences	Speech and Theatre Arts
RANGE MANAGEMENT	Agricultural Sciences	Range and Wildlife Management
RECREATION (FOR MEN)	Arts and Sciences	Health, Physical Education, and Recreation for Men
RECREATION (FOR WOMEN)	Arts and Sciences	Health, Physical Education, and Recreation for Women
SOCIAL WELFARE	Arts and Sciences	Sociology and Anthropology
SOCIOLOGY	Arts and Sciences	Sociology and Anthropology
SOILS	Agricultural Sciences	Agronomy
SPANISH	Arts and Sciences	Classical and Romance Languages
SPEECH	Arts and Sciences	Speech and Theatre Arts
STUDIO	Arts and Sciences	Art
TEXTILE ENGINEERING	Engineering	Textile Engineering
TEXTILE TECHNOLOGY AND MANAGEMENT	Engineering	Textile Engineering
THEATRE ARTS	Arts and Sciences	Speech and Theatre Arts
WILDLIFE MANAGEMENT	Agricultural Sciences	Range and Wildlife Management
ZOOLOGY	Arts and Sciences	Biology

## College of Agricultural Sciences

The programs of this college are designed to qualify the student for a place in 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 subject-matter 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 by students who plan careers as producers of farm and ranch products.

Laboratory facilities in agriculture include the 1,400-acre University Farm and approximately 14,000 acres at the Texas Tech Research Center 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 more highly specialized skills.

The College of Agricultural Sciences participates in the graduate program at Texas Tech University with master's level work in the areas of agricultural economics, agricultural education, agricultural engineering, animal breeding, animal nutrition, crop science, entomology, food technology, horticulture, meat science, park administration, range science, and soil science. Programs are available through the College of Agricultural Sciences leading to the Doctor of Philosophy degree in agricultural economics, animal science, and range science. Details concerning these programs are available in the *Catalog of the Graduate School*.

The College of Agricultural Sciences is divided into instructional departments which offer course work and supervise the degree programs. Specific curricula are designed by the departments for each of the degree programs. Any deviation from the approved curriculum for a particular degree must have prior approval from the chairman of the department involved and the office of the Dean of the College of Agricultural Sciences. These curricula are presented in special tables on the following pages along with a descriptive list of the courses offered by each department.

**General Requirements of the College of Agricultural Sciences.** All agricultural students, except those majoring in agricultural engineering, are required to take 9 semester hours of English and 13 hours of interdisciplinary agricultural courses. The different curricula all require 136 hours exclusive of physical education, band, or basic ROTC for graduation. It is expected that students enrolled in the College of Agricultural Sciences will earn credit toward a degree by following an orderly sequence of courses through consultation with the major department.

**Uniform Freshman Year for Students in Agriculture.** All students in the College of Agricultural Sciences (except those majoring in agricultural engineering, mechanized agriculture, or preveterinary medicine) follow a uniform freshman curriculum and need not designate a major interest during the freshman year. 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.

Required freshman courses should be taken during the freshman and sophomore years. Students who postpone taking required freshman subjects until the senior year must still take such subjects, but credit will not apply toward the hours required for a degree. (For purposes of this regulation a senior is considered as a student with a minimum of 96 hours.)

**FRESHMAN YEAR**

Fall		Spring	
AGED 111, The Ag. Industry	1	AECO 235, Fund. Ag. Eco.	3
BIOL 141, Botany	4	CHEM 141, Gen. Chem.	4
ENG 131, College Rhet.	3	ENG 132, Coll. Rhet.	3
MATH 137, Intro. Math. Anal. or		HIST 231, U.S. to 1877	3
MATH 133, Coll. Alg.	3	Ag. courses*	3
Ag. courses*	6	P.E., Band, or Basic ROTC	1
P.E., Band, or Basic ROTC	1		
	18		17

\* Select three from the following four courses: AGRO 131; ANSC 131; FD T 131; or HORT 131.

**Agricultural Science Major.** An interdepartmental curriculum for the agricultural science program leading to the B.S. degree is supervised directly by the Dean of the College of Agricultural Sciences. Course work, as indicated in the accompanying curriculum table, is provided in various departments.

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 two years, the place of employment to be approved by the curriculum adviser.

**Agricultural Science Curriculum.****FIRST YEAR**

(See Uniform Freshman Year)

**SECOND YEAR**

Fall		Spring	
CHEM 142, Gen. Chem.	4	MATH 131, Trig.	3
English (200 level or above)	3	Biol., Bot., Mbio., or Zool.	
BIOL 142, Zoology	4	(200 level or above)	3
P.E., Band, or Basic ROTC	1-2	English (200 level or above)	3
Ag. courses and electives	6	P.E., Band, or Basic ROTC	1-2
	18-19	Ag. courses and electives	8
			18-19

**THIRD YEAR**

Fall		Spring	
*CHEM 341, Intro. to Org. Chem.	4	Biol., Bot., Mbio., or Zool.	
GOVT 231, Amer. Govt., Org.	3	(200 level or above)	3
PHYS 141, Gen. Phys.	4	*CHEM 342, Physiol. Chem.	4
Ag. courses and electives	6	GOVT 232, Amer. Govt. Funct.	3
	17	PHYS 142, Gen. Phys.	4
		Ag. courses and electives	3
			17

**FOURTH YEAR**

Fall		Spring	
Ag. courses or basic science and electives	18	HIST 232, Hist. of U.S. since 1877	3
	18	Ag. courses or basic science and electives	14
			17

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136; 41 hours of total must be taken in the College of Agricultural Sciences.

\* May substitute CHEM 325, 326, 335, 336.

**Department of Agricultural Economics**

This department provides training leading to *Bachelor of Science*, *Master of Science*, and *Doctor of Philosophy* degrees in AGRICULTURAL ECONOMICS. Concerned with all business and economic aspects of agriculture and marketing

to and including the consumer, the department provides six special areas of undergraduate emphasis: Agribusiness Management, Agricultural Finance,

**Agricultural Economics Curriculum.**

BASIC CURRICULUM	EMPHASIS:					
	Farm Management	Ranch Management	Agribusiness Management	Agricultural Finance	Agricultural Economics Research	Rural Socioeconomics
<b>FIRST YEAR</b> (See Uniform Freshman Year)						
<b>SECOND YEAR</b>						
AECO 236, 324 CHEM 142 ENG 233 GOVT 231, 232 HIST 232 P.E., Band, or Basic ROTC (2 sem.)	AECO 334, 335 MCAG 333 G SP 338 or SOC 331	AECO 334, 335 R&WM 331 G SP 338 or SOC 331	AECO 334 ACCT 234, 235 MATH 138	AECO 334 ACCT 234, 235 MATH 138	ACCT 234, 235 MATH 131 G SP 338	PHIL 230 PSY 230 SOC 230 G SP 338
<b>THIRD YEAR</b>						
AECO 339, 341, 433 *Electives	AECO 332 AGRO 241 or 343, 331, 341 CHEM 341	AECO 332 R&WM 333 ANSC 331 AGRO 341 CHEM 341	AECO 332, 333 FIN 333 BLAW 338, 339 G SP 338 MGT 331	AECO 332, 333 FIN 333, 431 BLAW 338 or 339 G SP 338	ECO 3311 I E 321 MATH 151, 152 FIN 333	AECO 333 FIN 333 SOC 331, 334, 4313 PSY 330
<b>FOURTH YEAR</b>						
AECO 411, 430, 435 *Electives	AECO 431, 437, 4314, 4315 AGRO 4311, 4312	AECO 431, 437, 438, 4315 ANSC 332, 436	AECO 432, 434, 436, 439, 4315	AECO 432, 434, 437, 439, 4314 or 4315, 4316	AECO 432, 434, 439, 4312, 4313, 4315	AECO 432, 434, 4313
	*Electives: 17 hrs. (6 hrs. in Agri. Sci.)	*Electives: 18 hrs. (6 hrs. in Agri. Sci.)	*Electives: 17 hrs. (6 hrs. in Bus. Ad.)	*Electives: 17 hrs. (6 hrs. from FIN 331, 334, 438, MKT 435 or I E 321)	*Electives: 17 hrs. (6 hrs. from 300 or 400 level courses in Eco. or Math.)	*Electives: 26 hrs. (9 hrs. from 300 or 400 level courses in Soc., Psy., or Eco.)

Students select one area of emphasis in addition to the Basic Curriculum to satisfy the 136 hour minimum requirement for graduation (exclusive of P.E., Band, or Basic ROTC).

\* All electives must be approved by department chairman.



Farm Management, Ranch Management, Rural Socioeconomics, and Agricultural Economics Research. Training in farm appraisal, agricultural policy, price analysis, and agricultural marketing also is provided. The department reserves the right to require a C or better in courses considered departmental core courses.

### Courses in Agricultural Economics.

#### FOR UNDERGRADUATES

235. **Fundamentals of Agricultural Economics (3:3:0).** Introduction to fundamental economic principles and their application to agricultural problems.
236. **Principles of Marketing Agricultural Products (3:3:0).** Prerequisite: AEEO 235. Introduction to agricultural marketing, emphasizing applications of economic principles to marketing firms, functions, and problems.
324. **Agricultural Economics Research Methodology (2:2:0).** Prerequisite: AEEO 236. Methods of research analysis and statistics in agricultural economics, including surveys, budgeting and synthesis, experimental design, tabulation, graphic correlation, and use of electronic computers.
325. **Farm Laws (2:2:0).** Prerequisite: AEEO 236 or approval. Legal problems and practices affecting the farmer in his business.
332. **Agricultural Finance (3:3:0).** Prerequisite: AEEO 236. Basic principles of agricultural finance emphasizing costs and returns from use of capital and credit, types and sources of credit, development, characteristics, and role of agricultural lending institutions, legal aspects of borrowing, credit instruments, repayment capacity, and credit hazards and risks.
333. **Cooperatives in Agriculture (3:3:0).** Prerequisite: AEEO 236. Organization and operation of agricultural cooperatives.
334. **Farm Management (3:2:3).** Prerequisite: AEEO 236 or approval. Organization and management of the individual farm. Field trips to nearby farms.
335. **Agricultural Records and Analysis (3:2:2).** Prerequisite: AEEO 334 or approval. Methods and systems of recording and analyzing farm and ranch operational data; summarizing and using records as effective aids to improve farming and ranching. Laboratory practice in record keeping and analysis.
339. **Agricultural Price Theory (3:3:0).** Prerequisite: AEEO 236 and junior standing or approval. Basic economic principles with applications to agricultural pricing problems.
341. **Agricultural Statistics (4:3:3).** Prerequisite: Junior standing and 3 hours of mathematics. Principles and procedures involved in the analysis of agricultural data including indices of central tendency and dispersion; probability; sampling; significance tests; analysis of variance; and simple linear correlation.
411. **Seminar (1:1:0).** Prerequisite: Senior standing. Assigned readings, informal discussion, written and oral reports on subjects relating to agricultural economics.
430. **Special Problems in Agricultural Economics (3).** Prerequisite: AEEO 324 and 339 or approval. Individual instruction and assigned research on a problem of interest to the students. May be repeated with approval of department chairman.
431. **Livestock Marketing (3:3:0).** Prerequisite: AEEO 236 and junior standing. Organizational structure and adjustments in the livestock-meat industry, emphasizing prices and pricing; grades and grading; regulatory programs; foreign trade; and futures trading.
432. **Statistical Methods in Agricultural Research (3:3:0).** Prerequisite: AEEO 341. Advanced agricultural statistical analysis related to research methods using probability theory; tests of statistical significance; multiple correlation and regression; analysis of covariance; and experimental design.
433. **Production Economics (3:3:0).** Prerequisite: AEEO 339 or approval. Basic tools of economics used to analyze problems facing the farm business, emphasizing the decision-making process.
434. **Agricultural Marketing Economics (3:3:0).** Prerequisite: AEEO 339 or approval. Economic principles applied to marketing problems, emphasizing field crops, dairy and horticultural products; pricing, costs, market structure, marketing programs, and research procedures.
435. **Agricultural Policies and Organizations (3:3:0).** Prerequisite: Junior standing or approval. Historical development and economic analysis of public programs and policies affecting agriculture, emphasizing the role of farm organizations, economic effects of alternative programs, and current developments.
436. **Trade in Agricultural Products (3:3:0).** Prerequisite: Senior standing, AEEO 339, or approval. Economic principles of interregional and international trade, location, and inter-area competition in agricultural products.
437. **Farm and Ranch Appraisal (3:2:3).** Prerequisite: Senior standing or approval. Factors governing land prices and valuation. Appraisal of lands for use, sale, making loans, condemnation, settlement of estates, and taxation. Appraisal reports.
438. **Range and Ranch Economics (3:3:0).** Prerequisite: AEEO 235 and junior standing. Organization and management of ranch business, emphasizing resource and enterprise combinations, prices and marketing, ranch records, financing, appraisal, and range conservation. Short field trips.
439. **Agricultural Price Analysis (3:3:0).** Prerequisite: AEEO 341 and 339 or approval. Analysis of agricultural price variations, trends, cycles, seasonal variations, and statistical analysis of price changes.
4312. **Mathematical Economics for Agriculture (3:3:0).** Prerequisite: AEEO 339 and 341 or equivalents. Mathematical tools necessary for treatment of basic economic relationships involving prices and quantities, inputs and outputs, and costs and revenue. Formulation and analysis of economic models applicable to agriculture.
4313. **Agricultural Resource Economics (3:3:0).** Prerequisite: Junior standing or approval. Economics of agricultural resource allocation including land economics and economics of water development, allocation, and conservation.
4314. **Advanced Farm Management (3:2:3).** Prerequisite: AEEO 334 or approval. Advanced principles and practices emphasizing methods and techniques for analyzing farm organization and operation problems; enterprise budgeting, case studies, computer games, linear programming, and farm business simulation.
4315. **Agricultural Business Management (3:3:0).** Prerequisite: AEEO 339 or approval. Managerial techniques applied to decision making problems of agricultural business firms in

the procurement, handling, storage, processing, and distribution of agricultural inputs and products.

4316. **Agricultural Financial Analysis (3:3:0)**. Prerequisite: AEEO 332 and 339. Principles and procedures concerned with managing financial and credit resources; nature, purposes, and use of financial statements, budgets, and credit instruments from standpoints of both borrower and lender; analytical procedures and methods used by credit institutions and applicable to financial and credit records and instruments; and criteria for decision-making in borrowing and lending.

#### FOR GRADUATES

511. **Seminar (1:1:0)**. Current agricultural economic problems.
520. **Research Methodology in Agricultural Economics (2:2:0)**. Prerequisite: Graduate standing. Advanced training in research methods and procedures including role and uses of theory, problem selection, development and testing of hypotheses.
531. **Advanced Production Economics (3:3:0)**. Prerequisite: AEEO 433 and graduate standing. Criteria of resource efficiency; interindustry relationships; uncertainty and expectations; location and timing of production and technological changes.
532. **Agriculture and Public Policy (3:3:0)**. Prerequisite: AEEO 435 or equivalent. Analysis and evaluation of policies and programs affecting agriculture. Includes price and income policies, regulatory and service programs, marketing agreements and orders, antitrust and foreign trade policies.
533. **Seminar in Agricultural Marketing (3:3:0)**. Prerequisite: AEEO 434 or equivalent. Market structure analysis and public policy, interregional competition and regional economic development, economics of grading and marketing research.
534. **Research in Agricultural Economics (3)**. A selected research problem in agricultural economics. May be repeated for credit upon approval.
535. **Contemporary Agricultural Economics (3:3:0)**. Prerequisite: Graduate standing. Survey of the nature and development of basic economic principles and analytical economic research methods, with applications to agriculture. For nonmajors only.
536. **Agricultural Distribution Economics (3:3:0)**. Prerequisite: AEEO 4315 or equivalent. Economic principles and quantitative analytical procedures applied to the marketing and distribution of agricultural products with emphasis on fundamental demand relationships, emphasizing storage and inventory control; transportation and intermarket distribution; grades and quality control; product differentiation and price discrimination; location of processing facilities; and marketing programs.
537. **Advanced Statistical Methods in Agricultural Economics Research (3:3:0)**. Prerequisite: AEEO 341, graduate standing, and consent. Advanced statistical methods of analyzing agricultural economics data, including probability theory, methods of estimation, experimental and sample design, and tests of significance.
538. **Advanced Agricultural Resource Economics (3:3:0)**. Prerequisite: AEEO 4313, graduate standing, or consent. Economic theory and empirical investigation of resource utilization in agriculture with special emphasis on arid and semi-arid land areas.
539. **Rural Economic Development (3:3:0)**. Prerequisite: Graduate standing, AEEO 436, AEEO 4313, or consent. The application of economic theory, alternative growth models, requirements for growth, and quantitative techniques to problems concerning rural economic development and growth with emphasis on agriculture.
5311. **Econometric Methods in Agricultural Economics (3:3:0)**. Prerequisite: Graduate standing, AEEO 432, and consent. Application of econometric techniques with emphasis on the demand-supply-price structures for agricultural commodities; single equation, multiple regression, simultaneous equation techniques, recursive systems.
5312. **Operations Research in Agricultural Economics (3:3:0)**. Prerequisite: AEEO 432 and 4312 or equivalent and consent. Development, use, and evaluation of linear and non-linear models including farm and enterprise profit maximization models, transportation and spatial equilibrium models, inventory and business accounting models, Markov Chain analysis, simulation models, input-output models, systems analysis, and other operations research models applicable to agriculture.
5313. **Application of Computer Programming Techniques in Agricultural Economics (3:3:0)**. Prerequisite: I E 321, AEEO 341, or consent. Applications in agriculture and related business enterprises of programming techniques for digital computers with emphasis on selection of variables and programs, preparation of data, understanding and using programs, interpretation of results, and the writing of special programs.
631. **Master's Thesis (3)**. Enrollment required at least twice.

### Department of Agricultural Education

This department supervises the following degree programs: AGRICULTURAL EDUCATION, *Bachelor of Science*, *Master of Science*, and *Master of Education*. Degree requirements are given in the accompanying curriculum table.

#### Agricultural Education Curriculum.

##### FIRST YEAR

(See Uniform Freshman Year)

##### SECOND YEAR

Fall		Spring	
ENG 233, Tech. Writing	3	MCAG 221, Ag. Mech.-Metalwork	2
MCAG 220, Ag. Mech.-Woodwork	2	CHEM 341, Intro. Org. Chem.	4
CHEM 142, Gen. Chem.	4	G SP 338, Bus. & Prof. Spch.	3
GOVT 231, Amer. Govt., Org.	3	ENTO 231, Intro. Ento.	3
HIST 232, Hist. of U.S. since 1877	3	GOVT 232, Amer. Govt., Funct.	3
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2

### THIRD YEAR

Fall		Spring	
MCAG 231, Farm Elect. & Utilities	3	AECO 334, Farm Mgt. or	
AGRO 343, Princ. & Pract. in Soils	4	AECO 438, Ranch Eco.	3
AGRO 341, Fund. Prin. of Gen.	4	MCAG 333, Tractors & Power Units	3
ANSC 331, Prin. of Nutrition	3	ED 332, Ed. Psych.	3
R&WM 331, Range Mgt. Prin. or		ANSC 331, Livestock Prod.	3
AGRO 4312, Crop Prod.	3	Electives	7
	17		19

### FOURTH YEAR\*

Fall		Spring	
ED 4315, Audio-Visual Ed.	3	AGED 432, Adult Methods	3
Electives	2	AGED 434, High School Meth.	3
**Other Courses	14	AGED 435, Supervised Farm & FFA	3
	19	AGED 461, Student Tchg.	6
		MCAG 4311, Adv. Ag. Mech.	3
			18

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

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

\*\* Areas of Emphasis: Students will select one of the areas of emphasis listed below according to their interest. Selection of one of these areas will not prevent a student from teaching in the other vocational agriculture areas.

\*\* Production Agriculture Emphasis: 14 hours of advanced agricultural credit in two or more departments.

\*\* Preemployment Laboratory in Farm Power and Machinery Emphasis: AGE 331 and 5 additional credit hours in Ag. Engr.; AECO 4315 and 3 credit hours of advanced agriculture in a department other than Ag. Engr. or Ag. Eco. A student choosing this emphasis may substitute PHYS 141 or BIOL 141.

\*\* Preemployment Laboratory in Horticulture: HORT 232, 233, 334, 2 additional advanced credit hours of Hort., and AECO 4315.

### Courses in Agricultural Education.

#### FOR UNDERGRADUATES

111. The Agricultural Industry (1:1:0). Survey of the field of agriculture, vocational guidance. Required of all freshman students in the College of Agricultural Sciences.
430. Agricultural Education Problems (3). Prerequisite: senior standing and approval of department chairman. Individual investigation. May be repeated for credit.
432. Methods in Adult Agricultural Education (3:2:2).
434. Methods of Teaching Vocational Agriculture in the High School (3:2:3).
435. Methods in Supervised Farming and Future Farmer Work (3:2:3).
461. Student Teaching (6). Prerequisite: Senior standing in agriculture. One-half of one semester of off-campus supervised student teaching in high school vocational department approved by the Agricultural Education Department.

#### FOR GRADUATES

522. Advanced Methods in High School Vocational Agriculture (2:2:0).
523. Advanced Methods in Adult Agricultural Education (2:2:0).
524. Advanced Methods in Future Farmer Work (2:2:0).
531. Investigation in the Field of Agricultural Education (3). 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.
532. Research Methods in Agricultural Education (3:3:0). Adoption of research techniques to problems in agricultural education. The selection of a research problem and determining the correct research design and treatment of the data.
533. Methods of College Agricultural Teaching (3:2:3).
534. Administration and Supervision of Agricultural Education (3:3:0). Principles and problems involved in the administration and supervision of agricultural education in our public schools. Offered spring and summer terms.
535. Problems (3). Problems in the field 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.
538. Program Development in Agricultural and Extension Education (3:3:0).
630. Master's Report (3).
631. Master's Thesis (3). Enrollment required at least twice.

### Department of Agricultural Engineering

This department administers the following degree programs: AGRICULTURAL ENGINEERING (jointly supervised by the colleges of Agricultural Sciences and Engineering), *Bachelor of Science in Agricultural Engineering*, *Master of Science in Agricultural Engineering*; MECHANIZED AGRICULTURE, *Bachelor of Science*.

The Department of Agricultural Engineering is primarily concerned with the application of basic engineering principles to the conditions and require-

ments of agriculture as an industry, and as a field of applied science. This responsibility is discharged through teaching and research activities for service to agriculture and with the development and training of professional agricultural engineers and agriculture majors in mechanized agriculture. Appropriate course offerings and laboratory facilities are available in the areas of farm power and machinery, buildings and structures, electrification, processing, soil conservation, and water management. Courses are offered in Agricultural Engineering and in Mechanized Agriculture.

Expanding agricultural mechanization, to produce needed food and fiber, has caused an increasing demand for agricultural engineering and mechanization graduates with emphases in agribusiness, production, and teacher training. Many graduates move rapidly into management positions. Employment is well distributed among business and industrial organizations, individual private enterprises, educational institutions, and government agencies.

### Agricultural Engineering Curriculum.

#### FIRST YEAR\*

Fall		Spring	
AGED 111, The Ag. Industry	1	AGE 122, Constr. Matl. & Fabr.	2
AGRO 131, Ag. Plant Science	3	ECO 235, Fund. of Eco.	3
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Anal. I	3	EGR 136, Engr. Graphics I	3
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

15\*\*

16\*\*

#### SECOND YEAR

Fall		Spring	
AGE 232, Plane & Topo. Surv.	3	AGE 233, Engr. Instr. & Contr.	3
ANSC 339, An. Envir. & Physio.	3	CE 233, Statics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
MATH 235, Anal. Geom. & Calc. III	3	MATH 335, Math. for Engr. & Scits. I	3
PHYS 143, Prin. of Phys. I	4	PHYS 241, Prin. of Phys. II	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

17\*\*

17\*\*

#### THIRD YEAR

Fall		Spring	
AGE 336, Prin. Ag. Mach. Des.	3	EE 234, Elect. Instr.	3
AGRO 241, Soils	4	CE 3311, Mech. of Solids	3
CE 332, Dynamics	3	CE 3351, Mech. of Fluids	3
EE 233, Elec. Sys. Anal.	3	GOVT 231, Amer. Govt., Org.	3
ME 3314, Mechanisms	3	ME 3321, Engr. Thermo. I	3
Elective	2	Elective (Humanity)	3

18

18

#### FOURTH YEAR

Fall		Spring	
AGE 411, Seminar	1	AGE 433, Elem. of Tract. Des.	3
AGE 436, Ag. Proc. Sys.	3	AGE 434, Farm Elec. Sys.	3
AGE 438, Funct. Des. of Ag. Struct.	3	AGE 437, Des. Irrig. Sys.	3
AGE 442, Engr. Soil & Water Conser.	4	AGE 439, Struct. Des. Farm Bldg.	3
GOVT 232, Amer. Govt., Funct.	3	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Elective	3

17

18

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* See also Alternate Freshman Year, College of Engineering.

\*\* Exclusive of P.E., Band, or Basic ROTC.

### Mechanized Agriculture Curriculum.

#### FIRST YEAR\*

Fall		Spring	
AGED 111, The Ag. Industry	1	AECO 235, Fund. of Ag. Eco.	3
AGRO 131, Ag. Plant Sci.	3	CHEM 141, Gen. Chem.	4
ANSC 131, Animal Science	3	ENG 132, College Rhet.	3
ENG 131, College Rhet.	3	MATH 131, Trigonometry	3
MATH 133, College Algebra	3	MCAG 220, Ag. Mech. I	2
MCAG 131, Prin. of Ag. Mech.	3	MCAG 221, Ag. Mech. II	2

16\*\*

17\*\*

#### SECOND YEAR

Fall		Spring	
CHEM 142, Gen. Chem.	4	AGE 232, Plane & Topo. Surv.	3
FD T 230, Prin. of Food Tech.	3	ENG 233, Tech. Writing	3
HIST 231, Hist. of U.S. to 1877	3	GOVT 231, Amer. Govt., Org.	3
PHYS 141, Gen. Physics	4	HIST 232, Hist. of U.S. since 1877	3
MCAG 231, Farm Elect. & Utilities	3	PHYS 142, Gen. Physics	4

17\*\*

16\*\*

## THIRD YEAR

Fall		Spring	
GOVT 232, Amer. Govt., Funct.	3	AGRO 343, Prin. & Prac. in Soils	4
MCAG 331, Ag. Power & Mach.	3	G SP 338, Bus. & Prof. Speech	3
MCAG 335, Irrig. & Eros. Control	3	MCAG 333, Tractor & Power Units	3
***Emphasis courses	9	***Emphasis courses	7
	18		17

## FOURTH YEAR

Fall		Spring	
AG E 411, Seminar	1	MCAG 435, Farm Mech. Prob. or	
AECO 4315, Ag. Bus. Mgt. or		MCAG 4311, Adv. Ag. Mech.	3
MCAG 432, Farm Bldg. & Environ.	3	***Emphasis courses	15
***Emphasis courses	13		18
	17		

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136. All electives must be approved by department chairman.

\* If uniform Agriculture Freshman Year curriculum is followed, course variations may be substituted in this curriculum.

\*\* Exclusive of P.E., Band, or Basic ROTC.

\*\*\* **Agribusiness Industry Emphasis:** Student choosing this emphasis must take AECOT 231; AG E 233, 430; BLAW 338; ENTO 231; MGT 330; MKT 332, 334, 335, 339; MCAG 338; SECT 321; plus 9 credit hours of electives.

\*\*\* **Agri-Tech Production Emphasis:** This emphasis provides flexibility for individual program needs; however, the student is required to take AG E 233, 430; MCAG 338; and a minimum of an additional 3 credit hours in Acct., Ag. Eco., Agron., An. Sci. or Range & Wildlife Mgt., Entom., Mgt.; plus 20 credit hours of electives.

\*\*\* **Education-Teacher Emphasis:** In this emphasis the student must have completed the following advanced undergraduate courses by the end of the fall semester of his senior year: ED 332, 4315; AECO 334 or 438 and 4315; AGRO 341; 5 hours of Agron. and/or Range & Wildlife Mgt.; ANSC 331, 3311; CHEM 341; and 1 hour of elective. Courses for the spring semester of the senior year must be taken as a group and include AGED 432, 434, 435, 461, and MCAG 4311. Students who complete this emphasis are eligible to apply for Vocational Agriculture Teacher Certification.

## Courses in Agricultural Engineering.

## FOR UNDERGRADUATES

111. **Principles of Agricultural Engineering (1:1:2).** Principles of agricultural engineering; including farm power and machinery, farm structures, soil and water conservation, farm electrification, farm product processing, and agricultural environment.
122. **Construction Materials and Fabrication Methods (2:1:3).** Properties of materials, types of structures, construction equipment, and methods of construction. Includes wood, concrete, plastics, and metal member fabrication.
232. **Plane and Topographic Surveying (3:2:3).** Precision measurement of distances, areas, and elevations. Includes traversing, photogrammetry, plane table, transit, stadia, horizontal curves, topographic mapping, and construction layout.
233. **Engineering Instrumentation and Control Systems (3:2:2).** Basic engineering measurements and instrumentation for determining physical and environmental quantities. Instrument operation and calibration for measuring length, area, quantity, temperature, pressure, velocity, power, moisture, etc.
334. **Agricultural Climatology (3:3:0).** Weather as affecting the physical environment, effect of environmental parameters on biological responses of plants and animals, controlled micro-environments, agrometeorological instrumentation, and weather forecasting for agriculture.
336. **Principles of Agricultural Machinery Design (3:2:3).** Mechanical design and materials used for farm machinery construction. Includes materials, design principles, machine types, capacity, maintenance, and effective use.
337. **Engineering Systems for Agricultural Pollution Control (3:3:0).** Characteristics of agricultural crop and animal production and processing wastes; their pollution of air, structures, soil, and water; and the design of systems for their control.
411. **Agricultural Engineering Seminar (1).** Assigned readings, oral and written reports, discussions, lectures by visiting professional engineers, and field trips required.
430. **Agricultural Engineering Problems (3).** Individual investigation of a technical or design problem. Systematic retrieval, research, and a final written report required.
433. **Elements of Farm Tractor Design (3:2:3).** Theory of internal combustion engines; thermodynamic principles; kinematics and dynamics of tractor chassis and power transmission including drawbar, hydraulic, and power-take-off; and traction mechanisms.
434. **Farm Electrification Systems (3:2:3).** Farm electric distribution systems; wiring, controls, motor applications, refrigeration, heating, lighting, and ventilation. Special applications as applied to the agricultural industry.
436. **Agricultural Processing Systems (3:2:3).** Engineering principles in agricultural product conveyance, processing, and storage. Includes materials handling, treatment, and packaging of fibers, feeds, and food.
437. **Design of Farm Irrigation Systems (3:2:3).** Design of gravity and sprinkler irrigation systems; including well drilling, development, pumping, structures, conveyance, and efficiency control.
438. **Environmental and Functional Design of Agricultural Structures (3:2:3).** Biological response of plants and animals to environment. Engineering analysis and design of environmental structures; including heating, cooling, lighting, ventilation, and humidity.
439. **Structural Design of Farm Buildings (3:2:3).** Structural design of farm buildings and estimation. Includes load and stress analysis, axial loading, columns, beams, connections, foundations, floors, framing, and roofs.



442. **Engineering for Soil and Water Conservation (4:3:3).** Engineering aspects and design of soil and water conservation structures; including terraces, diversions, drops, chutes, spillways, drainage systems, earthen dams, runoff determination.

## FOR GRADUATES

511. **Seminar (1:1:0).** Classical development of the agricultural engineering profession and significant research. Oral presentations and organized discussion.
530. **Agricultural Engineering Research (3).** Advanced selected research problems in agricultural engineering.
532. **Instrumentation and Research Methods (3:3:0).** Principles, use, and limitation of instruments in measurement of physical quantities. Also research design, model study, analysis, and similitude.
533. **Advanced Theory of Farm Machinery Design (3:2:2).** Machine functional requirements, analysis of forces, loads, stress, materials, design, performance of series, testing of prototype models, and manufacture.
534. **Theory of Agricultural Structures Design (3:3:0).** Theoretical approach to an analysis of structures applicable to agricultural enterprises. Materials and structural design for housing plants, animals, and produce.
535. **Design Theory of Earth Structures (3:3:0).** Design principles of earthen embankments; engineering soil classification, earth pressures, seepage, consolidation, settlement, slope stability, and landslides.
536. **Advanced Farm Electrification and Processing Systems (3:3:0).** Theory of electronic and mechanical controls for automated materials handling and processing systems related to agricultural plants and enterprises.
537. **Advanced Theory of Water Utilization (3:3:0).** Advanced study of surface and underground water resources and means of utilization for agricultural, domestic, and industrial purposes.
538. **Advanced Technical Problems in Agricultural Engineering (3).** Advanced technical problem of interest to the profession. Individual study, laboratory work, and final report required.
539. **Bioengineering—Environmental Control (3:3:0).** Bioengineering aspects of environmental research facilities. Analysis of plant and animal growth chambers; including restrained and unrestrained measurement of physiological functions.
631. **Master's Thesis (3).** Enrollment required at least twice.

**Courses in Mechanized Agriculture.**

## FOR UNDERGRADUATES

112. **Fundamentals of Mechanized Agriculture (1:1:0).** An introduction to the development of agricultural mechanization, present concepts, and future role. A study of professional sales, service, and management of farm equipment, structures, and allied farm inputs.
131. **Principles of Agricultural Mechanization (3:3:0).** Modern agricultural equipment requirements, development and application. Emphasis on selection, use, and maintenance of power units, equipment, and structures. Includes engineering applications to resource conservation.
220. **Agricultural Mechanics I—Woodwork (2:1:3).** Selection, use and maintenance of hand tools and power woodworking equipment. The selection and estimation of materials and wood and concrete construction.
221. **Agricultural Mechanics II—Metalwork (2:1:3).** Hand and power tools for farm metal work. Includes welding and cold metal work for construction and repairs.
222. **Agricultural Surveying and Land Conservation (2:1:3).** Measurement of distances and areas, traversing, elevations, and mapping. Includes laying out terraces and ditches for water control.
231. **Farm Electrification and Utilities (3:2:2).** Principles of electricity as related to agricultural enterprise applications such as controls, wiring, power, heating, and lighting. Includes domestic water supply systems, waste disposal systems, and utilization of fuel gases.
311. **Farm and Home Safety (1:1:0).** Review and study of farm and home accidents. Accident prevention by education, habit forming, safety devices, warning signs, and enforcement. Includes safe handling of electrical equipment, petroleum fuels, vehicles, and safety design of facilities.
331. **Agricultural Production Power and Machinery (3:3:0).** Agricultural tractors as power units for field drawbar and other power transmissions. Machinery for tillage, planting, cultivating, and harvesting. Includes classification, operation, adjustment, and maintenance of such equipment.
333. **Farm Tractors and Other Power Units (3:2:2).** Principles of internal combustion engines, including tractors and small gas engines. Emphasis on functional design, adjustment, maintenance, repair and testing of such power units.
335. **Irrigation and Erosion Control (3:3:0).** Principles and practices of irrigation and water erosion control systems. Includes water movement, storage, quality, salinity, and use by plants.
338. **Processing Agricultural Products (3:3:0).** Physical and biological properties of agricultural materials. Materials storage, handling, and processing systems layout; including conveyance, treatment, and packaging equipment.
432. **Farm Buildings and Environment Control (3:3:0).** Determining farm building requirements, materials, design, and construction. Includes framing, environment control methods, equipment, and necessary utilities.
435. **Farm Mechanics Problems (3).** Individual study of an advanced phase of farm mechanization or farm mechanics. Research report required.
4311. **Advanced Agricultural Mechanics (3:2:2).** Organization, equipment, and management of vocational agricultural shops. Advanced techniques in design and construction of projects. Emphasis on welding and fabrication.

## FOR GRADUATES

531. **Investigations in Advanced Agricultural Mechanics (3).** Individual study or investigation of an advanced phase of agricultural mechanics. Emphasis placed on advanced mechanization technology.

## Department of Agronomy

This department supervises the following degree programs: *Bachelor of Science* in SOILS and *Bachelor of Science* in CROPS, with emphases in crop science, agronomy, agronomic industry, and production horticulture; *Master of Science* in CROP SCIENCE and in SOIL SCIENCE.

The Department of Agronomy concerns itself with the technology of plant growth and development in 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 interested students for service and graduate studies in the areas of agronomic industry, crop science, soil science, and fruits and vegetables. These curricula meet the standards recommended by the Crop Science Society of America and the Soil Science Society of America. All curricula meet the Civil Service standards for their respective professions.

### Crops Curriculum.

Basic Curriculum	Emphasis:			
	Crop Science*	Agronomy**	Agronomic Industry***	Production Horticulture
<b>FIRST YEAR</b> (See Uniform Freshman Year)				
<b>SECOND YEAR</b>				
Eng 233 CHEM 142 CHEM 341 GOVT 231 ENTO 231 P.E., Band, or Basic ROTC (2 sem.)	AGRO 241 MBIO 231 BIOL 142 MATH 131	AGRO 241 or 343 AG E 232 or MCAG 222 or MCAG 335	AGRO 343 MBIO 231 or 331 AEEO 236	BIOL 142 AEEO 236 AGRO 343 PRDH 231 PRDH 331
<b>THIRD YEAR</b>				
AGRO 341 BOT 331 HIST 232 GOVT 232	PHYS 141 PHYS 142 AGRO 331 ANSC 331 CHEM 251 or 342	BOT 332 ANSC 331 MBIO 231	AGRO 331 ANSC 331 G SP 338 AEEO 332 AEEO 339 AG E 232 or MCAG 222 or MCAG 335	MCAG 222 BOT 332 MBIO 231 PRDH 332
<b>FOURTH YEAR</b>				
	AGRO 410 BOT 332	AGRO 410 ENTO 321 or 431	AGRO 410	AGRO 436 or 4311 ENTO 431 PRDH 411 PRDH 430 PRDH 431 PRDH 435

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* Additional 21 hours of plant science, 6 hours of advanced soils, 16 hours of other electives approved by department, and minimum of 28 hours of agronomy are required.

\*\* Additional 20 hours of agronomy and 9 hours of plant science are required.

\*\*\* Additional 12 hours of agronomy, 15 hours from the following: AOCT 234, 235; MGT 331, 339; FTN 231, 331; MKT 332, 339; BLAW 338, 339; and 16 hours of electives approved by the department.

### Soils Curriculum\*.

<b>FIRST YEAR</b> (See Uniform Freshman Year)		<b>THIRD YEAR</b>	
<b>SECOND YEAR</b>		CHEM 251 MATH 152 PHYS 141 ENG 233	BOT 331 AGRO 341 PHYS 142 Chem. electives
AGRO 241 CHEM 142 GEOL 143 BIOL 142	MBIO 231 or 331 CHEM 341 MATH 151 P.E., Band, or Basic ROTC	GOVT 231 HIST 232	GOVT 232 AGRO 410

\* Additional 15 hours of advanced soils, 9 hours of advanced plant science, 6 hours of earth or atmospheric science, and 15 hours of other electives approved by the department are required.

**Courses in Agronomy.****FOR UNDERGRADUATES**

131. **Agricultural Plant Science (3:3:0).** Growth, importance, distribution, and utilization of world agronomic, range, fruit, and vegetable crops.
241. **Soils (4:3:2).** Prerequisite: CHEM 141, 142, or concurrent enrollment in CHEM 142. Formation and classification; physical, chemical, and biological properties; physical and chemical analysis and mapping of designated areas in laboratory.
331. **Forage and Pasture Crops (3:2:2).** Prerequisite: AGRO 131, junior standing in agriculture. The production and utilization of forage and pasture crops.
332. **Grain Crops (3:3:0).** Prerequisite: AGRO 131. The production, improvement, storage, and use of grain crops. Second session, summer term, odd years.
333. **Oilseed Crops (3:3:0).** Prerequisite: AGRO 131. The production, improvement, pest control, and uses of major oilseed crops. Second session, summer term, even years.
341. **Fundamental Principles of Genetics (4:3:2).** Prerequisite: Junior standing in agriculture or approval of instructor. Heredity and variation. The chromosome theory in plants and animals. Biometry as applied to genetic data.
342. **Crop Identification and Grain Grading (4:0:8).** Prerequisite: Sophomore standing in agriculture or approval of instructor. Identification of selected field crops, diseases, and weed plants and seeds; commercial grain grading.
343. **Principles and Practices in Soils (4:3:2).** Prerequisite: CHEM 141 or equivalent. Development, properties, classification, water relationships, nutrient availability, testing, fertilizer elements, fertilizer application and management, conservation, and selected soil management practices. Emphasis on needs of vocational agriculture teachers, county agents, farm managers, and farm operators. Not open to majors in soil science and crop science.
410. **Seminar (1).** Prerequisite: Senior standing or approval of instructor. Assigned readings, current advances. Informal discussions, oral reports, and papers. May be repeated.
425. **Seed Technology (2:1:2).** Prerequisite: Senior standing in agriculture or approval of instructor. Analysis of planting seed, germination, and purity. Production, processing, storing, and marketing pure seed. Emphasis on registered and certified seed; study of state and federal seed laws.
430. **Agronomy Problems (3).** Prerequisite: Approval of instructor. An assigned problem and individual instruction. May be repeated for credit with approval of department chairman.
431. **Fundamental Principles of Plant Breeding (3:3:0).** Prerequisite: AGRO 341. Practical application of genetics in the breeding and improvement of plants.
432. **Environmental Pollution (3:3:0).** Magnitude, importance, source, persistence, and control of air, soil, and water pollution. Fall semester.
433. **Cotton Production and Improvement (3:3:0).** Prerequisite: Junior standing in agriculture or approval of instructor. Culture, improvement, and classification of cotton. Disease and insect pests of cotton. Spring semester.
434. **Soil Conservation and Land Use Planning (3:2:3).** Prerequisite: AGRO 241, junior standing. Types of erosion, causes, and controls. Inspection trips in soil conservation, land use planning, and conservation management. Spring semester.
435. **Soil Classification (3:2:3).** Prerequisite: AGRO 241 or approval of instructor. Systems of classification and the relationships of world soils to different systems. Field trips to study selected soils.
436. **Soil Chemistry (3:2:3).** Prerequisite: AGRO 241, 12 hours of chemistry or approval of instructor for nonagriculture majors. Chemical composition of soils with emphasis on clays. Ion exchange phenomena. Chemical equilibria. Clay-organic reactions.
439. **Soil Microbiology (3:2:3).** Prerequisite: Junior standing and instructor's approval. Soil microorganisms, their occurrence, characteristics, and functions in the decomposition of organic matter and soil fertility.
4311. **Soil Fertility (3:2:3).** Prerequisite: AGRO 241. Nutrient availability as influenced by chemical, physical, and biological properties of soils. Fertilizer use. Field trips. Fall semester.
4312. **Crop Production (3:2:3).** Prerequisite: AGRO 131, 241, and junior standing in agriculture. Not open to agronomy majors. Applied production of fiber, grain, and forage crops. Seed and feed production. Emphasis on needs of vocational agriculture teachers, county agents, etc.
4313. **Weeds and Weed Control (3:2:2).** Prerequisite: CHEM 341. The importance, distribution, reproduction, and dissemination of weeds. Mechanical, biological, and chemical methods of control. Spring semester.
4314. **Soil Physics (3:2:3).** Prerequisite: AGRO 241, 6 hours each of physics and mathematics or approval of instructor. Physical properties of soils: structure, water, air, and temperature. Spring semester.
4315. **Nutrition of Crop Plants (3:3:0).** Prerequisite: BOT 331, CHEM 341, AGRO 241, or approval of instructor. The absorption, translocation, accumulation, re-export, essentially, and function of the macro- and micro-nutrients. Interactions among the various nutrients. Spring semester.
4316. **Agricultural Plant Physiology (3:3:0).** Prerequisite: BOT 331, or approval of instructor, CHEM 342 recommended. Considerations in plant chemistry, membranes, respiration, and physiological aspects of radiant energy and water. Quantitative aspects, measurements, and current literature. Fall semester.

**FOR GRADUATES**

511. **Seminar (1:1:0).** Prerequisite: Approval of the instructor. Current literature in the field. May be repeated for credit on approval of major professor.
512. **Problems in Field Crops (1).** Prerequisite: Graduate standing and consent of instructor. Selected problems based on the student's needs and interest, not included in other courses. May be repeated for credit with approval of department.
513. **Problems in Soils (1).** Prerequisite: Graduate standing and consent of instructor. Selected problems based on the student's needs and interests, not included in other courses. May be repeated for credit with approval of department.
530. **Pasture Management (3:2:2).** Prerequisite: AGRO 331 or equivalent and graduate standing. The theoretical basis and fundamental principles of cultivated pasture management. Interrelationship of grazing animals, soils, and pasture development and management. Influence of climate, evaluation of forages. International pasture problems. Fall semester, even years.

531. **Advanced Soil Fertility (3:3:0).** Prerequisite: AGRO 241 and 4311, or consent of instructor. Evaluation of and application of theory to soil fertility and fertilizers; a study of growth curves and predicting crop response and nutrient need. Fall semester.
533. **Pedology (3:3:0).** Prerequisite: Approval of instructor. Processes of rock weathering with associated soil formation. Genesis of clay minerals. Soil forming factors and their interrelationships.
534. **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.
535. **Plant Nutrition (3:2:3).** Prerequisite: Bot 331, CHEM 341, AGRO 241, or consent of instructor. The relationship of soil and plants to nutrient absorption, translocation, accumulation, re-export, essentiality, utilization, and function of the macro- and micro-nutrients. Interactions of plant nutrients. Spring semester.
536. **Soil and Plant Relationships (3:3:0).** Prerequisite: Approval of instructor. Selected topics in soil-plant relationships. Cause and effect, management, and control of factors influencing plant growth in the soil.
537. **Methods in Plant Breeding (3:3:0).** Prerequisite: Approval of instructor. Methods applicable to improving self- and cross-pollinated plants. Inbreeding, selection, hybridization, heterosis, quantitative inheritance, induced mutation, and ploidy.
538. **Laboratory Methods in Plant Breeding (3:0:9).** Prerequisite: AGRO 431 and graduate standing in agriculture or biology. Field study of plant breeding programs and techniques.
5310. **Soil Physics (3:2:3).** Prerequisite: AGRO 241 and consent of instructor. Physical characteristics of soils and porous media and principles underlying flow and distribution of water, air, and heat in soils. Spring semester.
5311. **Crop Physiology (3:3:0).** Prerequisite: BOT 331, CHEM 341, or consent of instructor; CHEM 342 recommended. Considerations in crop chemistry, subcellular components, membranes metabolism, and photosynthesis. The relationship of crop metabolism, to cellular organization. Emphasis on quantitative aspects, measurements, and current literature dealing with agricultural plants. Fall semester.
5312. **Environmental Crop Physiology (3:3:0).** Prerequisite: BOT 331 and consent of instructor. The plant-environment interaction in relation to growth and production of crop communities. Radiant energy, carbon dioxide, water, and temperature relationships in crop stands. Fall semester.
5313. **Soil Mineralogy (3:3:0).** Prerequisite: AGRO 436 or GEOL 241. The mineralogical makeup of sand, silt, and clay. The relation of physical and chemical soil properties to mineralogy.
5314. **Advanced Soil Classification (3:2:3).** Prerequisite: AGRO 241 or approval of instructor for non-agriculture majors. A study of the taxonomic System of Soil Classification as used in the United States.
5315. **Herbicidal Action in Plants (3:2:3).** Prerequisite: AGRO 4313 or consent of instructor. Mode of action and factors effecting herbicidal movement and reactions in plants.
5316. **Radioisotopes in Plant Research (3:2:3).** Prerequisite: Graduate standing and consent of instructor. Fundamental principles of radioisotope research techniques and their application to plant research.
631. **Master's Thesis (3).** Enrollment required at least twice.
632. **Advanced Genetics (3:2:3).** Prerequisite: AGRO 341 or consent of instructor. Basic principles of plant inbreeding, hybridization, selection, and progeny testing.
633. **Cytogenetics (3:2:3).** Prerequisite: AGRO 341 or consent of instructor. Correlation of genetic and cytologic phenomena in plants.
634. **Advanced Soil Chemistry (3:2:3).** Prerequisite: AGRO 436 or consent of instructor. Adsorption reactions, ion activities, solubility characteristics, equilibrium reactions.
635. **Advanced Soil Physics (3:2:3).** Prerequisite: AGRO 5310 or consent of instructor. The physical constitution and properties of soils.
636. **Advanced Soil Microbiology (3:2:3).** Prerequisite: AGRO 439 or consent of instructor. Nature of soil organic matter and biochemical transformations brought about by soil microorganisms.
637. **Advanced Experimental Design and Analysis (3:2:3).** Prerequisite: AGRO 532. Research designs and methods of statistical analysis for experimental research investigations.
638. **Metabolism of Crop Plants (3:2:3).** Prerequisite: AGRO 5311 or consent of instructor. Energy, adsorption, solution, and chemical reactions in plants.

## Courses in Production Horticulture.

### FOR UNDERGRADUATES

231. **Vegetable Crops (3:2:3).** Prerequisite: BOT 141. Principles and practices in production of the major truck crops. Fall semester only.
331. **Fruit Culture (3:3:0).** Prerequisite: BOT 141. Principles of fruit culture, nutrition, irrigation, training, fruit development and handling, orchard establishment, and varieties. Required field trips. Offered spring semester 1971 and alternate years.
332. **Fruit and Nut Plant Propagation and Pruning (3:2:3).** Prerequisite: PRDH 331 or concurrent enrollment. Principles, techniques, and field practices in propagation and pruning of fruit and nut plants.
411. **Seminar (1:1:0).** Prerequisite: Senior standing in production horticulture or consent of instructor. Assigned readings, current advances, informal discussions, oral reports, and papers. May be repeated for credit.
425. **Production Horticulture Problems (2).** 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.
430. **Production Horticulture Problems (3).** Prerequisite: Open to all advanced students having satisfactory scholastic records. Investigation of a problem in the field of special interest to the student. Repeated for credit with approval of program advisor.
431. **Advanced Fruit Production (3:3:0).** Prerequisite: PRDH 331, advanced standing in agriculture. Practices and problems in the commercial production, storage, and handling of the important fruit crops. Required field trips. Offered fall semester 1971 and alternate years.
435. **Advanced Vegetable Production (3:3:0).** Prerequisite: PRDH 231, advanced standing in agriculture. Practices and problems in the commercial production and handling of important vegetable crops for fresh market and processing. Required field trips. Offered spring semester 1971 and alternate years.

## FOR GRADUATES

511. Seminar (1:1:0). Prerequisite: Approval of instructor. Current literature in the field. May be repeated for credit.
531. Fruit and Vegetable 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.
532. Fruit and Vegetable Crop Behavior (3:3:0). Prerequisite: BOT 331. Crop responses and their modification. Recently developed techniques used to regulate physiological processes in growth and maturation of fruit and vegetable crops.
534. Selected Topics in Fruit Production (3:3:0). Prerequisite: PRDH 431. Recent developments in production requirements, trends in mechanization of production and harvest.
535. Selected Topics in Vegetable Production (3:3:0). Prerequisite: PRDH 435. Recent developments in production requirements, trends in mechanization of production and harvest.
536. Post Harvest Physiology of Fruit and Vegetable Crops (3:3:0). Prerequisite: BOT 331, CHEM 342 recommended. Physiological changes associated with maturation, ripening, and senescence of harvested fruit and vegetable crops. Consideration of methods to control these changes.
537. Breeding of Fruit and Vegetable Crops (3:3:0). Prerequisite: AGRO 341. Application of genetic principles to fruit and vegetable crop improvement. Techniques employed in breeding programs. Required projects.
631. Master's Thesis (3). Enrollment required at least twice.

## Department of Animal Science

This department supervises the following degree programs: *Bachelor of Science* in ANIMAL BUSINESS, ANIMAL PRODUCTION, or ANIMAL SCIENCE, *Master of Science* in ANIMAL BREEDING, ANIMAL NUTRITION, or MEAT SCIENCE, and *Doctor of Philosophy* in ANIMAL SCIENCE. The Department of Animal Science also directs the program in PREVETERINARY MEDICINE. Degree requirements are given in the accompanying curriculum tables.

## Animal Business Curriculum.

## FIRST YEAR

(See Uniform Freshman Year)

## SECOND YEAR

Fall		Spring	
ACCT 234, El. Acct. I	3	ACCT 235, El. Acct. II	3
AECO 236, Prin. Mkt. Ag. Prod.	3	ANSC 333, Anat. of Farm Anim.	3
ANSC 232, Meat & Meat Prod.	3	BIOL 142, Zoology	4
CHEM 142, Gen. Chem.	4	ENG 233, Tech. Writing	3
Other Courses	3	HIST 232, Hist. of U.S. since 1877	3
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	17		17

## THIRD YEAR

Fall		Spring	
AGRO 341, Fund. Prin. of Genetics	4	ANSC 331, Prin. of Nutrition	3
BLAW 338, Bus. Law I	3	ANSC 332, Animal Genetics	3
CHEM 341, Intro. Org. Chem.	4	ANSC 336, Physiol. of Farm Anim.	3
GOVT 231, Amer. Govt., Org.	3	ANSC 338, Meat Proc. & Mdse.	3
G SP 338, Bus. & Prof. Spch.	3	BLAW 339, Bus. Law II	3
	17	GOVT 232, Amer. Govt., Funct.	3
			18

## FOURTH YEAR

Fall		Spring	
ANSC 411, Anim. Sci. Seminar	1	ANSC 431, Range Cattle Prod.	3
ANSC 436, Anim. Nutrition	3	ANSC 432, Swine Prod.	3
ANSC 441, Sheep, Wool, & Mohair Prod.	4	*Other courses	12-13
*Other Courses	10-11		18-19
	18-19		

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* In addition to the above courses, the student wishing to major in animal business must take the following courses: A total of 15 hours chosen within one of the areas of (A) Data Programming: ANSC 422; ACCT 121, 232, 233, 246; AECO 341; IE 321; MATH 131, 151, 152; (B) Land: ACCT 323, 331; AECO 334, 335, 437, 438, 4313; BLAW 3311, 3313; FIN 231, 432, 439; MGT 330, 331; and (C) Marketing: ACCT 331; AECO 325, 333, 339, 431, 434, 436; FIN 231, 333; MGT 330, 331; MKT 334, 332, 335, 339, 439. A total of 10 hours of electives subject to the approval of the department chairman.

## Animal Production Curriculum.

## FIRST YEAR

(See Uniform Freshman Year)

## SECOND YEAR

Fall		Spring	
AECO 236, Prin. Mkt. Ag. Prod.	3	AGRO 343, Prin. & Prac. in Soils	4
ANSC 232, Meat & Meat Prod.	3	ANSC 333, Anat. of Farm Anim.	3
CHEM 142, Gen. Chem.	4	BIOL 142, Zoology	4
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Other Courses	3	HIST 232, Hist. of U.S. since 1877	3
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	17-13		18-19



### THIRD YEAR

Fall		Spring	
ANSC 321, Lvstk. & Meat Eval. I	2	ANSC 331, Prin. of Nutr.	3
ANSC 336, Physiol. of Farm Anim.	3	ANSC 332, Anim. Genetics	3
AGRO 341, Fund. Prin. of Genetics	4	ANSC 337, Anim. San. & Disease Contr.	3
CHEM 341, Intro. Org. Chem.	4	MBIO 231, Bacteriology or	
ENG 233, Tech. Writing	3	ENTO 231, Intro. Entom.	3
*Other courses	2-3	R&WM 331, Range Mgt. Prin. & Pract.	3
		G SP 338, Bus. & Prof. Spch.	3
	18-19		18

### FOURTH YEAR

Fall		Spring	
ANSC 411, Anim. Sci. Seminar	1	*Other courses	16-17
ANSC 436, Anim. Nutrition	3		
*Other courses	12-13		16-17
	16-17		

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* In addition to the above courses, the student wishing to pursue an animal production major must complete the following three groups: (A) 11 hours of electives, approved by department chairman, (B) 6-7 hours chosen from ANSC 431, 4312, 435, and 441, (C) 17-18 hours chosen from the remaining courses in the preceding group and those within one of the following two areas: (1) Livestock: ANSC 233, 335, 338, 4311, 4313, 4314, 422, 430, 434; MCAG 221, 222; AECC 334, 431; or (2) Range: R&WM 231, 333, 337, 436; BOT 334; AECC 334, 438; MCAG 222, subject to approval of department chairman. Students desiring to work within a feedlot management emphasis will delete the option of FID T 131 or HORT 131, and R&WM 331, from the required courses. The student is required to take ANSC 338, 422, 433, 4311; AECC 332, 431, 4314; AG E 436, 438; IE 321; MGT 331; and one course from ANSC 431, 441, or 4312. Three months' summer employment in an approved commercial feedlot will also be required. A total of 6-7 hours of electives is available in this option.

### Animal Science Curriculum.

#### FIRST YEAR

(See Uniform Freshman Year)

#### SECOND YEAR

Fall		Spring	
ANSC 232, Meat & Meat Prod.	3	AGRO 343, Prin. & Pract. in Soils	4
CHEM 142, Gen. Chem.	4	ANSC 333, Anat. of Farm Anim.	3
ENG 233, Tech. Writing	3	BIOL 142, Zoology	4
Other courses	3	HIST 232, Hist. of U.S. since 1877	3
MATH 131, Trig.	3	G SP 338, Bus. & Prof. Spch.	3
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	17		18

#### THIRD YEAR

Fall		Spring	
AGRO 341, Fund. Prin. of Genetics	4	ANSC 331, Prin. of Nutrition	3
ANSC 336, Physiol. of Farm Anim.	3	ANSC 332, Anim. Genetics	3
CHEM 341, Intro. Org. Chem.	4	CHEM. 342, Physiol. Chem.	4
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
*Other courses	3-4	*Other courses	3-4
	17-18		16-17

#### FOURTH YEAR

Fall		Spring	
ANSC 411, Anim. Sci. Seminar	1	*Other courses	17-18
ANSC 436, Anim. Nutrition	3		
*Other courses	13-14		17-18
	17-18		

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* In addition to the above courses, the student wishing to prepare for advanced studies must complete the following three groups: (A) 11 hours of electives approved by the department chairman; (B) 12-15 hours chosen from ANSC 337, 339, 430, 431, 441, 4311, 4312, 4313 (prevet students may include ANSC 233); (C) 16-19 hours chosen from BIOL 431; CHEM 251; MATH 151, 152; MBIO 231, 334, 430; PHYS 141, 142; ZOOL 241, 331, 332, 333, 435, 438, subject to the approval of the department chairman.

### Preveterinary Medicine Curriculum.

This curriculum is designed to qualify students for entrance to schools of veterinary medicine. Texas Tech University offers only the two-year preveterinary medicine curriculum. Students who complete this curriculum may either apply for admission to a school of veterinary medicine or change to one of the four-year curricula in the College of Agricultural Sciences.

#### FIRST YEAR

Fall		Spring	
AGED 111, The Ag. Industry	1	BIOL 142, Zoology	4
ANSC 131, Gen. Animal Sci.	3	CHEM 142, Gen. Chemistry	4
BIOL 141, Botany	4	ENG 132, Coll. Rhetoric	3
CHEM 141, Gen. Chemistry	4	HIST 231, Hist. of U.S. to 1877	3
ENG 131, Coll. Rhetoric	3	MATH 131, Trigonometry	3
MATH 133, Coll. Algebra	3	P.E., Band, or Basic ROTC	1
P.E., Band, or Basic ROTC	1		
	19		18



4312. **Swine Production (3:2:2)**. Prerequisite: ANSC 331, 332. 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.
4313. **Swine Management Systems (3:3:0)**. Prerequisite: ANSC 4312. Factors affecting and interrelationships of capital, feed, labor, buildings, equipment, and other items in swine production.
4314. **Poultry Production (3:3:0)**. Prerequisite: ANSC 233, 331. 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.

## 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.
531. **Developmental Growth and Fattening (3:3:0)**. A study of differentiation, development, growth, and fattening of domestic animals as influenced by hereditary and environmental interactions, and the interrelationships of growth and fattening with the physical and chemical composition of the body.
532. **Environmental Physiology of Domestic Animals (3:3:0)**. The study of animal-environment relationships with particular emphasis upon animal acclimatization to environmental conditions encountered in arid and semiarid land areas.
533. **Techniques in Animal Research (3)**. Techniques currently employed in animal research. Inservice training in the use and application of these techniques.
534. **Research in Animal Science (3)**. Inservice 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.
535. **Endocrinology (3:3:0)**. Prerequisite: ANSC 333. A study of the endocrine glands and their secretions. The role of hormones in livestock production, including their influence upon metabolism, dietary requirements, growth, reproduction, lactation, and fattening.
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.
537. **Advanced Animal Breeding (3:3:0)**. Population parameters. Heritability and heterosis. Genetic-environmental interactions. Methods for deriving population statistics. Genetic bases for performance testing programs.
538. **Animal Nutrition I—Ruminant (3:3:0)**. Analysis of nutritional theory. Intermediary metabolism of nitrogen, energy, vitamins, and minerals under the conditions of maintenance and various types of production. Ruminant fermentation.
539. **Physiology of Reproduction (3:2:2)**. Anatomy of reproductive systems; physiological regulations of reproductive processes; estrous cycle; gonadal functions; semen evaluation; fertilization; embryology; pregnancy; parturition; lactation; factors affecting reproductive efficiency; research techniques.
541. **The Science of Meat and Meat Products (4:3:3)**. 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.
5311. **Animal Nutrition II—Monogastric (3:3:0)**. Analysis of monogastric nutritional theory. Utilization of nutrients in various body processes. Effects of environment. Research procedures.
5312. **Advanced Studies in Specialized Areas of Animal Science (3:3:0)**. Study and investigation of recent advances and concepts in specialized areas, research techniques, and current problems. May be repeated for credit.
5321. **Advanced Meat Science (3:3:0)**. Advanced study of meat components, their development, and effect on meat characteristics and processing properties. Emphasis on current scientific literature.
631. **Master's Thesis (3)**. Enrollment required at least twice.
731. **Research (3)**. Investigation in areas of current interest. May be repeated for credit.
831. **Doctor's Dissertation (3)**. Enrollment required at least four times.

## Department of Food Technology

This department supervises the following degree programs: **FOOD TECHNOLOGY, Bachelor of Science** and **Master of Science**. Degree requirements are given in the accompanying curriculum table.

The department emphasizes the technological aspects of food processing and quality control and maintains a modern milk plant for teaching the fundamentals of dairy processing. Laboratories are available for microbiological and chemical analyses of food products and for research in food product development.

## Food Technology Curriculum.

FIRST YEAR  
(See Uniform Freshman Year)

## SECOND YEAR

Fall		Spring	
CHEM 142, Gen. Chem.	4	CHEM 341, Intro. Org. Chem.	4
MBIO 331, Gen. Bact.	3	HIST 232, Hist. of U.S. since 1877	3
F&N 131, Nutr. & Food	3	MATH 131, Trigonometry	3
GOVT 231, Amer. Govt., Org.	3	ENG 233, Technical Writing or	
FD T 230, Prin. Food Tech.	3	G SP 338, Bus. & Prof. Speech	3
P.E., Band, or Basic ROTC	1	FD T 220, Analysis of Foods	2
		FD T 232, Food Chemistry I	3
	17	P.E., Band, or Basic ROTC	1

## THIRD YEAR

Fall		Spring	
FD T 231, Food Preparation	3	CHEM 343, Phys. Chem. or	
MBIO 430, Advanced Gen. Bact.	3	CHEM 251, Anal. Chem. or	
FD T 310, Org. Food Eval.	1	AOCT 234, Elem. Acct. I	3-5
FD T 330, Adv. Food Anal.	3	ANSC 232, Meat & Meat Prod.	3
MCAG 231, Farm Elec. & Util.	3	AG E 233, Inst. & Controls	3
FD T 336, Food Chemistry II	3	MCAG 338, Proc. Ag. Products	3
GOVT 232, Amer. Govt., Funct.	3	FD T 331, Food Micro.	3
		Electives	1-3
	19		18

## FOURTH YEAR

Fall		Spring	
AECO 341, Ag. Statistics	4	FD T 421, Food Tech. Sem.	2
FD T 425, Dairy Prod. I	2	FD T 431, Dairy Prod. II	3
FD T 432, Food Processing	3	FD T 436, Qual. Cont. & Mgt.	3
Electives	7	Electives	8
	16		16

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

## Courses in Food Technology.

## FOR UNDERGRADUATES

131. Survey of Food Industry (3:3:0). History and scope of the industry; sources, classes, and composition of foods; general processes; bacterial, physical, and chemical qualities of foods.
220. Chemical Analysis of Foods I (2:1:3). Basic laboratory practice in food product testing. Spring only.
230. Principles of Food Technology (3:3:0). Advanced classification of food systems; elementary standardization and formulation of food products; sanitation, cleaning practices, and water and sewage control in food plants; inspection systems. Fall only.
232. Food Chemistry I (3:2:3). Problem solving in food technology with reference to chemical standardization procedures. Spring only.
310. Organoleptic Food Evaluation (1:0:2). Texture and sight appeal of food. Fall only.
330. Chemical Analysis of Foods II (3:1:6). Chemical and physical evaluations of meats, eggs, cereal products, fruit and vegetable foods, and microchemical testing. Fall only.
331. Food Microbiology (3:2:3). Bacteria, yeasts, and molds in their relation to food spoilage and food sanitation. Spring only.
336. Food Chemistry II (3:3:0). Structure, occurrence, interactions, and degradation of food constituents. Fall only.
421. Food Technology Seminar (2:2:0). Review of scientific literature, class reports, and discussions. Spring only.
425. Dairy Products Manufacturing I (2:0:4). Market, flavored, and cultured milks. Visits to commercial operations. Fall only.
430. Food Technology Problems (3). Investigation of special problems in food technology of special interest to the student. Taught on individual basis. May be repeated for credit.
431. Dairy Products Manufacturing II (3:1:4). Butter, cheese, frozen desserts, concentrated milks, and by-products manufacture. Visits to commercial operations. Spring only.
432. Advanced Food Processing (3:2:3). Methods used for converting agricultural food products to market forms. Visits to commercial operations. Fall only.
436. Food Plant Quality Control and Management (3:3:0). Mathematical tools for evaluating food materials, controlling processes, and making management decisions. Spring only.

## FOR GRADUATES

530. Research in Food Industry (3). Scientific research problems of industrial nature. May be repeated for credit.
532. Selected Topics in Food Technology (3:3:0).
533. Research in Food Technology (3). Scientific research in problems of technological nature. May be repeated for credit.
631. Master's Thesis (3). Enrollment required at least twice.

## Department of Park Administration, Horticulture, and Entomology

This department directs programs for the *Bachelor of Science* and *Master of Science* degrees in PARK ADMINISTRATION, HORTICULTURE, and ENTOMOLOGY. Offices and most classroom facilities are located in the Agricultural Plant Science Building.

The park administration curriculum provides for training students capable of directing the various facets of park and recreation development. Specifically, studies in park administration are directed toward developing an understanding and acquiring an expertise in the planning, design, and development of park and recreational areas as an integral part of the living environment. The interdisciplinary approach is emphasized. Participation in a departmentally sponsored, nation-wide field work program during the summer months is offered to add a practical dimension to the student's professional training.

Horticulture through the application of science and art prepares young people as managers of greenhouses, nurseries, garden centers; as salesmen,

technicians, agribusiness specialists and representatives; and as managers of parks, recreational areas, landscape services, and many other diverse areas. The horticulture major finds not only pleasure and profit in his chosen profession, but also makes a direct contribution to enhance the quality of human life and environment. This involves production and use of ornamental plants. The student can enter the teaching, research, or extension profession with advanced training.

Entomology includes the study of the principles of biology, ecology, and agriculture and their application to the management of pest and beneficial insect populations. Summer and school year employment opportunities are offered in agricultural chemical sales and service and in research on the biology, ecology, and control of major insect pests of the region and the United States. Graduates are sought for positions in technical services to agriculture and sales and management in industry, teaching, and research. Elective courses are permitted to adapt the academic program to student need. -

### Park Administration Curriculum.

#### FIRST YEAR (See Uniform Freshman Year)

SECOND YEAR			
Fall		Spring	
HORT 232, Plant Mater. I	3	HORT 233, Plant Mater. II	3
AG E 232, Plane & Topo, Survey	3	SOC 230, Intro. to Soc. or	
ENTO 231, Intro. to Ento.	3	SOC 4312, The Urban Community	3
GOVT 231, Amer. Govt. Org.	3	ENG 233, Tech Writing	3
GEOL 143, Phys. Geol.	4	GOVT 232, Amer. Govt., Functions	3
P.E., Band, or Basic ROTC	1-2	HIST 232, Hist. of U.S. since 1877	3
		P.E., Band, or Basic ROTC	1-2
	17-18		16-17

THIRD YEAR			
Fall		Spring	
PA 254, Landscape Arch. I	5	PA 255, Landscape Arch. II	5
PA 339, Landscape Const.	3	PA 3313, Basic Park Admin.	3
HORT 338, Turfgrass Mgt.	3	BLAW 338, Bus. Law	3
ARCH 332, Hist. of Landscape Arch	3	PA 441, Aerial Photo Interpret. in	
ANTH 231, Origin & Nature of Man or		Nat. Res. Mgt.	4
ANTH 232, Cul. Anth.	3	ARCH 337, Prin. of City Planning	3
*Elective	1	*Elective	1
	18		18

FOURTH YEAR			
Fall		Spring	
PA 354, Landscape Arch. III	5	PA 355, Landscape Arch. IV	5
PA 422, Park Admin.	2	PA 432, Land & Water Res. for	
RMGT 232, Ecology of Natural Res.	3	Rec. Devel.	3
ARCH 420, Prof. Practice	2	PA 410, Seminar	1
*Electives	6	BOT 436, Plant Geography	3
	18	*Electives	6
			18

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

**Administrative Emphasis:** Students selecting the Administrative emphasis will take 13 hours of electives. Students planning to undertake graduate study should take AECO 341 plus 9 hours of electives.

**Landscape Architecture Emphasis:** Students selecting the Landscape Architecture emphasis will take PA 346, 3314, 444, 445, 4311, ARCH 338, and 2 hours of electives in lieu of GEOL 143, ANTH 231 or 232, ENTO 231, and 13 hours of electives.

\* Elective must be approved by department.

### Entomology Curriculum.

#### FIRST YEAR (See Uniform Freshman Year)

SECOND YEAR			
Fall		Spring	
ENTO 231, Intro. Entom.	3	ENTO 322, Livestock Pests or	
BIOL 142, Zoology	4	ENTO 323, Hort., Pests	2
CHEM 142, Gen. Chem.	4	CHEM 341, Org. Chem.	4
GOVT 231, Amer. Govt., Org.	3	ENG 233, Tech. Writing	3
MBIO 231, Bacteriology	3	PRDH 231, Vegetable Crops	3
P.E., Band, or Basic ROTC	1-2	Elective	4
		P.E., Band, or Basic ROTC	1-2
	18-19		17-18



## THIRD YEAR

Fall		Spring	
ENTO 321, Field Crop Insects	2	ENTO 334, Insect Morph.	3
ENTO 335, Insect Taxonomy	3	BOT 331, Plant Physiol.	3
GOVT 232, Amer. Govt., Funct.	3	HIST 232, Hist. of U.S. since 1877	3
BOT 332, Plant Pathology	3	G SP 338, Bus. & Prof. Spch. or	
*Agronomy course	3	BLAW 338, Bus. Law	3
Zool 336, Comp. Invert. Zool.	3	Electives	5
	17		17

## FOURTH YEAR

Fall		Spring	
ENTO 432, Insect Ecology	3	ENTO 433, Immature Insects	3
ENTO 441, Insect Tox. & Physiol.	4	ENTO 431, Ag. Compounds	3
*Agronomy course	4	ENTO 431, Med. Entom.	3
Electives	6	ENTO 410, Seminar	1
	17	Electives	9
			19

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* Must be elected from AGRO 241, 331, 341, 4313, 433.

## Horticulture Curriculum.

## FIRST YEAR

(See Uniform Freshman Year)

## SECOND YEAR

Fall		Spring	
BIOL 142, Zoology	4	AGRO 343, Prin. & Practices in Soils	4
CHEM 142, Gen. Chem.	4	CHEM 341, Intro. to Org. Chem.	4
ENG 233, Tech. Writing	3	ENTO 231, Intro. Entom.	3
HORT 234, Propagation Meth.	3	HORT 233, Plant Mat. II	3
HORT 232, Plant Mat. I	3	P.E., Band, or Basic ROTC	1-2
P.E., Band, or Basic ROTC	1-2	Elective	3
	18-19		18-19

## THIRD YEAR

Fall		Spring	
MBIO 231, Bacteriology	3	BOT 331, Plant Physiol.	3
AGRO 341, Prin. of Genetics	4	HIST 232, Hist. of U.S. since 1877	3
MOAG 222, Ag. Survey & Land		PRDH 231, Fruit Culture	3
Conser. or AG E 232, Plane &		BOT 334, Tax. of Flowering Plants	3
Topog. Survey	2-3	HORT 334, Prin. of Floriculture	3
HORT 338, Turf Mgt.	3	Elective	2
HORT 3314, Fund. of Home Landscape			
Design	3		17
Elective	3		
	18-19		

## FOURTH YEAR

Fall		Spring	
BOT 332, Plant Path.	3	ENTO 431, Ag. Compounds	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
HORT 410, Seminar	1	HORT 430, Hort. Prob.	3
BOT 436, Plant Geog.	3	HORT 436, Adv. Flor. Prob.	3
Electives	7	Electives	5
	17		17

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

## Courses in Park Administration.

## FOR UNDERGRADUATES

134. Fundamentals of Park Planning (3:1:6). The study of graphics including lettering; basic forms, descriptive geometry, perspectives, and shades and shadows, as well as principles of design as each relates to park planning.
254. Landscape Architecture I (5:1:9). Prerequisite: Permission of the professor. The study of graphics including lettering; basic forms, descriptive geometry, perspectives, shades and shadows; as well as principles of design as each relates to landscape architecture. Fall semester only.
255. Landscape Architecture II (5:1:9). Prerequisite: PA 254, AG E 232. A basic design course in landscape architecture with special emphasis on the elements and principles of design, theory analysis, and application to projects in the design of private, semi-private, and public facilities. Spring semester only.
330. Problems Course (3). Prerequisite: Student is assured to have completed basic work which would equip him for the problem assigned. PA 330 is a junior level problems course designed to accommodate students in specific problems assigned during their in-service training.
339. Landscape Construction (3:3:0). Prerequisite: Junior classification. Design and construction of landscape structures. Consideration is given to ethics, professional practices, specifications, quantity surveys, and construction materials. Working drawings and specifications of various landscape structures required.
346. Planting Design (4:1:9). Prerequisite: HORT 232, 233; PA 255. Selection and arrangement of plant materials for esthetic and functional purposes. Fall semester only.
354. Landscape Architecture III (5:1:9). Prerequisite: PA 255, HORT 232. A continuation of Landscape Architecture II with intermediate landscape architectural problems of greater

- complexity and continued emphasis on the systematic approach to site planning and design. Fall semester only.
355. **Landscape Architecture IV (5:1:9)**. Intermediate landscape architectural projects with emphasis on investigation and research, analysis, synthesis, and graphics relative to medium scale projects. Emphasis on land planning problems. Spring semester only.
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. Spring semester only.
3314. **Graphic Communication (3:1:6)**. Prerequisite: Landscape Architecture I or consent of instructor. A course to develop the illustration skills of the professional landscape architect through the implementation of plans, sketches, and models in various media.
410. **Seminar (1:1:0)**. Prerequisite: Senior standing in park administration. Assigned readings, informal discussions, and oral reports and papers.
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. Fall semester only.
425. **Park Administration Problems (2)**. Junior or senior standing or permission of the chairman of the department.
430. **Park Administration Problems (3)**. Prerequisite: Open to all advanced students having satisfactory scholastic records. An investigation of a problem in the field of special interest to the individual student concerned. May be repeated for credit with approval of department chairman.
431. **Municipal Recreation Administration (3:3:0)**. Prerequisite: Junior standing. Permission of the department chairman. A course in basic principles of municipal recreation with practical suggestions for carrying these principles into effect.
432. **Land and Water Resources for Recreation Development (3:3:0)**. Prerequisite: Permission of instructor. Concepts of management, use, and conservation of natural resources. Analysis of resource planning techniques and their application to park and recreation facilities administration.
441. **Aerial Photo Interpretation in Natural Resource Management (4:2:3)**. Knowledge of trigonometry desirable. Review of principles of photogrammetry. Fundamentals of aerial photograph reading, interpretation and evaluation with special application to management of renewable natural resources. Introduction of remote sensing techniques. A senior level course for students in general field of natural resource management.
444. **Landscape Architecture V (4:1:8)**. Prerequisite: PA 355. Advanced work in a variety of comprehensive and current landscape architectural projects. Fall semester.
445. **Landscape Architecture VI (4:1:8)**. Prerequisite: PA 444. A terminal project in landscape architecture. Spring semester.
4311. **Advanced Landscape Construction (3:1:6)**. Prerequisite: HORT 338, and AG E 232. Site selection, orientation, and modification through land shaping to solve landscape development problems.

#### FOR GRADUATES

531. **Park Administration 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.
532. **Research Methods in Park Administration (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 plants.
534. **State, Regional, County and Metropolitan Park Systems of the Country (3:3:0)**. Aimed at giving the graduate a recent approach to the modifications in plant responses and recently developed techniques used to regulate physiological responses of growth, development, and production of horticultural plants. Fall semester only.
535. **National Park System and Other Federal Agencies Administering Federal Lands (3:3:0)**. Prerequisite: Graduate standing or consent of instructor. A review of federal programs which created outstanding examples of recreational facilities.
536. **Interpretation Techniques (3:3:0)**. Prerequisite: Graduate standing; consent of instructor. Methods of interpretation of historical, ethnic, and cultural aspects of a region.
538. **Contemporary Problems in Management of Renewable Natural Resources (3:3:0)**. Prerequisite: Permission of instructor. Interdisciplinary graduate course dealing with current issues in natural resources management.
540. **Advanced Park Administration (4:3:2)**. Essential to the development of advanced park administration concepts is the ability 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 national 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: P A 541. A continuation of P A 541, in which 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.
232. **Plant Materials I (3:2:2)**. Prerequisite: HORT 131. Identification, characteristics, and use of plant materials of ornamental value, from the ferns and conifers to the rose family. Fall semester only.
233. **Plant Materials II (3:2:2)**. Prerequisite: HORT 131 and 232. Identification, characteristics, and use of plant materials of ornamental value, from the rose and legume families through the composites. Spring semester only.
234. **Propagation Methods (3:2:3)**. Prerequisite: HORT 131, CHEM 141. Propagation techniques of commercial nurseries and greenhouse ranges; study of the physiological reaction and cutting material. Fall semester only.

320. **Horticulture Problems (2:2:0).** Prerequisite: Completion of basic work in the student's program which would equip him for the problem assigned. Subject to approval of the department.
334. **Principles of Floriculture (3:3:0).** Greenhouse construction, heating, fundamental soil treatment, and the basic principles of flower production and floriculture marketing. Offered fall semester 1969 and alternate years. Required field trips.
338. **Turfgrass Management (3:3:0).** Principles and practices of turfgrass management for such specialized areas as athletic fields, playground areas, golf courses, home lawns, etc. Offered fall semesters only.
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. Fall semester only.
410. **Seminar (1:1:0).** Prerequisite: Senior standing in horticulture and park management. Assigned readings, current advances, informal discussions, and oral reports and paper.
421. **Arboriculture (2:1:3).** Prerequisite: HORT 333 and senior standing. The physiological principles and industry practices in the production, moving, care, and maintenance of ornamental trees and shrubs. Required field trips. Offered spring semester 1971 and alternate years.
425. **Horticulture Problems (2).** 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.
430. **Horticulture Problems (3).** Prerequisite: Open to all advanced students having satisfactory scholastic records. Investigation of a problem in the field of special interest to the student. Repeated for credit with approval of department chairman.
432. **Advanced Turfgrass Management (3:2:3).** Prerequisite: HORT 338. Advanced problems of specialized turfgrass management, with special emphasis on golf course management and park lawns. Field trips required. Offered spring semester 1972 and alternate years.
436. **Advanced Floricultural Science (3:3:0).** Prerequisite: HORT 334. Junior standing. Recent cultural techniques of fertilization crop regulation and the detailed study of the factors of culture of the principle floricultural crops. Required field trips. Offered spring semester 1970 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 (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.
532. **Ornamental Plant 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. Fall semester only.
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 techniques. Spring semester only.
631. **Master's Thesis (3).** Enrollment required at least twice.

## Courses in Entomology.

## FOR UNDERGRADUATES

131. **Life of the Insects (3:2:2).** The role of the insects in nature and their implication in the affairs of man. Biological principles are implemented with examples from the insect world. A basic laboratory science course available to all majors.
231. **Introductory Entomology (3:2:2).** An introduction to insects and their role in human affairs, particularly agriculture; emphasis on morphology and biology as applied to control of pest species; control materials and methods.
321. **Field Crop Insects (2:1:3).** Prerequisite: ENTO 231. Field crop pests; cotton, range crop, and small grains insect pests; storage pests. Fall semester only.
322. **Livestock Pests (2:2:0).** 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.
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.
410. **Seminar (1:1:0).** Prerequisite: Senior or advanced standing in entomology. Assigned readings, current advances, informal discussions, oral reports, and papers. May be repeated for credit.
430. **Entomology Problems (3).** Prerequisite: Undergraduate standing. Open to all advanced students having satisfactory scholastic record. Investigations of a problem in the field of special interest to the student. Repeated for credit with approval of department chairman.
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 semesters and summer terms.
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-habitants, and insect responses. Fall semester only.
433. **Insect Natural History (3:2:2).** An introductory course for non-majors. The resources of the insect as applied to our understanding of life, the animal world, and man's relationship to insects.
434. **Immature Insects (3:2:3).** Prerequisite: ENTO 231. A course in the identification, alternate morphology and biology of immature insect forms. Spring semester only.
441. **Insect Toxicology and Physiology (4:3:3).** Prerequisite: ENTO 231, CHEM 341. A study of physiological process of digestion, metabolism, nerve transmission, etc., and the toxic mechanisms used to combat insect pests. Fall semester only.
4311. **Medical Entomology (3:2:3).** Prerequisite: Advanced standing in zoology, premed, or agriculture. Insects, mites, and ticks as vectors of human disease and as pests. Spring semester only.

4312. **Acarology (3:2:3)**. Prerequisite: Advanced standing in zoology, premed, or agriculture. The systematics, life histories, and control of mites affecting man, animals, and plants. Spring semester only.

## FOR GRADUATES

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.
532. **Literature and History of Entomology (3:3:0)**. 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.
533. **Advanced Insect Taxonomy (3:1:6)**. Prerequisite: Basic entomology and ENTO 334, and 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.
534. **Advanced Economic Entomology (3:3:0)**. 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.
631. **Master's Thesis (3)**. Enrollment required at least twice.

## Department of Range and Wildlife Management

This department administers the following degree programs: *Bachelor of Science* in RANGE MANAGEMENT, *Bachelor of Science* in WILDLIFE MANAGEMENT, and *Master of Science* and *Doctor of Philosophy* in RANGE SCIENCE.

The Department of Range and Wildlife Management is primarily concerned with the application of basic ecological principles to the management and use of uncultivated rangelands as found on ranches and public rangeland.

A range management curriculum is offered for students interested in becoming ranch managers or livestock use managers of public rangeland. The wildlife management curriculum provides training in both range management and wildlife habitat management for those interested primarily in wildlife use of the range resource. A business emphasis is provided for those who plan to go into the business of ranching as owner-operators or managers.

The range curriculum meets the standards set by the Range Management Education Council of the American Society of Range Management. The wildlife curriculum meets the standards set by the Range Management Education Council for range managers and exceeds the standards for training recommended by the Wildlife Society for wildlife biologists.

### Range Management Curriculum.

FIRST YEAR (See Uniform Freshman Year)			
SECOND YEAR			
Fall		Spring	
BIOL 142, Zoology	4	AGRO 331, Forage & Past. Crops	3
CHEM 142, Gen. Chem.	4	BOT 334, Taxonomy	3
R&WM 231, Intro. Wildlife	3	CHEM 341, Intro. Org. Chem.	4
AG E 232, Plane & Topo. Surv.	3	ENG 233, Technical Writing	3
MATH 131, Trigonometry	3	AGRO 241, Soils	4
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	18-19		18-19
THIRD YEAR			
Fall		Spring	
ANSC 331, Prin. of Nutr.	3	BOT 331, Plant Physiol.	3
GOVT 231, Amer. Govt., Org.	3	R&WM 337, Prin. of Range Mgt.	3
R&WM 333, Range Plants	3	GOVT 232, Amer. Govt., Funct.	3
AGRO 435, Soil Class.	3	HIST 232, Hist. of U.S. since 1877	3
BIOL 333, Biocology	3	G SP 338, Bus. & Prof. Speech	3
AGRO 341, Genetics	4	R&WM 432, Range Mgt. Problems	3
	19		18
FOURTH YEAR			
Fall		Spring	
R&WM 410, Range & Wildlife Sem.	1	AECO 438, Range & Ranch Eco.	3
ANSC 331, Livestock Prod.	3	*Other courses	12
R&WM 436, Range Plant Ecol.	3		
R&WM 448, Range Anal. Imp. & Mgt. Planning	4		15
*Other courses	6		
	17		

Hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

In addition to the above courses, the student should select at least one advanced course from AGRO 434, 436, 439, 4311, 4314; R&WM 431, 434 or 439; and sufficient elective hours to total 136 hours.

\* **Range Business Emphasis:** Students desiring additional background for the business phases of range management can select courses in agricultural economics, finance, accounting, business

law, marketing, and similar areas to provide the needed academic information. The selection of such courses must be made with consultation and approval of the department staff. Substitutions in the range management curriculum may be considered where sufficient need is demonstrated by the individual student to permit the completion of courses necessary for emphasizing the business aspects of range management.

### Wildlife Management Curriculum.

#### FIRST YEAR (See Uniform Freshman Year)

SECOND YEAR		Spring	
Fall			
BIOL 142, Zoology	4	CHEM 341, Intro. Organ. Chem.	4
MATH 131, Trigonometry	3	R&WM 231, Intro. Wildlife	3
CHEM 142, Gen. Chemistry	4	BOT 334, Taxonomy	3
HIST 232, Hist. of the U.S. since 1877	3	R&WM 333, Range Plants	3
ENG 233, Tech. Writing	3	ENTO 231, Intro. Entomology	3
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	18-19		17-18

#### THIRD YEAR

THIRD YEAR		Spring	
Fall			
BIOL 333, Biocology	3	R&WM 337, Prin. of Range Mgt.	3
ZOOL 241, Comp. Anatomy	4	ZOOL 333, Parasitology	3
AGRO 241, Soils	4	ZOOL 439, Comp. Physiology	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
*Other courses	3-4	BOT 331, Plant Physiology	3
	17-18	*Other courses	3
			18

#### FOURTH YEAR

FOURTH YEAR		Spring	
Fall			
R&WM 448, Range Anal. Imp. & Mgt. Plan.	4	ZOOL 437, Nat. Hist. Vert.	3
ZOOL 337, Ornithology	3	ANSC 337, An. San. & Dis. Contr.	3
AECO 341, Ag. Statistics	4	R&WM 410, Range & Wildlife Sem.	1
R&WM 436, Range Plant Ecol.	3	R&WM 430, Wildlife Problems	3
*Other courses	3-4	*Other courses	7-8
	17-18		17-18

\* To include at least one of the following in the senior year: R&WM 431, 433, 434 or 439. Other selections include at least 6 hours outside the College of Agricultural Sciences; IE 321, MATH 151, GEOL 143, ANTH 231, and SOC 230 are among the recommendations for this requirement.

### Courses in Range and Wildlife Management.

#### FOR UNDERGRADUATES

231. **Introductory Wildlife (3:3:0).** Prerequisite: Sophomore standing. Introduction to the ecology and management of wildlife populations. Stresses principles, life histories, and management techniques.
232. **The Ecology of Natural Resource Conservation (3:3:0).** Prerequisite: Sophomore standing. An introduction to the conservation of renewable natural resources of native lands, including their multiple use for timber, water, range, recreation, and wildlife.
331. **Range Management Principles & Practices (3:2:3).** Prerequisite: Sophomore standing. A general course in the principles and practices of range management designed for non-range majors who plan to enter the ranching industry. Field trips required. Not open to range majors.
333. **Range Plants (3:2:3).** Prerequisite: Sophomore standing. A study of the native forage plants of the U.S.; their identification, distribution, ecology, and economic value.
337. **Principles of Range Management (3:2:3).** Prerequisite: R&WM 333. Application of ecological principles in the management of rangelands for sustained livestock products consistent with conservation of the range resource. Field trips required.
410. **Range and Wildlife Seminar (1).** Prerequisite: Senior standing. An organized discussion of current problems and research in range management. May be repeated.
430. **Wildlife Problems (3).** Prerequisite: Approval of instructor. Individual investigation of an assigned problem in wildlife management. Emphasis placed on the theory, methods, and practice of wildlife field work.
431. **Game Management (3:2:3).** Prerequisite: BIOL 142, R&WM 231, 3 hours of range management. A study of production, harvest, and maintenance of wildlife populations. Emphasis on big game species and their management. Field trips required.
432. **Range Management Problems (3).** Prerequisite: Departmental approval. Individual study and research in range or ranch management problems. May be repeated.
433. **Principles of Waterfowl Management (3:2:3).** Prerequisite: R&WM 231, BOT 334, or approval of instructor. Ecology and management of continental waterfowl resources. Life histories, population management, and habitat manipulation are stressed. Field trips required.
434. **Upland Game Ecology (3:2:3).** Prerequisite: R&WM 231, or approval of instructor. Ecological approach to the management of upland game populations. Stresses population mechanisms and habitat management of selected species. Field trips required.
436. **Range Plant Ecology (3:2:3).** Prerequisite: BOT 334, AGRO 241, R&WM 333 and 337. Successional patterns and descriptions of vegetation in grassland, forest, and desert communities of the western U.S., and manipulation of these communities with livestock and game. Field trips required.



439. **Wildlife Habitat Management (3:2:3).** Prerequisite: R&WM 231, 337 or approval of instructor. A study of wildlife habitats based on major vegetation types and the management problems involved. Emphasis on how other resource demands can be integrated with wildlife. Field trips required.
448. **Range Analysis, Improvement, and Management Planning (4:3:3).** Prerequisite: R&WM 337. Principles and practices of range improvements including noxious plant control, revegetation, fertilization, and grazing systems. Range inventory and analysis and their application in ranch management planning.

## FOR GRADUATES

510. **Range Seminar (1).** Prerequisite: Departmental approval. An organized discussion of current problems in range management. May be repeated.
511. **Wildlife Seminar (1).** Prerequisite: Approval of instructor. Discussion of current wildlife problems, research and management. May be repeated for credit.
512. **Problems in Range Management (1).** Prerequisite: R&WM 331, 337, or approval of instructor. Special problems in range management not commonly included in other courses. May be repeated for additional credit.
513. **Problems in Wildlife Management (1).** Prerequisite: R&WM 231 or approval of instructor. Special problems in wildlife management not commonly included in other courses. May be repeated for additional credit.
522. **Wildlife Behavior (2:2:0).** Prerequisite: 6 hours of wildlife or advanced biology or approval of instructor. Introduction to the behavioral aspects of wildlife ecology and management. Graduate standing required.
530. **Fire Behavior and Ecology (3:2:3).** Application of weather and fire behavior principles to prescribed burning; planning and conducting prescribed fires; the role of fire in succession and management of plants and animals in all major vegetation types of U.S.; heat effects on living plants.
531. **Synecology (3:3:0).** Prerequisite: R&WM 332 or equivalent. An advanced study of the range eco-system, causes and patterns of community development; coactions of plants and animals; and dynamics of succession and community change. Field trips required.
532. **Vegetation Influences (3:3:0).** Prerequisite: Departmental approval. A study of the influence of plants on their organic and inorganic environments; and the effects of vegetation manipulation on soils, micro-climate, erosion, and water yields.
533. **The Physiological Basis for Grazing Management (3:2:3).** A study of the physiological processes, morphological development, nutritional qualities, and palatability of range plants and their effect on animal production.
534. **Range Research (3).** Prerequisite: Departmental approval. Individual study and research in range-related problems.
535. **Wildlife Research (3).** Prerequisite: Approval of instructor. Individual study and research in wildlife-related problems. May be repeated for credit.
536. **Ecology of Arid Lands (3:3:0).** Prerequisite: Approval of instructor. A study of the unique ecological features of arid lands, including plant and animal adaptations.
537. **Range Research Methods (3:2:3).** Prerequisite: ANSC 536, AGRO 532 or approval of instructor. Methods and techniques of measuring range vegetation. Methods of analysis and presenting data. Application of experimental designs to range problems.
538. **Contemporary Resource Use (3:3:0).** Prerequisite: Approval of instructor. A study of related disciplines in agricultural science. Emphasizes the integration of all agricultural research toward the solution of ecological problems caused by changing resource use patterns.
539. **Experimental Design and Analysis (3:2:2).** Prerequisite: ANSC 536 or equivalent course. Definition, description, and evaluation of the principal experimental designs and methods of analysis.
5310. **Advanced Studies in Wildlife Habitat (3:2:3).** Prerequisite: Approval of instructor. An ecological approach to game management stressing the relationships between animals and plants. In addition to the basic needs of animals and the ecological limitations that exist for management, the course stresses the coordination of wildlife production with other resource demands. Field trips required.
5311. **Waterfowl Ecology (3:2:3).** Prerequisite: R&WM 433 or approval of instructor. An ecological examination of waterfowl behavior, breeding biology, and habitat requirements. For students with advanced training in natural resource management. Field trips required.
5313. **Advanced Wildlife Ecology and Management (3:2:3).** Prerequisite: Approval of instructor. An advanced study of the ecology and management of big game and upland game resources. Field trips required.
631. **Masters Thesis (3).** Enrollment required at least twice.
731. **Research (3).** Prerequisite: Admission to doctoral study and consent of the instructor. Research in areas of current interest. May be repeated for credit with approval of major professor.
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## College of Arts and Sciences

The primary function of the College of Arts and Sciences is to provide a liberal education for its students. Through the programs offered by its 22 departments, the college 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 college 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 definite realms of knowledge, but also in affording lifelong personal satisfaction and enjoyment. These basic studies are to be found among those offered by the College of Arts and Sciences.

The work offered in this college 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.

Students previously enrolled in a program leading to a Bachelor of Science in Education degree (elementary or secondary) in the College of Arts and Sciences may complete the program as specified in the catalog under which they entered, but they will be enrolled in the College of Education.

The departments in the College of Arts and Sciences participate extensively in the graduate programs of Texas Tech University on both master's and doctor's levels. Details are available in the *Catalog of the Graduate School*.

The College of Arts and Sciences is divided into instructional departments which offer course work and supervise the degree programs. The student should note carefully any particular requirements indicated by a department in which he plans to major or minor. For most of the Bachelor of Science programs specific curricula have been designed and are presented in tables under the appropriate departmental heading. There are several interdepartmental degree programs which are described in a separate section below.

Courses are listed on the following pages by departments. Each course 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.

**Course Load.** The amount of work normally carried by a student in the College 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 as a part of the course load. Course loads in excess of 20 semester hours will not be approved.

**Freshman Year.** Entering freshmen are expected to follow the program outlined below during their first year in college:

	Sem. Hrs.
1. English composition .....	6
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
Total for both semesters of freshman year .....	34-36

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.

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 unabridged freshman requirements. 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.

### Special and Interdepartmental Programs

**Biblical Literature.** This is not a degree program but serves 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 University, all courses are taught off campus in centers provided by the churches at no expense to the University. Courses are described in the departmental section on the following pages.

**Bilingual Secretarial Program.** A degree of Bachelor of Arts with a bilingual secretarial major is offered in cooperation with the Department of Business Education and Secretarial Administration in the College of Business Administration. The curriculum is arranged by student consultation with the chairman of the foreign language department of the student's language emphasis.

The degree requirements follow:

- (1) Completion of the general requirements for a Bachelor of Arts degree.
- (2) Completion of a major (of 33 semester hours) in French, German, or Spanish and a minor (minimum 18 hours) in an academic subject.
- (3) Completion of an additional 25 semester hours in courses in the Department of Business Education and Secretarial Administration. This will not normally cause the total hours required for a degree to exceed 123 because the usual elective courses may be used for this purpose. For students who have previously attained basic skills in typing and/or shorthand the requirements in business education and secretarial administration will be proportionately reduced. Courses in typing and shorthand may be counted as semester hours toward the degree if this program is completed.

**Economics.** A degree of Bachelor of Arts with an economics major is offered in cooperation with the Department of Economics in the College of Business Administration. The curriculum is arranged by student consultation with the Chairman of the Department of Economics.

The degree requirements are those of the Bachelor of Arts degree with a major (minimum of 30 semester hours) in economics.

**Comparative Literature.** The departments of English, Classical and Romance Languages, and Germanic and Slavonic Languages offer programs in comparative literature at the master's and doctor's levels.

At the master's level the program is administered by the interdepartmental committee, which is composed of faculty members from the departments involved in the program. The degrees offered are the Master of Arts with a major in English and a program in comparative literature; and the Master of Arts with a major in French, German, or Spanish with a program in comparative literature. Credit is offered on a reciprocal basis for courses taken in these departments.

The doctor's degree is offered by the Department of English with a major in English and a field of specialization in comparative literature and by the

Department of Classical and Romance Languages with a major in Spanish and a field of specialization in comparative literature.

Candidates for admission to the graduate programs in comparative literature should have completed one year of university-level study (or equivalent) in a classical language and/or two years of university-level study in a modern foreign language in addition to having met the general requirements of the Graduate School. Inquiries about the master's program in comparative literature should be addressed to Dr. W. T. Zyla, Chairman of the Interdepartmental Committee on Comparative Literature; about the doctor's program, to the Chairman of the English Department or the Chairman of the Department of Classical and Romance Languages.

At the master's level candidates complete 24 hours of course work in the participating departments, the greater part of which, including the thesis, will be in the field of comparative literature. A 6-hour minor is also required.

At the doctor's level, the program includes approximately two years of course work beyond the master's degree. This program is supervised by a doctoral advisory committee appointed for the purpose.

### Courses in Comparative Literature.

#### FOR GRADUATES

- 530. Studies in Medieval Literature (3:3:0). (ENG 530)
- 534. Old English (3:3:0). (ENG 534)
- 536. Beowulf (3:3:0). (ENG 536)
- 5312. Studies in Drama (3:3:0). (ENG 5312)
- 5313. Studies in Modern European Literature (3:3:0). (ENG 5313)
- 5314, 5315. Studies in French Language and Literature I, II (3:3:0 each). (FREN 5312, 5313)
- 5316, 5317. Studies in German Language and Literature I, II (3:3:0 each). (GERM 5312, 5313)
- 5318, 5319. Studies in Spanish and Spanish American Literature (3:3:0 each) (SPAN 5312, 5313)
- 5326. The German Novelle (3:3:0). (GERM 5317)
- 5326, 5327. Seminar in Modern German Literature I, II (3:3:0 each). (GERM 5321, 5322)
- 5333. Studies in Literary Criticism (3:3:0). (ENG 5314)
- 5341. Studies in Bibliography (3:3:0). (ENG 5341)
- 731, 732. Research (3 each).
- 831. Doctor's Dissertation (3). Enrollment required at least four times.

Students with adviser's permission may take 531, 532, 630, 631, and other courses in English, French, German, Greek, Italian, Latin, Portuguese, Russian, and Spanish to be applied toward the comparative literature programs.

**Honors Studies.** The College of Arts and Sciences offers a specific program in honors studies for students seeking a special intellectual experience. Smaller sections, increased student participation, and freedom of choice in selecting courses within the program characterize honors studies. The program is administered by a Director of Honors Program, a faculty-student Honors Council, and a student Honors Council. An honors student must major in an academic subject and fulfill his normal degree requirements. In order to graduate in honors, he must have a 3.00 grade-point average with a minimum of 30 hours in honors courses, including two of the Arts and Sciences honors seminars. Honors courses available to students in the program include special sections in courses required for a degree, the seminars, and individual study under the direction of a faculty member selected by the student. For further information, consult Dr. Peder Christiansen, Director of Honors Program, Department of Classical and Romance Languages. Honors courses and honors sections are offered in the departments of Biology, Government, History, Philosophy, Psychology, and Sociology and Anthropology.

The following courses are administered by the Director of Honors Program.

### Courses in Honors Studies.

- A&S H 330. Individual Honors Research (3:3:0). Prerequisite: Junior standing and participation in Honors Studies. Contents will vary to meet the needs of students. May be repeated once for credit. Independent work under the individual guidance of a staff member, who must be either a member of the graduate faculty or approved by the Director of Honors Program.
- A&S H 331. Honors Seminar in Humanities (3:3:0). Prerequisite: Junior standing and participation in Honors Studies. In-depth study of major literary works emphasizing the interrelationships of literature and philosophy. Participating departments: Classical and Romance Languages, English, Germanic and Slavonic Languages, and Philosophy.
- A&S H 332. Honors Seminar in Sciences (3:3:0). Prerequisite: Junior standing and participation in Honors Studies. Study of origin, development, and interrelationship of land-form and life-form. Historical and current concepts are emphasized. Participating departments: Biology and Geosciences.
- A&S H 333. Honors Seminar in Social Sciences (3:3:0). Prerequisite: Junior standing and participation in Honors Studies. Study of techniques, principles, and methodology of the social sciences as applied to a central topic to demonstrate the interrelationships of the various disciplines. Participating departments: Economics, Education, Government, History, Psychology, and Sociology and Anthropology.

**A&S H 430. Individual Honors Research (3:3:0).** Prerequisite: Senior standing and participation in Honors Studies. Contents will vary to meet the needs of students. May be repeated once for credit. Independent work under the individual guidance of a staff member, who must be either a member of the graduate faculty or approved by the Director of Honors Program.

**Latin American Area Studies.** A major in Latin American Area Studies for a Bachelor of Arts degree consists of course work in several departments. Additional information may be obtained from the Director, Dr. Harley Oberhelman, in the Department of Classical and Romance Languages.

For the major, 30 semester hours must be completed from among the following courses:

Anthropology and Sociology: 3 to 6 hours in ANTH 4316, SOC 336.

Economics: 3 hours in ECO 339 (Prerequisite: ECO 231, 232).

Spanish/Portuguese: Either 6 hours of SPAN 4321, 4322, 4323, 4324, 4325, 4326, 4327, 4328, 4329, or 6 hours of PORT 430, 435, 436.

Geography: 3 to 6 hours in GEOG 4363, 4364.

Government: 3 to 6 hours in GOVT 4374, 4375.

History: 6 to 12 hours in HIST 4316, 4317, 4318, 4321, 4322, 4323, 4324, 4325, 4326.

With prior approval, substitutions may be possible.

For the minor, 18 hours may be chosen from any field in which a minor is customarily taken. However, the same course may not be counted in both the major and the minor.

In addition, the standard requirements for a Bachelor of Arts degree must be met.

**Liberal Arts.** Freshmen or sophomores may major in a general program known as Liberal Arts until they select the major degree area in which they wish to graduate. Additional information may be obtained from the Liberal Arts Adviser, Dr. Paul J. Woods, in Room 16, Social Science Building.

**Library Science.** The College of Arts and Sciences is currently developing a graduate program in library science which will be implemented in the near future. Interested students should contact the Dean of the College of Arts and Sciences.

**Linguistics.** The departments of Classical and Romance Languages, English, and Germanic and Slavonic Languages offer a program in linguistics at the master's level. Credit for course work is offered on a reciprocal basis, each department offering major credit for courses listed in the program which are taught by staff members in the other departments. Credit for the master's report or thesis is also offered on a reciprocal basis, each department allowing its majors to select a thesis director from another department if feasible. The degree offered is the Master of Arts. In the departments of Classical and Romance Languages or Germanic and Slavonic Languages the majors would be in French, German, or Spanish with a field of specialization in linguistics. In the Department of English the major would be in English with a field of specialization in linguistics.

The program consists of 24 hours of course work to be approved by the Chairman of the Interdepartmental Committee on Linguistics. Candidates will be urged to take courses from each of the participating departments.

Inquiries about the program should be addressed to Dr. James Foster, Chairman of the Interdepartmental Committee on Linguistics.

## Courses in Linguistics.

### FOR GRADUATES

530. Romance Linguistics (3:3:0).

531, 533. Research in French (3 each). (FREN 531, 532)

534. Old English (3:3:0). (ENG 534)

535. Research in Portuguese (3). (PORT 531)

536. Beowulf (3:3:0). (ENG 536)

537. Research in Spanish (3). (SPAN 531)

538, 539. Research in German (3 each). (GERM 531, 532)

5310. Research in Portuguese (3). (PORT 532)

5311. Linguistic Techniques in Teaching Romance Languages (3:3:0).

5335. Spanish and English as Second Languages in the Elementary School (3:3:0).

5340. Studies in Medieval Language and Literature (3:3:0). (FREN 533)

5341. Research in Spanish (3). (SPAN 532)

5342, 5343. Studies in French Language and Literature I, II (3:3:0 each). (FREN 5312, 5313)

5344. Principles of Language (3:3:0). (ENG 5335)

5345. Studies in Linguistics (3:3:0). (ENG 5337)

5346. Linguistic Analysis I: Syntax (3:3:0). (ENG 5338)

5347. Linguistic Analysis II: Phonology (3:3:0). (ENG 5339)



- 5348, 5349. Research (3 each). (ENG 731, 732)  
 5350. Middle High German (3:3:0). (GERM 5316)  
 5351. Old Icelandic (3:3:0). (GERM 5318)  
 5352, 5353. Studies in German Language and Literature I, II (3:3:0 each). (GERM 5312, 5313)  
 5354, 5355. Research in Russian (3 each). (RUSN 531, 532)  
 5356, 5357. Research in Latin (3 each). (LAT 531, 532)  
 5358, 5359. Research in Greek (3 each). (GRK 531, 532)

**Prelaw.** 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. The prelaw 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 GOVT 231 and 232. **Sophomore Year:** ENG 231 and 232, HIST 231 and 232, advanced government courses, and ECO 231 and 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 he should work out a degree plan for the Bachelor of Arts degree during his junior year. Electives should be chosen chiefly from the social sciences.

The Chairman of the Department of Government is the official University adviser for prelaw students, and recommendations to the law schools should be channeled through him. Regardless of their major field of interest, prelaw students should consult him for counseling and guidance in planning their programs.

**Premedical and Predental.** 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 predentistry students, certain modifications may be advisable.

The premedical 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 the premedical adviser at each registration period. Application for admission to the professional school should be made through the office of the Chairman of the Premedical Advisory Committee, Professor Margret Stuart, Department of Chemistry. Professional aptitude and admission tests may be taken at Texas Tech University.

The degree of Bachelor of Arts for premedical or predental students may be obtained in one of two ways.

A. By completing the requirements for a B.A. while in residence at Texas Tech University. The major selected depends on the interest of the student.

B. By completing three years of work in the College of Arts and Sciences, totaling a minimum of 100 semester hours, and by graduating 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 university. This minimum will apply to transfer students 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 university, with the exception of the requirements in the major area of study.

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 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.

**Premedical and Predental Curriculum.****FIRST YEAR**

Fall		Spring	
CHEM 141 or 143	4	CHEM 142 or 144	4
BIOL 141 or 142	4	BIOL 141 or 142	4
ENG 131 or 133	3	ENG 132 or 134	3
MATH 133 or other*	3	MATH 131 or other*	3
Foreign Lang. or HIST 231	3-4	Foreign Lang. or HIST 232	3-4
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
18-19		18-19	

**SECOND YEAR**

Fall		Spring	
CHEM 251, Anal. Chem. or ZOO 241, Comp. Vert. Anat.	4-5	ZOO 241, Comp. Vert. Anat. or CHEM 251, Anal. Chem.	4-5
PHYS 141, Gen. Phys.	4	PHYS 142, Gen. Phys.	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Foreign Lang. or HIST 231	3-4	Foreign Lang. or HIST 232	3-4
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
15-18		15-18	

**THIRD YEAR**

Fall		Spring	
ZOO 331, Histology	3	ZOO 332, Embryology	3
CHEM 335, Org. Chem., Lec.	3	CHEM 336, Org. Chem., Lec.	3
CHEM 325, Org. Chem., Lab.	2	CHEM 326, Org. Chem. Lab.	2
Foreign Lang.	3	Foreign Lang.	3
GOVT 231, Amer. Govt., Org.	3	Fine Arts	3
Fine Arts	3	GOVT 232, Amer. Govt., Funct.	3
17		17	

The curriculum above does not include all the general requirements for the Bachelor of Arts degree.

\* By 1971, one semester of analytical geometry or calculus will be required by some medical schools.

**Preprofessional Programs.** Basic courses for entrance into seminaries and into schools of optometry and pharmacy may be completed at Texas Tech University. Preministerial students may receive advice from the Chairman of the Sociology and Anthropology Department; preoptometry students from the Chairman of the Physics Department; prepharmacy students from the Chairman of the Chemistry Department.

**Teacher Education.** The curricula of most of the Bachelor of Arts degree programs and some of the Bachelor of Science programs are sufficiently flexible to permit a student to major in an academic subject, yet meet the requirements for certification by taking the required courses in the College of Education. The student should refer to the section of this catalog describing teacher education and should consult with the chairman of the department in which he wishes to major.

**General Degree Requirements**

Requirements for the degree of Bachelor of Arts also apply to all other degrees offered through the College of Arts and Sciences unless specifically shown to the contrary.

**Bachelor of Arts.** The curriculum established for this degree is designed 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 are the general requirements for this degree:

	Sem. Hrs.
1. English .....	12
2. Foreign Language .....	12-14
A student must complete 12 to 14 hours, two years, in the same language. Courses at the freshman level may not be used to fulfill this requirement if a student has studied this language for two or more years in high school.	
3. Mathematics .....	0-6
If 3½ units of mathematics including 2 of algebra, 1 of geometry, and ½ of trigonometry are accepted for admission, no further courses in mathematics are required. If 3 units are accepted, including 2 of algebra and 1 of geometry, 3 semester hours are required. If these admission requirements are not met, 6 hours of mathematics are required.	
4. Required Government and History .....	12

5. Social science other than major or minor and in addition to the legislative requirements in government and history above .....	6
6. Laboratory Science .....	8-16
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. If this admission requirement is not met, one year of two sciences or two years in one science must be completed.	
7. Fine Arts .....	6
ART 130, 131, 4310, 4311; M LT 238, 239; P E 3313; TH A 233, 331.	
8. Major, minor, and electives sufficient with the above courses to total a minimum of 123 semester hours, not including physical education, band, or basic ROTC .....	
9. Physical Education, Band, or ROTC .....	4-6
Total for degree .....	127-129

The student should have selected his major and minor fields by the time he reaches his junior year. 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 college. For the major subject he will be required to complete a minimum of 30 semester hours, although as indicated in the degree programs on the following pages, some majors require more than the minimum. 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 chairman of the department concerned. Students are expected to develop a degree plan during the first semester of the junior year. Forms and information are available in the office of the Dean of the College of Arts and Sciences.

For the Bachelor of Arts degree, a *minimum of 40 semester hours of junior and senior work must be presented*; not more than 42 semester hours in one subject may be counted; 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; not more than 24 hours in the technical or professional subjects of agriculture, business administration, engineering, and/or home economics may be counted as electives; and courses in shorthand and typewriting may not be offered for this degree except in the bilingual secretarial major.

**Bachelor of Fine Arts.** The curriculum leading to the Bachelor of Fine Arts degree provides highly professional programs in advertising art, art education, interior design, and studio areas.

The following are the requirements for this degree:

	Sem. Hrs.
1. English .....	12
2. Government .....	6
3. History .....	6
4. Art History .....	12
5. General Requirement** .....	20-40
6. Art Courses** .....	69-74
7. Physical Education, Band, or Basic ROTC .....	4-6
Total for degree .....	135-153

**Bachelor of Science.** The curriculum for the degree of Bachelor of Science places greater emphasis on specialized training in mathematics and the sciences.

The following are the requirements for this degree:

	Sem. Hrs.
1. English .....	12
2. Foreign Language .....	12-14
3. Mathematics .....	6
4. Required Government and History .....	12
5. Major, minor, and electives sufficient with the above courses to total a minimum of 124 semester hours, not including physical education, band, or basic ROTC .....	
6. Physical Education, Band, or ROTC .....	4-6
Total for degree .....	128-130

\* An exception in foreign languages is explained under the department concerned.

\*\* Requirements vary according to different majors.

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 microbiology, botany, chemistry, geosciences, mathematics, physics, or zoology. In addition, computer science may be used as a minor. The minimum requirements for the major and minor are 36 and 18 semester hours, respectively, including a minimum of 18 hours advanced work in the major and 6 advanced hours in the minor.

Specific curricula are provided for all programs leading to the Bachelor of Science degree, and it is expected that students will follow the suggestions and recommendations contained therein.

**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 College of Arts and Sciences and 12 months' training in a school of medical technology approved by the American Society of Clinical Pathologists.

Students should check with the adviser in the Department of Biology for the list of approved schools and the correct procedure for application. The specific courses for the degree program are provided. Transfer students from other colleges or from other degree plans 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 University for two semesters, during which he must complete 30 semester hours of work; at least 24 of the last 30 hours offered for credit must be completed in residence. An overall C average on work taken at Texas Tech University is required.

**Bachelor of Science in Physical Education (Men and Women).**

	Sem. Hrs.
1. English .....	12
2. Required Government and History .....	12
3. Mathematics .....	3
4. Psychology 335 .....	3
5. Sociology .....	3
6. Speech .....	3
7. Laboratory Science .....	12
8. Major, minor, and electives sufficient with the above courses to total a minimum of 128 semester hours. A minor of at least 18 hours including 6 hours of advanced courses is required on this degree. If a student wishes to complete requirements for a certificate he must take required courses in the College of Education which will count as electives.	

**Bachelor of Music Education.** The Bachelor of Music Education degree is for the student who expects to teach or direct vocal or instrumental music in the public schools.

Minimum requirements for the degree of Bachelor of Music Education are as follows:

	Sem. Hrs.
1. English .....	12
2. Required Government and History .....	12
3. Foreign Language .....	6-8
4. Science or Mathematics .....	6-8
5. Academic Electives .....	6
6. Professional Education and Student Teaching .....	18
7. Applied music, music literature, music education, music theory, music ensemble (band, chorus, orchestra, opera), and free electives, to total a minimum of 130-134 semester hours, not including physical education, band, or basic ROTC.	
8. Physical Education, Band, or ROTC .....	4-6
Total for degree .....	134-140

**Bachelor of Music.** Minimum requirements for the degree of Bachelor of Music (Applied Music) are as follows:

	Sem. Hrs.
1. English .....	12
2. Required Government and History .....	12

3. Foreign Language .....	6-22
4. Applied music, music literature, music education, music theory, music ensemble (band, chorus, orchestra, opera theater), and free electives to total a minimum of 124 to 132 semester hours, depending upon the major, not including physical education, band, or basic ROTC. ....	
5. Physical Education, Band, or ROTC .....	4-6
Total for degree .....	128-138

## Department of Art

This department supervises the following degrees: *Master of Fine Arts* with a major in ART; *Bachelor of Fine Arts* with professional majors in ADVERTISING ART, ART EDUCATION, INTERIOR DESIGN, and STUDIO areas; and *Bachelor of Arts* with a major in ART. This department also supervises the certification programs in Art under the *Bachelor of Science in Education* degree.

The Department of Art provides (1) degree programs that lead to professional development in the visual arts, (2) a general degree program that leads to a liberal education in the visual arts, and (3) courses which are designed to appeal to nonmajors who desire experiences in the visual arts as part of their liberal education.

The department reserves the right to retain, exhibit, and reproduce work submitted by students for credit in any course. Work submitted for grade is the property of the department and remains such until it is returned to the student by the department.

At the end of the sophomore year the student majoring in art will be required to have a 2.00 overall grade-point average and a 2.00 in art courses to proceed to upper level art courses.

**Freshman Core.** All students majoring in art and those establishing a teaching field in art are required to take the freshman core which consists of the following courses:

ART 120	Introduction to Drawing
ART 121	Introduction to Drawing
ART 132	Introduction to Design
ART 142	Introduction to Design
Art History, 6 hours	

**Advertising Art Major, B.F.A. Degree.** This program offers a concentration of professional courses in the field of advertising design and design communication. Minor options can be elected from one of the following areas: photography, illustration, crafts design, or a selection of advertising courses offered by the Department of Marketing. The student has the opportunity to prepare for a career in the advertising agency, the design studio, publication design, package design, and related areas of illustration and photography.

The advertising art curriculum consists of the freshman art core (17 semester hours), general degree requirements (64-68 semester hours), and courses for the major (59 semester hours). Advanced courses can require submission of a portfolio of work to the faculty as a condition for admission. Listed below is the curriculum for advertising art.

### Art Courses Required

Freshman Art Core, 17 hours

ART 223	Introduction to Painting—Oil
or	
ART 224	Introduction to Painting—Synthetic Media
or	
ART 225	Introduction to Painting—Watercolor
or	
ART 228	Introduction to Pottery
ART 230, 231	Graphic Design I
ART 232	Life Drawing I
ART 235	Introduction to Printmaking
ART 3314	Type as a Design Element
ART 3315	Perspective I
ART 3320, 3321	Graphic Design II
ART 3322	Lettering



ART 3328 Life Drawing II  
 ART 4314 Advanced Drawing  
 ART 4318, 4319 Advanced Graphic Design  
 ART 4321 Advertising Art for Production  
 Art electives, 3-6 hours

Advertising Art Minor selected from one option area: 9-12 hours

Illustration

ART 3220 Figure Indication  
 ART 3323 Illustration I (may be repeated as Illustration II)  
 ART 4322 Advanced Illustration (may be repeated once)  
 ART 332 Painting Oil

or

ART 333 Painting in Synthetic Media

or

ART 334 Painting in Watercolor

ART 336 Printmaking—Silkscreen and Lithography

or

ART 3329 Printmaking—Woodcut and Etching

Photography

JOUR 4315 Advanced Photojournalism  
 ART 3339 Photographic Arts II (may be repeated once)  
 ART 4323 Cinematography (may be repeated once)

Crafts Design

ART 220 Crafts Design  
 ART 221 Introduction to Enameling  
 ART 222 Introduction to Textile Design  
 ART 227 Introduction to Jewelry  
 ART 3335 Jewelry

Two of the following:

ART 3310 Textile Design—Dyeing Processes  
 ART 3311 Textile Design—Yarn Processes  
 ART 3312 Textile Design—Printing Processes

Business—Marketing

MKT 331 Public Relations  
 MKT 332 Principles of Marketing  
 MKT 339 Principles of Salesmanship  
 MKT 4312 Advertising Campaigns  
 MKT 4316 Advertising Administration

General Degree Requirements: 64-68 semester hours

ENG 131, 132, 231, 232

History, 6 hours

Government, 6 hours

Art history electives, 6 hours

Foreign Language, 6-8 hours

MATH 135

G SP 338

MKT 334

JOUR 3313, 3351

General Electives, 9 hours

P.E., Band, or Basic ROTC, 4-6 hours

Total hours required for graduation, 140-144 semester hours

**Art Education Major, B.F.A. Degree.** This major is designed for students who plan to teach in the public schools and desire depth in art. The student who completes this program will earn a broadfield-secondary or all-level certification in art. The curriculum for this major is given below.

Art Courses Required: 75-79 semester hours

Freshman Art Core, 17 hours

ART 220 Crafts Design

or

ART 230 Graphic Design

ART 221 Introduction to Enameling

ART 222 Introduction to Textile Design

ART 223	Introduction to Painting—Oil
ART 224	Introduction to Painting—Synthetic Media
ART 225	Introduction to Painting—Watercolor
ART 227	Introduction to Jewelry
ART 228	Introduction to Pottery
ART 229	Introduction to Sculpture
ART 232	Life Drawing
ART 235	Introduction to Printmaking
*ART 3318	Crafts in Elementary Education
ART 3330	History and Philosophy of Art Education
ART 3334	Presentation Techniques
ART 432	Art in Secondary Education
ART 433	Secondary Art Curriculum

#### Art Area Emphasis

(May be selected from one or two of the following areas: drawing, painting, pottery, printmaking, sculpture, textiles, jewelry), 22 hours

#### General Degree Requirements: 72-74 semester hours

ENG 131, 132, 231, 232

HIST 231, 232

GOVT 231, 232

Math., Foreign Language, Laboratory Science, 12-16 hours

(Select 2 of the 3 areas)

P.E., Band, or Basic ROTC, 4-6 hours

Art History electives, 6 hours

General electives, 4-8 hours

Professional Education, 18 hours

Students desiring teacher certification with less depth in art may meet certification requirements and be prepared to teach under the Bachelor of Arts degree or the Bachelor of Science in Education degree.

**Interior Design Major, B.F.A. Degree.** This curriculum provides the preparation for a career as a professional interior designer by offering the interior design students a concentration of art courses. The curriculum for this major is given below.

#### Art Courses Required: 77-80 semester hours

Freshman Art Core, 17 hours

ART 220 Crafts Design

or

ART 230 Graphic Design I

ART 225 Introduction to Painting—Watercolor

ART 2220 Introduction to Interior Design

ART 2221 Beginning Interior Design Studio

ART 232 Life Drawing I

ART 3224 Contemporary Interiors

ART 3313 History of Interiors

ART 3315 Perspective I

ART 3325 Interior Design Graphics I

ART 3326 Interior Design Graphics II

ART 3327 Equipment and Materials for Interiors

ART 3334 Presentation Techniques

ART 4221 Interior Design Studio Procedure

ART 4222 Professional Practices for Interior Design

ART 4325 Residential Interiors

ART 4326 Commercial Interiors

ART 4327 Research in Dynamics of Interior Space

ART 4328 Advanced Interior Problems

ART 4329 Fieldwork in Interior Design

Art electives, 10-12 hours

#### General Degree Requirements: 58-65 semester hours

ENG 131, 132, 231, 232

Foreign Language, 6-8 hours

\* Required only for all-level certification.

GOVT 231, 232

HIST 231, 232

ACCT 234, 235

C&T 231

ART 4310, 4311

P.E., Band, or Basic ROTC, 4-6 hours

Electives (Select 9-12 hours from the following:

ARCH 331; C&T 438, 4330; ECO 235; HORT 3314; MATH 135;

PHYS 237; PSY 230; SECT 121; G SP 338.)

A nonprofessional interior design option with a major in general home economics is available through the College of Home Economics.

**Studio Major, B.F.A. Degree.** This major is planned to offer depth in the studio areas. A student is required to select a major area of concentration (23-30 semester hours) in one of the following areas: drawing, jewelry, painting, pottery, printmaking, or sculpture. A minor area of concentration (14-18 semester hours) is required in a second area which may be one of the above or enameling or textile design. The curriculum for this major is given below.

**Art Courses Required:** 82 semester hours minimum

Freshman Art Core, 17 hours

Sophomore Year: ART 230, 232, plus three courses representing both groups I and II. Group I: ART 223, 224, 225, 235. Group II: ART 221, 222, 227, 228, 229.

In addition, major and minor areas of concentration in studio are required to total 37-40 semester hours.

**Major Area:** 21-28 semester hours in Painting, Drawing, Printmaking, Sculpture, Pottery, or Jewelry.

(A student must successfully complete 400-level courses in his major area of concentration. Entry into these courses requires departmental approval.)

**Minor Area:** 12-16 semester hours in Painting, Drawing, Printmaking, Sculpture, Pottery, Jewelry, Textile Design, or Enameling.

**Art History Electives:** 6 hours minimum beyond the freshman core.

**Art Electives:** a number of hours in any art area for which the student has the prerequisites (including art history), and exclusive of his major or minor area of concentration, that will bring his total art hours to a minimum of 82 hours.

**General Degree Requirements:** 53-57 semester hours

ENG 131, 132, 231, 232

History, 6 hours

Government, 6 hours

Foreign Language, 6-8 hours

Laboratory Science, 8 hours

Anthropology, Foreign Language, JOUR 3313, Philosophy, Psychology, PHYS 237, Sociology, or Mathematics, 6 hours

P.E., Band, or Basic ROTC, 4-6 hours

Electives, 5 hours

**Art Major, B.A. Degree.** This major includes three options: (1) a nonprofessional general art option, (2) an art education option leading to broadfield-secondary or all-level certification in art, and (3) an art history option.

Students working toward the general nonprofessional art option must (1) complete the freshman core in art, (2) complete sufficient electives in art to total 42 hours, including the freshman core, and (3) complete the other requirements for the Bachelor of Arts degree.

Students working toward the art education option must (1) complete the freshman core in art, (2) complete the art requirements as listed under Teacher Education, (3) complete 18 semester hours in professional education required for secondary-broadfield or all-level certification in art, and (4) complete the other requirements for the Bachelor of Arts degree.

Students working toward the art history option must (1) complete the freshman core in art, (2) complete 25 semester hours in art history in addi-

tion to the freshman core, and (3) complete the other requirements for the Bachelor of Arts degree.

**Teacher Education.** These programs are planned to meet broadfield-secondary and all-level certification in art. These certification plans are available through two degree programs: *Bachelor of Arts* (133 hours) and *Bachelor of Science in Education* (128 hours). The art course requirements for broadfield-secondary and all-level certification are as follows:

**Freshman Art Core, 17 hours**

ART 221	Introduction to Enameling
ART 222	Introduction to Textiles
ART 223	Introduction to Painting—Oil
ART 224	Introduction to Painting—Synthetic Media
ART 225	Introduction to Painting—Watercolor
ART 227	Introduction to Jewelry
ART 228	Introduction to Pottery
ART 229	Introduction to Sculpture
ART 235	Introduction to Printmaking
ART 3318	Crafts for Elementary Education
ART 3330	History and Philosophy of Art Education
ART 3334	Presentation Techniques
*ART 432	Art in Secondary Education
*ART 433	Secondary Art Curriculum

Art electives (3-6 hours) to total 54 hours

These electives should be selected in consultation with an art education adviser.

**Courses in Art.**

**FOR UNDERGRADUATES**

120. **Introduction to Drawing (2:0:6).** Fundamentals of freehand drawing.
121. **Introduction to Drawing (2:0:6).** Prerequisite: ART 120. Fundamentals of freehand drawing.
130. **Introduction to the History of Art (3:3:0).** Architecture, sculpture, painting, and the minor arts from prehistoric times to the 14th century.
131. **Introduction to the History of Art (3:3:0).** Architecture, sculpture, painting, and the minor arts from the 14th century to the present.
132. **Introduction to Design (3:0:9).** Fundamental principles of two-dimensional design.
136. **Design Applied to Daily Living (3:1:4).** For non-majors, elements and principles of design as they function in life of individuals.
138. **Survey of Drawing (3:1:4).** For non-majors, a survey of freehand drawing.
142. **Introduction to Design (4:1:9).** Prerequisite: ART 132. Fundamental principles of three-dimensional design.
220. **Crafts Design (2:0:6).** Prerequisite: Freshman art core. Exploration of design fundamentals as related to crafts.
221. **Introduction to Enameling (2:0:6).** Prerequisite: Freshman art core. Presentation of basic processes of enameling on metal.
222. **Introduction to Textile Design (2:0:6).** Prerequisite: Freshman art core or departmental approval. Introduction to textile design through a variety of decorative and structural processes.
223. **Introduction to Painting—Oil (2:0:6).** Prerequisite: Freshman art core. Introduction to basic painting in oil.
224. **Introduction to Painting—Synthetic Media (2:0:6).** Prerequisite: Freshman art core. Introduction to basic painting in synthetic media.
225. **Introduction to Painting—Watercolor (2:0:6).** Prerequisite: Freshman art core. Introduction to basic painting in watercolor.
227. **Introduction to Jewelry (2:0:6).** Prerequisite: Freshman art core. Basic techniques in jewelry construction.
228. **Introduction to Pottery (2:0:6).** Prerequisite: Freshman art core. Introduction to hand building methods, glaze application, and decorative techniques.
229. **Introduction to Sculpture (2:0:6).** Prerequisite: Freshman art core. Compositional study of the relationship between form and space with emphasis on basic sculptural concepts, terminology, and techniques.
230. **Graphic Design I (3:0:9).** Prerequisite: Freshman art core. Continuation of basic design with special emphasis on two-dimensional elements of composition.
231. **Graphic Design I (3:0:9).** Prerequisite: ART 230 and 3314. Basic problems in advertising and editorial design.
232. **Life Drawing I (3:0:9).** Prerequisite: Freshman art core. Study of anatomical structure, drawing from life.
235. **Introduction to Printmaking (3:0:9).** Prerequisite: Freshman art core. Problems in the four major printmaking areas. Silkscreen, etching, lithography, and woodcut. Emphasis on materials and techniques.
2210. **Art and Environment (2:2:0).** This course attempts to explore the relationship and impact of the fine arts on man's environment.
2220. **Introduction to Interior Design (2:2:0).** Prerequisite: Freshman art core. An analysis of the fundamentals of designing through the study of draperies, furniture selection, color, textiles, wallpapers, and decorative accessories.

\* May also be counted as part of the 24-hour requirement in professional education.

2221. **Beginning Interior Design Studio (2:1:3).** Prerequisite: ART 2220. Beginning interior design studio. Experiences through studies in mediums, visual elements, and spatial representations.
2310. **Historiography (3:3:0).** An examination of the historiography of art history as seen in contemporaneous writings. Designed for any student interested in the changing attitudes toward the visual arts. Required for all art history majors.
321. **Problems in Visual Communications (2:0:6).** Prerequisite: Junior standing in business advertising or journalism. Basic elements of graphic design and introduction to technical, typographic, and production techniques.
328. **Appreciation of Art Today (2:2:0).** Development of aesthetic awareness through the examination of contemporary arts and crafts.
331. **Enameling (3:0:9).** Prerequisite: ART 221. Experimentation with enameling techniques on various metals. May be repeated for credit.
332. **Painting Oil (3:0:9).** Prerequisite: ART 223 and 232. Application of beginning painting but with greater emphasis on aesthetics and individual exploration.
333. **Painting in Synthetic Media (3:0:9).** Prerequisite: ART 224 and 232. Continuation of synthetic media painting, but with more emphasis on aesthetic and individual exploration.
334. **Painting in Watercolor (3:0:9).** Prerequisite: ART 225 and 232. Continuation of watercolor painting, but with more emphasis on aesthetics and individual exploration.
335. **Advanced Painting (3:0:9).** Prerequisite: ART 230, 3328, and 332, or 333, or 334. Advanced study of composition related to the human figure, still life, landscape and non-objective, emphasizing the development and application of aesthetic concepts. May be repeated for credit.
336. **Printmaking—Silkscreen and Lithography (3:0:9).** Prerequisite: ART 235. In-depth study of printmaking methods of silkscreens and lithography. Emphasis on advanced techniques and aesthetic factors.
337. **Pottery (3:0:9).** Prerequisite: ART 228. Introduction of throwing on the potter's wheel and continuation of hand building.
338. **Advanced Pottery (3:0:9).** Prerequisite: ART 232, 337. Emphasis on aesthetic production using the clay medium as a means of expression. May be repeated for credit.
3220. **Figure Indication (2:0:6).** Prerequisite: ART 232. Sketching costumed model in chalk and various other media with controlled lighting for layout and illustration planning.
3222. **Perspective II (2:0:6).** Prerequisite: ART 232 and 3315. Principles of mechanical perspective and accurate shades and shadows as applied to renderings containing objects and human figures.
3224. **Contemporary Interiors (2:2:0).** Prerequisite: ART 3313. A study of contemporary furniture movements and their effect on modern design in home furnishings.
3310. **Textile Design—Dyeing Processes (3:0:9).** Prerequisite: ART 220, 222. Presentation of various dyeing processes, including batik and tie dyeing. May be repeated for credit.
3311. **Textile Design—Yarn Processes (3:0:9).** Prerequisite: ART 220, 222. Presentation of various techniques for applied and structural uses of yarn, including weaving stitchery, macramé, and others. May be repeated for credit.
3312. **Textile Design—Printing Processes (3:0:9).** Prerequisite: ART 220, 222. Presentation of various printing processes, including block printing and silk screening. May be repeated for credit.
3313. **History of Interiors (3:3:0).** Prerequisite: ART 2221. A survey of historical styles of interiors. Egyptian to 20th century.
3314. **Type as a Design Element (3:0:9).** Prerequisite: Freshman art core. Families of type and type indication, use of type as a design element, printers' terms, copy fitting, measurements and techniques.
3315. **Perspective I (3:0:9).** Prerequisite: Freshman art core. Mechanical and optical perspective with special emphasis on picture making.
3316. **Survey of Pottery (3:1:4).** For non-majors, a survey of pottery.
3317. **Art in Elementary Education (3:1:4).** For non-majors, a practical application of current art education theories in promoting creative experiences for children.
3318. **Crafts in Elementary Education (3:1:4).** Application of current art education practices regarding three-dimensional work in providing creative experiences for children.
3319. **Survey of Painting (3:1:4).** For non-majors, a survey of various painting techniques and media.
- 3320, 3321. **Graphic Design II (3:0:9 each).** Prerequisite: ART 230. Advertising and editorial design including photographic layouts and design for television. May be repeated for credit.
3322. **Lettering (3:0:9).** Prerequisite: ART 231 and 3314. Analysis of letter forms. Lettering for printed reproduction.
3323. **Illustration I (3:0:9).** Prerequisite: ART 3328. Planning and rendering of advertising and editorial illustrations in various media. May be repeated once for credit.
3325. **Interior Design Graphics I (3:1:4).** Prerequisite: ART 3324 and 3315. A study of the techniques of graphic representation including drafting skills in both presentation and working drawings.
3326. **Interior Design Graphics II (3:1:4).** Prerequisite: ART 3325. Intermediate interior design studio with emphasis on freshhand perspective drawing and rendering in mixed media that is relative to interior designing.
3327. **Equipment and Materials for Interiors (3:1:4).** Prerequisite: ART 3325. Properties, installation, and sales problems relating to lighting and other equipment and materials for interiors.
3328. **Life Drawing II (3:0:9).** Prerequisite: ART 232. Drawing from life in a variety of media and approaches with emphasis upon aesthetic factors.
3329. **Printmaking—Woodcut and Etching (3:0:9).** Prerequisite: ART 235. In-depth study of printmaking methods of woodblock and etching. Emphasis on advanced techniques and aesthetic factors.
3330. **History and Philosophies of Art Education (3:3:0).** Prerequisite: Freshman art core. An investigation of the history and major philosophies of teaching visual arts with emphasis on the elementary school. (For art education majors only)
3331. **Organization and Furnishings of Living Space (3:1:4).** Prerequisite: ART 136. For non-majors, the application of design principles to selection and arrangement of furnishings for a home with emphasis on function and aesthetics.
3333. **Survey of Crafts (3:1:4).** For non-majors, a survey of crafts.



- 3334. Presentation Techniques (3:1:4).** Prerequisite: Freshman art core. Exploration of different areas of visual presentation to include lettering, graphic representation and organization, and other display techniques.
- 3335. Jewelry (3:0:9).** Prerequisite: ART 227. Continuation of jewelry construction with further investigation of processes, introduction to casting methods. May be repeated for credit.
- 3337. Sculpture (3:0:9).** Prerequisite: ART 229. Introduction to technology and philosophy of studio and architectural sculpture with emphasis on carved media, concrete, welding, and casting.
- 3338. Advanced Sculpture (3:0:9).** Prerequisite: ART 232, 3337. Structured to encourage mastery in specialized areas of sculpture with emphasis on development of individual techniques and philosophies. May be repeated for credit.
- 3339. Photographic Arts II (3:0:9).** Prerequisite: JOUR 3313. Advanced use of black and white and color still photography with emphasis toward editorial and advertising utilization and the media as an art form. May be repeated for credit.
- 3340. Greek and Roman Art (3:3:0).** Prerequisite: ART 130. An examination of the principal contributions of the classical world in the areas of architecture, sculpture, and painting.
- 3341. The Art of the Middle Ages (3:3:0).** Prerequisite: ART 130. An examination of the principal contributions of the medieval period in the areas of architecture, sculpture, and painting.
- 3342. 20th Century Art (3:3:0).** Prerequisite: ART 131. An examination of the principal contributions of the 20th century in the areas of architecture, sculpture, and painting.
- 3343. American Art (3:3:0).** Prerequisite: ART 130 and 131. An examination of the principal American contributions in the areas of architecture, sculpture, and painting from the 17th century to the present.
- 3344. Creative Visual Media (3:1:4).** Prerequisite: ART 3317 or departmental approval. A course designed to develop knowledge, understanding, and appreciation of exploratory and creative experiences with materials, processes, and presentations involved in the broad fields of puppetry, cinema, film strips, educational television, and their inter-relational aspects.
- 411. Seminar for Elementary Specialization (1:1:0).** Prerequisite: Junior classification. Discussions built upon pertinent topics related to teaching art in elementary school. (For elementary education majors with an art specialization only.)
- 414. Advanced Problems (1:0:3).** Prerequisite: Departmental approval. Advanced problems in an area of production in which student has achieved competence. May be repeated for credit.
- 424. Advanced Problems (2:0:6).** Prerequisite: Departmental approval. Advanced problems in an area of production in which student has achieved competence. May be repeated for credit.
- 431. Advanced Textile Design (3:0:9).** Prerequisite: Two of the following: ART 3310, 3311, 3312. Problems in textile design allowing the student to combine and explore at his own initiative. May be repeated for credit.
- 432. Art in Secondary Education (3:3:0).** Prerequisite: ART 3330. An investigation of the teaching of the visual arts in secondary schools and its relationship to the history and philosophies of art education. (For art education majors only).
- 433. Secondary Art Curriculum (3:3:0).** Prerequisite: ART 432. An investigation and study of current art education practices and research regarding the secondary schools. (For art education majors only).
- 434. Advanced Problems (3:0:9).** Prerequisite: Departmental approval. Advanced problems in area of production in which student has achieved competence. May be repeated for credit.
- 435. Experimental Painting (3:0:9).** Prerequisite: ART 335 and departmental approval. Advanced exploration into aesthetics on a more individual basis. May be repeated for credit.
- 436. Advanced Printmaking (3:0:9).** Prerequisite: ART 230, 336, 3328, 3329, and departmental approval. Advanced problems in two printmaking areas of the student's choice. Controlled projects and individual criticism. May be repeated for credit.
- 437. Advanced Jewellery (3:0:9).** Prerequisite: ART 3335 and departmental approval. Emphasis on the experimental elements in jewelry making. Student selects approved individual problems. May be repeated for credit.
- 438. Experimental Pottery (3:0:9).** Prerequisite: ART 338 and departmental approval. Individual studies toward developing professional statement in clay; kiln construction and firing. May be repeated for credit.
- 439. Experimental Sculpture (3:0:9).** Prerequisite: ART 3338 and departmental approval. Advanced study by mature students. Structured primarily toward advancement of existing philosophy and technology with emphasis on experimentation. May be repeated for credit.
- 422. Professional Practices for Interior Design (2:2:0).** Prerequisite: ART 4326. Professional practices. Lectures and discussions of legal, business, ethical, and other aspects of the practice of interior design.
- 4310, 4311. Art and Ideas (3:3:0 each).** Prerequisite: Junior classification. An examination of major intellectual concepts as they recur in the art production of various cultures and time periods.
- 4313. Seminar in Art History (3:3:0).** Prerequisite: 6 hours of art history. Extensive exploration of a particular period in art history. May be repeated for credit.
- 4314. Advanced Drawing (3:0:9).** Prerequisite: ART 230 and 3328. Drawing from life with various media emphasizing aesthetic expression. May be repeated for credit.
- 4315. Special Problems in Art History (3:3:0).** Prerequisite: Art history major and/or consent of instructor. An in-depth art history research course designed for maximum flexibility between the instructor and advanced student. May be repeated for credit.
- 4318, 4319. Advanced Graphic Design (3:0:9 each).** Prerequisite: ART 3321 and portfolio evaluation. Advanced problems in graphic design, including printed media, television, point-of-purchase, package design, and typography. Coordination with ART 4321.

4321. **Advertising Art for Production (3:0:9)**. Prerequisite: ART 3314, 231, 235. Preparation of original art for printed media, television, three-dimensional units, production materials and techniques. Coordination with ART 4318.
4322. **Advanced Illustration (3:0:9)**. Prerequisite: ART 3323 and portfolio approval. Experimental approach to illustration for editorial and advertising purposes with attention to the individual portfolio. May be repeated for credit.
4323. **Cinematography (3:0:9)**. Prerequisite: ART 3339. Basic film making techniques in both 8mm and 16mm production. Special emphasis given to the creative use of film as an art form. May be repeated for credit.
4325. **Residential Interior (3:1:4)**. Prerequisite: ART 3327. Advanced study in various dimensions, purposes, and characters in relation to the small and large residential shelters. Cost estimating. May be repeated for credit.
4326. **Commercial Interior (3:1:4)**. Prerequisite: ART 3327. Analyzing furnishings, and estimating of moderate to large commercial or institutional spaces. May be repeated for credit.
4327. **Research in Dynamics of Interior Space (3:1:4)**. Prerequisite: ART 4326. Advanced problems relating to architectural space. May be repeated for credit.
4328. **Advanced Interior Problems (3:1:4)**. Prerequisite: ART 4326. Activity area planning concerning problems in designing for living space needs within certain areas of the home. May be repeated for credit.
4329. **Fieldwork in Interior Design (3:1:8)**. Prerequisite: ART 4326 and departmental approval. Field work wherein the student gains first-hand experience in a local business firm of his choice.
4340. **Seminar in Greek and Roman Art (3:3:0)**. Prerequisite: ART 3340 or consent of instructor. Extensive exploration of a particular area of Greek or Roman art.
4342. **Seminar in 20th Century Art (3:3:0)**. Prerequisite: ART 3342 or consent of instructor. Extensive exploration of a particular area of 20th century art.

## FOR GRADUATES

511. **Advanced Art Unit (1:0:3)**. Prerequisite: Graduate standing and departmental approval. Individual investigation in art. May be repeated for credit.
518. **Art Seminar (1:1:0)**. Prerequisite: Graduate standing and departmental approval. An investigation of current trends in art based on a survey of the literature. May be repeated for credit.
530. **Readings in Art Education (3:3:0)**. Prerequisite: Graduate standing. A survey of pertinent literature in the field of and relative to art education.
531. **Special Problems in Art (3:0:9)**. Prerequisite: Graduate standing and departmental approval. Advanced, independent work in an art area in which a student has had previous training. May be repeated for credit.
532. **Research Methods in the Visual Arts (3:3:0)**. Prerequisite: Graduate standing and departmental approval. A survey of research methods applicable to the visual arts.
533. **Environmental Studies Related to Interior Design (3:3:0)**. Prerequisite: Graduate standing and consent of instructor. Behavioral oriented studies serving the socio-physical requirements of the client, ranging from natural environmental disasters to man's individual sensory responses to manipulated elements of interior design. May be repeated for credit.
534. **Advanced Studio: Two-dimensional (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced two-dimensional studio problems. May be repeated for credit.
535. **Advanced Studio: Three-dimensional (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced three-dimensional studio problems. May be repeated for credit.
536. **Art in Home Economics (3:1:6)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in the visual arts as they relate to home economics. Open only to graduate students in home economics. May be repeated for credit.
537. **Art for Exceptional Children (3:1:4)**. Prerequisite: Graduate standing and departmental approval. Review of the characteristics of typical children; application of this knowledge in unfolding the creative potentialities of each child through the use of art experience.
538. **Art for the Culturally and Economically Disadvantaged (3:3:0)**. Prerequisite: Graduate standing. A review of the literature including descriptive and other recent research into the problems of the culturally deprived student.
539. **Methods and Materials Laboratory in Art (3:0:9)**. Prerequisite: Graduate standing. A course wherein graduate students develop theory and applications of classroom practices with art processes and techniques encountered at their own level. May be repeated for credit.
5310. **Aesthetic Theory as Applied to Art (3:3:0)**. Prerequisite: Graduate standing. A course designed to enable students to understand how various conceptions of art have implications for the teaching of art.
5311. **Experimental Methods in Teaching Art (3:2:3)**. Prerequisite: Graduate standing. A combination of theory and practicum to develop an awareness of and practice in innovative procedures relative to art teaching. May be repeated for credit.
5312. **The Interrelationship of the Arts (3:3:0)**. Prerequisite: Graduate standing. A study of the visual and performing arts and the implications for fine arts curriculum.
5313. **Curriculum Development in Art Education (3:3:0)**. Prerequisite: ART 530 and 532. Fundamental bases for curriculum development in art education.
5314. **Supervision and Administration in Art Education (3:3:0)**. Prerequisite: ART 5313. School organization, personnel, curriculum, responsibilities of modern administration, and supervision.
5315. **Historical Survey of the Teaching of Art (3:3:0)**. Prerequisite: Graduate standing. Survey of the historic growth of art education in Europe and America.
5316. **History and Theory of Interior Design (3:3:0)**. Prerequisite: Graduate standing and consent of instructor. Emphasis on current trends such as computer-aided design and programming from the industrial revolution to today. May be repeated for credit.
5317. **Research into the Effects of the Interior Design Environment on the User (3:3:0)**. Prerequisite: Graduate standing and consent of instructor. Suggested areas of study include color, texture, and illumination. May be repeated for credit.

5318. **Advanced Problems in Interior Design (3:0:9)**. Prerequisite: Graduate standing and consent of instructor. Investigation and execution of special problems in the field of interior design. May be repeated for credit.
5319. **Production Procedures for Interior Designers (3:1:4)**. Prerequisite: Graduate standing and consent of instructor. Studies of materials and procedures used in producing furnishings, including analysis of the relationship between design and quality in materials and construction used in the design product. May be repeated for credit.
5320. **Structure in Interior Design (3:1:4)**. Prerequisite: Graduate standing and consent of instructor. Relationships between systems, methods, techniques, materials, costs of new construction and remodeling. May be repeated for credit.
5321. **Home Furnishings Industry (3:3:0)**. Prerequisite: Graduate standing and consent of instructor. Patterns of production and distribution in the home furnishings industry, the market area, and in merchandising techniques. May be repeated for credit.
5322. **Interior Design Seminar (3:1:4)**. Prerequisite: Approval by the student's advisory committee. Individual readings in current problems relating to interior design, and applying this information to setting up the thesis problem. May be repeated for credit.
5323. **Special Unit Course in Interior Design (3:0:9)**. Prerequisite: Graduate standing and consent of instructor. Intensive course consisting of various units of work with specialists in charge of each phase. May be repeated for credit.
5330. **Graduate Seminar in Art History (3:3:0)**. Prerequisite: Graduate standing and departmental approval. A conceptual/comparative approach to select topics in art history as seen in the visual arts and reflected in contemporary writings.
5331. **Graduate Problems in Art History (3:3:0)**. Prerequisite: Graduate standing and departmental approval. A conceptual/comparative examination of certain art historical problems which emphasizes the interrelationship of the arts.
5333. **Advanced Photography (3:0:9)**. Prerequisite: Graduate standing and departmental approval. Experimental investigation into still and motion picture photography as creative media in visual communication. May be repeated for credit.
5334. **Advanced Design (3:0:9)**. Prerequisite: Graduate standing and departmental approval. Investigation into the visual design components of form and content as related to contemporary graphic communication. May be repeated for credit.
5335. **Theory and Practice of Art for Elementary Teachers (3:1:4)**. Prerequisite: Graduate standing and departmental approval. Art activities and experiences for the child.
5336. **Graduate Sculpture (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in sculpture. May be repeated for credit.
5337. **Graduate Painting (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in painting. May be repeated for credit.
5338. **Graduate Textile Design (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in textiles. May be repeated for credit.
5339. **Graduate Pottery (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in pottery.
5340. **Graduate Jewelry (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in jewelry. May be repeated for credit.
5341. **Graduate Printmaking (3:0:9)**. Prerequisite: Graduate standing and departmental approval. The development and execution of advanced problems in printmaking. May be repeated for credit.
630. **Master's Report (3)**. Prerequisite: Completion of 18 hours of graduate work and departmental approval. A written and/or visual statement regarding a substantial problem or issue in the field of art. Enrollment required at least twice.
631. **Master's Thesis (3)**. Prerequisite: Approval by the student's advisory committee. Independent research and master's thesis preparation under the cognizance of a graduate faculty member in the student's area of specialization. Enrollment required at least twice.

## Department of Biblical Literature

The objective of this department is to provide sound academic courses in the literature found in the Bible, in order that students may better understand and appreciate this significant collection of documents. Courses are taught in three locations near the campus, under auspices of the Baptist, Churches of Christ, and United Bible Chairs. Instructors are fully qualified and credit may be obtained for as many as 12 academic hours, which are counted as electives toward regular degree plans. This area of study is offered to students at no expense to the University, its cost being borne by the various supporting religious groups.

### 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 are 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, etc.).
422. **The Book of Revelation (2:2:0).** 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 given to problems of Genesis.

## Department of Biology

This department supervises the following degree programs: *BIOLOGY, Doctor of Philosophy*; *BOTANY, Bachelor of Arts or Bachelor of Science, Master of Science, Doctor of Philosophy*; *MEDICAL TECHNOLOGY, Bachelor of Science in Medical Technology*; *MICROBIOLOGY, Bachelor of Arts or Bachelor of Science, Master of Science, Doctor of Philosophy*; *ZOOLOGY, Bachelor of Arts or Bachelor of Science, Master of Science, Doctor of Philosophy*.

Students majoring in microbiology, 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 37 semester hours of the following courses in the Department of Biology: BIOL 141, 142, 331, 411; BOT 231, 331, 334, 339; ZOOL 241; and 9 additional hours in courses of junior and senior rank in microbiology, biology, or botany. Students majoring in zoology for the bachelor's degree are expected to complete as a minimum 37 semester hours of the following courses in the Department of Biology: BIOL 141, 142, 331, 411; ZOOL 241 and three of the following six: ZOOL 331, 332, 336, 437, 438, 439; BOT 231,\* 334,\* and 6 additional hours in courses of junior and senior rank in biology, entomology, microbiology, or zoology.

Students majoring in microbiology will be expected to complete 37 semester hours of the following courses: BIOL 141, 142, 331, 411; ZOOL 241 or 243; MBIO 331, 430, 432, 433; plus 6 semester hours of microbiology of junior and senior rank, or 3 semester hours of junior or senior rank and ZOOL 333; and 3 additional semester hours of junior or senior rank offered in the Department of Biology.

Chemistry provides an excellent minor for students majoring in microbiology. Students majoring in microbiology may minor in chemistry by completing the following courses: CHEM 141, 142, 251, 341, 342. If the student expects to do graduate work in microbiology, the following courses are recommended: CHEM 141, 142, 251, 325, 335, 326, 336. Students majoring in microbiology who minor in fields other than chemistry are expected to complete a minimum of 12 hours in chemistry, including organic chemistry (CHEM 141, 142, 341; or CHEM 141, 142, 251, 341).

Students majoring in one of the programs in this department may count no more than two courses with a grade of D, and minors in the department may count no more than one course with a grade of D. Students following the medical technology curriculum must maintain an overall C average in courses taken at Texas Tech. At least one field course 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.

\* With the consent of the chairman of the department a premedical or a pre dental student may substitute another course offered in the Department of Biology.

Courses numbered 300 or above in microbiology or biology may be counted as part of the major in the degree programs in botany or zoology. Honors sections in BIOL 141, 142 are offered for all students in the Honors Program. Honors Research (BIOL 334) and Honors Thesis (BIOL 432) are offered in the Honors Program.

Premedical and pre dental students may major or minor in microbiology or zoology. Microbiology also offers programs useful to students whose interests are in sanitation, medical technology, home economics, and agriculture.

Specific curricula for the Bachelor of Science degree programs in botany, medical technology, microbiology, and zoology are set forth in the accompanying tables.

**Teacher Education.** Students completing the Bachelor of Arts or the Bachelor of Science degree, together with the special requirements for teacher certification, including required courses in professional education and in two teaching fields will be qualified to teach biology in the public schools of Texas. Chemistry, physics, or mathematics is recommended as a second teaching field.

Those students using biology as a teaching field for the degree of Bachelor of Science in Education should take the following courses: BIOL 141, 142, 331, 411; MBIO 331; BOT 334; ZOOL 243, 336, 437.

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: BIOL 141, 142; CHEM 141, 142; GEOL 143, 144; PHYS 141, 142; BIOL 331, 411; MBIO 331; ZOOL 336, 437; and 5 semester hours of junior and 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: BIOL 141, 142.
2. 12 semester hours: BIOL 141, 142, 331, 411.
3. 15 semester hours: BIOL 141, 142, 331, 411; MBIO 331.
4. 18 semester hours: BIOL 141, 142, 331, 411; MBIO 331; ZOOL 437.

The department is a participating member of the Organization for Tropical Studies. Information on courses and research opportunities in this multidiscipline program can be obtained by writing to the department.

### Botany Curriculum, B.S. Degree.

FIRST AND SECOND YEARS			
Fall		Spring	
BIOL 141, Botany	4	BIOL 142, Zoology	4
*Chem., Geol., or Phys. (beginning course)	8	Mathematics	3
Mathematics	3	Chem., Geol., or Phys. (beginning course)	8
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Foreign Language	4	BOT 334, Tax. of Pl. Plants	3
BOT 231, Surv. Plant Groups	3	Foreign Language	4
ZOOL 241, Comp. Vert. Anat.	4	P.E., Band, or Basic ROTC	2-3
P.E., Band, or Basic ROTC	2-3		
	34-35		30-31
THIRD AND FOURTH YEARS			
Fall		Spring	
BOT 331, Plant Physiol.	3	BOT 339, Plant Anat.	3
Mbio., Biol., or Bot. (junior or senior)	6	Mbio., Biol., or Bot. (junior or senior)	3
BIOL 331, Heredity	3	Chem., Geol., or Phys. (beginning course)	4
Chem., Geol., or Phys. (beginning course)	4	Science electives	9
Science or Mathematics minor	6	Foreign Language	3
Foreign Language	3	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	GOVT 232, Amer. Govt., Funct.	3
GOVT 231, Amer. Govt., Org.	3	BIOL 411, Seminar	1
Elective	2	Science or Mathematics minor	6
	33		35

\* This curriculum requires the completion of the freshman year in chemistry, geology, and physics.



## Medical Technology Curriculum.

FIRST YEAR			
Fall		Spring	
*BIOL 141, Botany	4	BIOL 142, Zoology	4
*CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
ENG 131, Coll. Rhct.	3	ENG 132, Coll. Rhct.	3
Foreign Language	3-4	Foreign Language	3-4
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
<hr/>		<hr/>	
15-16		15-16	
SECOND YEAR			
Fall		Spring	
CHEM 251, Anal. Chem.	5	CHEM 341, Intro. Org. Chem.	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Mathematics	3	Mathematics	3
Foreign Language	3	ZOOL 243, Human Anat. & Physiol.	4
P.E., Band, or Basic ROTC	1-2	Foreign Language	3
<hr/>		<hr/>	
15-16		P.E., Band, or Basic ROTC 1-2	
		<hr/>	
		18-19	

SUMMER SESSION  
(Preceding Junior Year)

MBIO 331, Gen. Bact.	3
MBIO 430, Adv. Gen. Bact.	3
	6

THIRD YEAR			
Fall		Spring	
MBIO 432, Immun. & Serology	3	MBIO 333, Commun. Diseases or	
MBIO 434, Path. Bact.	3	BIOL 431, Biol. Tech. or	
PHYS 141, Gen. Phys.	4	BIOL 331, Heredity	3
GOVT 231, Amer. Govt., Org.	3	PHYS 142, Gen. Phys.	4
HIST 231, Hist. of U.S. to 1877	3	CHEM 342, Physiol. Chem.	4
16		GOVT 232, Amer. Govt., Funct.	3
		HIST 232, Hist. of U.S. since 1877	3
		17	

## FOURTH YEAR

Twelve months in a school of medical technology approved by the American Society of Clinical Pathologists.

\* Certain changes are possible in order of work suggested, when circumstances indicate the advisability of such change BIOL 141, 142 and CHEM 141, 142 should be completed during the first year, because these courses are prerequisite to the others required in these fields.

## Microbiology Curriculum, B.S. Degree.

FIRST YEAR			
Fall		Spring	
BIOL 141, Botany	4	BIOL 142, Zoology	4
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Foreign Language	3-4	Foreign Language	3-4
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
15-16		15-16	
SECOND YEAR			
Fall		Spring	
*CHEM 251, Anal. Chem.	5	ZOOL 241, Comp. Vert. Anat. or	
ENG 231, Mast. of Lit.	3	ZOOL 243, Human Anat. & Physiol.	4
Mathematics	3	*CHEM 341, Intro. Org. Chem.	4
Foreign Language	3	ENG 232, Mast. of Lit.	3
P.E., Band, or Basic ROTC	1-2	Mathematics	3
15-16		Foreign Language	3
		P.E., Band, or Basic ROTC	1-2
		18-19	
THIRD YEAR			
Fall		Spring	
MBIO 331, Gen. Bact.	3	MBIO 430, Adv. Gen. Bact.	3
Mbio., Biol., or Zool. (junior or senior)	3	Mbio., Biol., or Zool. (junior or senior)	3
Chem. (junior or senior) or science minor	5-6	Chem. (junior or senior) or science minor	5-6
GOV'T 231, Amer. Gov't., Org.	3	GOV'T 232, Amer. Gov't., Funct.	3
BIOL 331, Heredity	3	Elective	3
17-18		17-18	
FOURTH YEAR			
Fall		Spring	
MBIO 432, Immunol. & Serology	3	MBIO 433, Physiol. of Bact.	3
Mbio. (junior or senior)	3	BIOL 411, Seminar	1
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Science electives	6	Science elective	2-3
Electives	2-3	Electives	6
17-18		15-18	

\* See chemistry requirement options.

**Zoology Curriculum, B.S. Degree.****FIRST AND SECOND YEARS**

Fall		Spring	
BIOL 142, Zoology	4	BIOL 141, Botany	4
*Chem., Geol., or Phys. (beginning course)	8	Chem., Geol., or Phys. (beginning course)	8
Mathematics	3	Mathematics	3
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
ENG 231, Mast. of Lit.	3	ENG 232, Mast. Lit.	3
Foreign Language	4	Foreign Language	4
ZOOL 241, Comp. Vert. Anat.	4	**BOT 334, Tax. of Fl. Plants	3
**BOT 231, Surv. Plant Groups	3	P.E., Band, or Basic ROTC	2-3
P.E., Band, or Basic ROTC	2-3		

34-35

30-31

**THIRD AND FOURTH YEARS**

Fall		Spring	
ZOOL 331, Anim. Histol., or ZOOL 336, Comp. Invert. Zool.	3	ZOOL 332, Comp. Vert. Embry. or ZOOL 438, Cell. Physiol.	3
Mbio., Biol., or Zool. (Junior or senior)	6	Mbio., Biol., or Zool. (Junior or senior)	3
Chem., Geol., or Phys. (beginning course)	4	Chem., Geol., or Phys. (beginning course)	4
Science or Mathematics minor	6	Science electives	9
Foreign Language	3	Foreign Language	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Elective	2	BIOL 411, Seminar	1
BIOL 331, Heredity	3	Science or Mathematics minor	6

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\* This curriculum requires the completion of the freshman year in chemistry, geology, and physics, with the exception that premedical and pre dental students may substitute additional courses in chemistry for the beginning courses in geology.

\*\* With the consent of the chairman of the department, a premedical or a pre dental student may substitute another course offered in the Department of Biology.

**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, should be completed before credit is received toward a degree. In both courses 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 the terminology used in genetics.
331. Heredity (3:3:0). Prerequisite: 8 semester hours in the Biology Department. Principles of heredity with special reference to practical application in human affairs, heredity mechanisms, and problems.
333. Bio-Ecology (3:2:3). Prerequisite: BIOL 141, 142, or consent of the instructor. Introduction to the relationship of organisms to their environment. Field trips included at a minimum cost to the student.
334. Honors Research in Biology (3:0:9). Prerequisite: Junior standing in biology and participation in the Honors Program. Independent investigation in botany, microbiology, or zoology.
335. Evolution (3:3:0). Prerequisite: BIOL 141, 142, or consent of instructor. A basic evolutionary course for majors and non-majors. A survey of evolutionary history, evidence, and theories.
411. Biology Seminar (1:1:0). Prerequisite: Senior standing in microbiology, botany, or zoology. Critical reviews of classical and recent literature and reports of original investigations. May be repeated for credit.
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 slides of plant and animal tissues; research techniques.
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 in biology, botany, microbiology, or zoology.
433. Principles of Radiation Biology (3:2:3). Prerequisite: 6 semester hours of physics; CHEM 341 or equivalent; one of the following courses or equivalent, BOT 331, MBIO 433, ZOOL 438, or ZOOL 439.

**FOR GRADUATES**

511. Seminar (1:1:0). Required of all graduate students majoring in biology. May be repeated for credit.
512. Advanced Experimental Heredity (1:0:3). Prerequisite: BIOL 141, 142; BIOL 331 or its equivalent. Experimental inquiry of heredity mechanisms; emphasis on *Drosophila* genetics.
521. Biological Electron Microscopy (2:2:0). Prerequisite: Consent of instructor. Description of techniques used in preparing biological samples for electron microscopy and introduction to the theory and principles of electron microscopes.
532. Population Genetics (3:2:3). Prerequisite: BIOL 331 or the equivalent. Genetics of natural populations, basic dynamics, and evolutionary mechanisms responsible for origin of species.
533. Selected Topics in Radiation Biology (3:2:3). Prerequisite: Consent of instructor. Principles of radiation biology applied to biological problems.
534. Application of Radioactive Tracers in Biology (3:2:3). Prerequisite: BIOL 433 or BIOL 533.
535. Biological Fine Structure (3:3:0). Prerequisite: CHEM 342 or CHEM 436 recommended. Modern concepts of the structure and function of cell organelles and various cellular phenomena will be approached at the molecular level.

536. **Techniques in Biological Electron Microscopy (3:0:9)**. Prerequisite: Consent of instructor; ZOOL 435 recommended; prerequisite or parallel: BIOL 52L. Preparation of biological samples for electron microscopy and operation of the electron microscope.
5312. **Cytogenetics (3:2:3)**. Prerequisite: BIOL 331 or AGRO 341. A study of genetic mechanisms of plants and animals and their correlated cytological interpretations. Human material will be included.
5313. **Biochemical Genetics (3:3:0)**. Prerequisite: BIOL 331 and CHEM 325, 335, 326, 336 or CHEM 341. CHEM 436 or CHEM 342 recommended. A comprehensive basis of heredity as interpreted through molecular and biochemical studies.
731. **Research (3)**. Prerequisite: Admission to doctoral study and consent of the instructor. May be repeated for credit. Research in areas of current interest.
831. **Doctor's Dissertation (3)**. Enrollment required at least four times.

## 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. Field trips required.
331. **Plant Physiology (3:2:3)**. Prerequisite: BIOL 141, 142; prerequisite or parallel, CHEM 141. Physiological processes as applied to the seed plants.
332. **Plant Pathology (3:2:3)**. Prerequisite: BIOL 141, 142; prerequisite or parallel, MBIO 231 or equivalent. Principles underlying the cause, identification, and control of plant diseases.
334. **Taxonomy of the Flowering Plants (3:2:3)**. Prerequisite: BIOL 141, 142. Principles and practice in classification of flowering plants. Field trips required.
339. **Plant Anatomy (3:2:3)**. Prerequisite: BIOL 141, 142. Anatomy of the vascular plants.
431. **Undergraduate Research in Botany (3:0:9)**. Prerequisite: Junior or senior standing in botany; 15 semester hours of biology. Selected research problems according to the needs and interests of the students. May be repeated or taken parallel for credit in another field or with new materials in the same field.
436. **Plant Geography (3:3:0)**. Prerequisite: BIOL 141, 142, or consent of the instructor. Principles of the geography of plants; vegetation types, especially of North America. Occasional field trips.
438. **Morphology of Fungi (3:2:3)**. Prerequisite: BIOL 141, 142. Morphology as a basis for the classification of the fungi.

### FOR GRADUATES

531. **Problems in Botany (3:0:9)**. May be repeated for full credit in another field or with new materials in the same field. Offered at intervals.
532. **Vector Relationships in Plant Diseases (3:2:3)**. Prerequisite: BOT 332; ENTO 334, or equivalent with consent of instructor. Insect, mite, and nematode transmission of plant pathogens with emphasis on pathovector relationships.
534. **Advanced Plant Anatomy (3:0:9)**. Prerequisite: BOT 339. Advanced anatomy of vascular plants. Offered at intervals.
535. **Field Botany (3:3:0)**. 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: BIOL 141, 142; BOT 231, 334; or consent of the instructor. Classification of the lower plants exclusive of the fungi. Lecture, laboratory, and field study.
537. **Morphology of the Vascular Plants (3:2:3)**. Prerequisite: BIOL 141, 142; BOT 231, 334; or consent of the instructor. The form and reproduction of plant groups. Field trips required.
538. **Advanced Taxonomy of the Vascular Plants (3:2:3)**. Prerequisite: BOT 334; consent of the instructor. A critical study of classification and nomenclature as applied to vascular plants.
539. **Plant Speciation (3:3:0)**. Prerequisite: BIOL 331 or AGRO 341. Genetic and environmental factors operating in plant evolution and species formation. A critical examination of natural and experimental populations.
5311. **Morphogenesis and Plant Growth Regulators (3:2:3)**. Prerequisite: BOT 331, CHEM 325, 335, 326, 336, or CHEM 341. CHEM 436 or 432 recommended. Study of environmental and chemical control of plant morphogenesis, growth and development. Photoperiodism, thermal regulation, naturally occurring hormones, and synthetic growth regulators.
5331. **Plant Growth and Development (3:2:3)**. Prerequisite: A course in organic chemistry and 12 semester hours in biology; a course in biochemistry recommended. A course in plant physiology presented at an advanced level for graduate students with a background in organic chemistry and biology but with no previous training in plant physiology.
5332. **Plant Pathology for Advanced Students (3:2:3)**. Prerequisite: MBIO 231 or equivalent; ENTO 231 or equivalent; 12 semester hours in plant sciences, or consent of instructor. Principles underlying the cause, identification, and control of plant diseases. A course for graduate students who have had no previous courses in plant pathology.
5336. **Readings in Plant Geography (3:3:0)**. Prerequisite: Consent of instructor. Selected readings in the geographic distribution of plants and its underlying principles. This course is offered for graduate students who have had no previous courses in plant geography.
5338. **Morphology of Fungi for Advanced Students (3:2:3)**. Morphology as a basis for classification of the fungi. A course for graduate students who have not received credit for BOT 438 or its equivalent.
630. **Master's Report (3)**.
631. **Master's Thesis (3)**. Enrollment required at least twice.
731. **Research (3)**. Prerequisite: Admission to doctoral study and consent of the instructor. May be repeated for credit. Research in areas of current interest.
831. **Doctor's Dissertation (3)**. Enrollment required at least four times.

## Courses in Entomology.

### FOR UNDERGRADUATES

4311. **Medical Entomology (3:2:3)**. Prerequisite: Advanced standing in zoology, premed, or agriculture. Insects, mites, and ticks as vectors of human disease and as pests.
4312. **Acarology (3:2:3)**. Prerequisite: Advanced standing in zoology, premed, or agriculture. The systematics, life histories, and control of mites affecting man, animals, and plants.

**Courses in Microbiology.****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 economics, and nursing.
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.
333. **Communicable Diseases (3:3:0).** Prerequisite: 3 semester hours in microbiology. History, prevalence, etiology, sources and modes of infection, laboratory diagnosis, and methods of control of the principal human diseases.
334. **Bacteriology of Foods and Food Sanitation (3:2:3).** Prerequisite: 3 semester hours in microbiology. Bacteria and molds in their relation to food spoilage and food sanitation.
430. **Advanced General Bacteriology (3:2:3).** Prerequisite: 12 semester hours in the Department of Biology or Chemistry, and MBIO 231 or 331; prerequisite or parallel: 6 semester hours in chemistry. Advanced and detailed 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 microbiology. Selected problems in the various fields of microbiology, according to the needs or interests of the student. May be repeated or taken parallel for full credit in another field or with new materials in the same field.
432. **Immunology and Serology (3:2:3).** Prerequisite: 6 semester hours of microbiology; 10 semester hours of chemistry. Theories of infection and resistance, the production and demonstration of antibodies, the action of antigens, and diagnostic tests.
433. **Physiology of Bacteria (3:2:3).** Prerequisite: 6 semester hours of microbiology; 12 semester hours of chemistry. Chemistry and physiology of bacteria and related microorganisms.
434. **Pathogenic Bacteriology (3:2:3).** Prerequisite: MBIO 430 or 333. Principles of diagnostic microbiology. Laboratory procedures in the isolation and identification of etiological agents.
435. **Taxonomic and Determinative Bacteriology (3:2:3).** Prerequisite: MBIO 430 or consent of instructor. Identification, classification, and nomenclature of bacteria.

**FOR GRADUATES**

521. **Instrumental Methods of Microbiology (2:0:6).** Prerequisite: Consent of the instructor. Application of instrumental methods to the analysis of physiological phenomena at the cell and cell-free level.
531. **Research in Microbiology (3:0:9).** Prerequisite: MBIO 331, 430, 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: MBIO 331, 430, and consent of instructor. Study of advanced concepts of microbiology. May be taken more than once for credit.
533. **General Virology (3:2:3).** Prerequisite: Consent of the instructor. An introduction to the biology of animal, bacterial, and plant viruses.
534. **Microbial Genetics (3:2:3).** Prerequisite: Consent of instructor. Current biochemical, physiological, and physio-chemical ideas and techniques of molecular genetics applied to microorganisms.
535. **Microbial Ecology (3:2:3).** Prerequisite: BIOL 333 and MBIO 430. The function of microorganisms in natural habitats. The role of microorganisms in nutrient cycling, energy flow, and the food webs of ecosystems.
536. **Immunochimistry (3:2:3).** Prerequisite: Consent of instructor.
631. **Master's Thesis (3).** Enrollment required at least twice.

**Courses in Zoology.****FOR UNDERGRADUATES**

241. **Comparative Vertebrate Anatomy (4:3:3).** Prerequisite: BIOL 141, 142. Structure and evolution of the vertebrates. Laboratory study of the anatomy of representative vertebrate types.
243. **Human Anatomy and Physiology (4:3:3).** Prerequisite or parallel: 6 semester hours of chemistry recommended. Structure and function of cells and body systems. Open to students in home economics, medical technology, microbiology, physical education, prenursing, and to students in the biology teaching field.
331. **Animal Histology (3:2:4).** Prerequisite: ZOOL 241. The study of normal animal tissues.
332. **Comparative Vertebrate Embryology (3:2:4).** Prerequisite: ZOOL 241. The embryological development of different vertebrates, with emphasis on the chick and the pig.
333. **Parasitology (3:2:3).** Prerequisite: ZOOL 336. Internal and external parasites, with emphasis on the helminths. Life histories and host relationships.
336. **Comparative Invertebrate Zoology (3:2:3).** Prerequisite: BIOL 141, 142, or consent of the instructor. Structure, life history, and evolution of the invertebrates. Occasional field trips.
337. **General Ornithology (3:2:3).** Prerequisite: BIOL 141, 142, and junior standing. Emphasis on laboratory and field work in systematics ecology and anatomy of birds. Local and overnight field trips.
431. **Undergraduate Research in Zoology (3:0:9).** Prerequisite: Junior or senior standing in zoology; 15 semester hours of biology. Selected research problems according to the needs and interests of the students. May be repeated or taken parallel for credit in another field or with new materials in the same field.
435. **Cytology (3:2:3).** Prerequisite: BIOL 331 or ZOOL 331 or 332, or junior standing in botany. The cell in evolution and heredity.
437. **Natural History of the Vertebrates (3:2:3).** Prerequisite: BIOL 141, 142, or consent of the instructor. Habits, life history, and ecology of vertebrates. Local fauna will be studied. Local and overnight field trips.
438. **Cellular Physiology (3:2:3).** Prerequisite: 6 semester hours of chemistry and 6 semester hours of biology; or consent of instructor. The basic physiological phenomena common to cells of all living organisms.
439. **Comparative Animal Physiology (3:2:3).** Prerequisite: ZOOL 241; 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.

## FOR GRADUATES

521. **Selected Topics in Invertebrate Physiology (2:2:0).** Prerequisite: ZOOL 438 or 439; CHEM 335 or 342; consent of instructor. Advanced concepts in invertebrate physiology. May be repeated for credit.
531. **Problems in Zoology (3:0:9).** May be repeated for full credit in another field or with new materials in the same field.
532. **Principles and Methods of Systematic Zoology (3:2:3).** Prerequisite: Consent of instructor. Procedures useful in taxonomic and ecological studies of natural populations.
533. **Herpetology (3:2:3).** Prerequisite: Consent of the instructor. The course will be concerned with the biology of amphibians and reptiles. Stress will be placed on classification, evolution, ecology, and anatomy of the various groups.
534. **Advanced Invertebrate Zoology (3:2:3).** Prerequisite: Consent of the instructor. Emphasis upon selected major groups, particularly terrestrial forms. Written reports on special projects required.
535. **Field Zoology (3:3:0).** Readings, reports, and field work on assigned problems. May 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 241, 437, or consent of the instructor. Classification, distribution, life history, evolution, and the identification of mammals. Field work will be stressed.
537. **Physiological Ecology of the Vertebrates (3:3:0).** Prerequisite: Consent of the instructor. A study of the physiological adaptations of organisms, particularly vertebrates, to their environments.
538. **The Arachnids (3:2:3).** Prerequisite: Consent of the instructor. Emphasis on systematics, morphology, distribution, ecology, and behavior. Field trips required.
5311. **Biology of the Acarina (3:2:3).** Prerequisite: Consent of the instructor. Morphology, ecology, cytology, and behavior of mites.
5313. **Advanced Ornithology (3:2:3).** Prerequisite: Consent of instructor. Selected topics including avian systematics, migration, physiology, ecology, and comparative behavior.
5314. **Zoogeography (3:3:0).** Prerequisite: ZOOL 533 and 536 recommended. Study of the geographical distribution of vertebrate animals with special reference to North America. Faunal regions, barriers, dispersal, and the relationship of distribution to the origin of species and intraspecific groups.
5317. **Experimental Embryology (3:2:3).** Prerequisite: ZOOL 332; consent of the instructor. A survey of experimental work concerning mechanisms of development.
5318. **Comparative Endocrinology (3:2:3).** Prerequisite: ZOOL 241, 331, 438, and consent of the instructor. Hormones as chemical coordinators of bodily functions, integrated control of growth.
5319. **Ichthyology (3:2:3).** Prerequisite: Consent of instructor. The classification, evolution, distribution, and ecology of fish.
5320. **Advanced Vertebrate Anatomy (3:2:3).** Prerequisite: ZOOL 241 or consent of instructor. Topics in functional and comparative vertebrate anatomy, with special emphasis on evolution and adaptation. Interrelationships between locomotion and the central nervous system will be stressed.
5337. **Vertebrate Zoology for Advanced Students (3:2:3).** Prerequisite: BIOL 142; ZOOL 241 or a course in chordate anatomy. Modern concepts of field and laboratory vertebrate biology. Field work required. Open to graduate students who have not taken ZOOL 437 or equivalent.
5338. **Physiology of Animal Cells (3:2:3).** Prerequisite: 8 semester hours in biology; 8 semester hours in chemistry; a course in organic chemistry recommended. Basic physiological mechanisms common to all animal cells and the modification of these mechanisms in selected cell types. Offered for graduate students who have had no training in cell physiology.
5339. **Comparative Physiology for Advanced Students (3:2:3).** Prerequisite: 8 semester hours of chemistry; ZOOL 241, 336; CHEM 335, 336, recommended. Comparative study of the functions of organ systems and how these systems interact. Open to graduate students who have had no training in comparative physiology.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
731. **Research (3).** Prerequisite: Admission to doctoral study and consent of the instructor. May be repeated for credit. Research in areas of current interest.
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Chemistry

This department supervises the following degree programs: *CHEMISTRY, Bachelor of Arts or Bachelor of Science, Master of Science, and Doctor of Philosophy.*

The undergraduate student may take courses leading to a Bachelor of Arts or a Bachelor of Science degree. The program leading to a Bachelor of Arts degree offers the greater flexibility in curriculum; a specific curriculum for the Bachelor of Science degree is set forth in the accompanying table. It is highly desirable that the student's accomplishments 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 two-semester course.

**Advanced Standing.** The Chemistry Department will permit a student to receive credit in any course in the curriculum if he can demonstrate his proficiency in that area by examination. It will be the responsibility of the student to petition the department chairman for such examination(s) well before



he would normally enroll in such course. Forms for this purpose can be procured from the department chairman's office and should be completed and returned to his office prior to August 15 or January 6 of each year.

**Teacher Education.** Students seeking a provisional certificate with chemistry as a teaching field may satisfy the requirement in chemistry through any one of five 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. or B.S. 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 out of a total of 24-26 semester hours are provided:

CHEM 141, 142 (or equivalent), 251, 341,\* and 347, 348

or

CHEM 141, 142 (or equivalent), 251, 343,\* and 335, 336, 325, 326.

In both sequences, calculus and 8 hours of physics are prerequisite to the physical chemistry courses. Additional requirements for teaching certificates will be found in the Teacher Education section of this catalog.

### Chemistry Curriculum, B.S. Degree.

#### FIRST YEAR

Fall		Spring	
CHEM 143, Chem. I	4	CHEM 144, Chem. II	4
*MATH 151, Anal. Geom. & Calc. I	5	*MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet. or		ENG 132, Coll. Rhet. or	
ENG 133, Adv. Comp.	3	ENG 134, Adv. Comp.	3
**Science elective	4	**Science elective	4
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	17		17

#### SECOND YEAR

Fall		Spring	
CHEM 335, Org. Chem., Lec.	3	CHEM 336, Org. Chem., Lec.	3
CHEM 325, Org. Chem., Lab.	2	CHEM 326, Org. Chem., Lab.	2
*Free elective or		ENG 233, Tech. Writing	3
MATH 235, Anal. Geom. & Calc. III	3	GERM 142, Beg. German	4
GERM 141, Beg. German	4	PHYS 241, Prin. of Phys. II	4
PHYS 143, Prin. of Phys. I	4	P.E., Band, or Basic ROTC	1
P.E., Band, or Basic ROTC	1		
	17		17

#### THIRD YEAR

Fall		Spring	
CHEM 251, Anal. Chem.	5	CHEM 348, Phys. Chem.	4
CHEM 347, Phys. Chem.	4	CHEM 432, Instrum. Anal.	3
GERM 233, Scien. Germ.	3	GERM 234, Scien. Germ.	3
***Minor	3	***Minor	3
HIST 231, Hist. of U.S. to 1877	3	Free elective	3
	18	HIST 232, Hist. of U.S. since 1877	3
			19

#### FOURTH YEAR

Fall		Spring	
CHEM 420, Chem. Lit. & Sem.	2	ECO 235, Prin. of Eco.	3
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
CHEM 445, Inorg. Chem.	4	****Senior Chem.	3
***Minor	3	***Minor	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
****Senior Chem.	3		
	18		15

\* Adequate training in algebra and trigonometry is prerequisite for analytic geometry and calculus. If the student is in doubt about which mathematics courses to take in his first year, he must consult with an adviser in the Chemistry Department.

\*\* Science electives are BIOL 141, 142 and GEOL 143, 144. PHYS 143 and 241 are required in this curriculum.

\*\*\* The minor will be chosen in biology, geosciences, mathematics, or physics. If mathematics be chosen, 3 of these hours become optional.

\*\*\*\* Senior chemistry courses to be chosen from the following list: 431, 432; 438; 433, or 434.

\* Note to all majors and minors in this department. The following special purpose courses do not serve as adequate background for graduate majors and minors in chemistry: CHEM 133, 134, 341, 342, and 343.

## Courses in Chemistry.

## FOR UNDERGRADUATES

- 133, 134. **Elementary Chemistry (3:2:3 each)**. Some of the principles and applications of inorganic, organic, and biochemistry. Only for home economics students and applicable to degrees with such majors.
- 141, 142. **General Chemistry (4:3:3 each)**. A general course in chemistry. Available to all students of the College.
- 143, 144. **Chemistry I and II (4:3:3 each)**. Greater detailed description and discussion of basic chemical principles and processes. Required for Chemistry, Chemical Engineering, and other selected majors with proper chemical background.
251. **Analytical Chemistry (5:3:6)**. Prerequisite: Freshman chemistry. Basic course in the theories and techniques of analytical chemical methods. Prerequisite for all higher-numbered courses in analytical chemistry.
- 315, 316. **Organic Chemistry Laboratory (1:0:3 each)**. Prerequisite: Freshman chemistry. Parallel registration in 335, 336 required. Fundamental techniques of organic chemistry. For chemical engineering majors only.
- 325, 326. **Organic Chemistry Laboratory (2:0:6 each)**. Prerequisite: Freshman chemistry. Parallel registration in 335, 336 required. Techniques of preparative organic chemistry. For chemistry and premedical majors and other students.
- 335, 336. **Organic Chemistry (3:3:0 each)**. Prerequisite: Freshman chemistry. Parallel registration in 315, 316 or 325, 326 required. A thorough foundation course in organic chemistry. Prerequisite for all courses in organic chemistry above the junior level.
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: Freshman chemistry, 8 hours of physics, and MATH 151, 152; MATH 235 is recommended. 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)**. Prerequisite: Freshman chemistry, PHYS 143, 241, and MATH 151, 152; MATH 235 is recommended. A thorough foundation course in physical chemistry. Prerequisite for all higher numbered courses in physical and inorganic chemistry.
420. **Chemical Literature (2:2:0)**. Prerequisite: Senior standing. Chemical literature, the methods of using it. The study of and reports on specific literature topics.
431. **Qualitative Organic Analysis (3:1:6)**. Prerequisite: CHEM 335, 336, and 315, 316, or 325, 326. Identification of unknowns and the separation and identification of the components of mixtures of organic substances.
432. **Structure and Mechanisms in Organic Chemistry (3:3:0)**. Prerequisite: CHEM 335, 336, and 315, 316, or 325, 326. Organic chemistry at an advanced level. Emphasis on developments in theoretical organic chemistry.
433. **Molecular Biochemistry I (3:3:0)**. Prerequisite: CHEM 335, 336; 315, 316 or 325, 326; 347 and 348. Molecular descriptions of biological materials and systems.
434. **Molecular Biochemistry II (3:1:6)**. Prerequisite: CHEM 433. Laboratory in biochemistry including procedures and lectures on physico-chemical methodology.
- 436, 437. **Biological Chemistry I and II (3:2:3 each)**. Prerequisite: CHEM 251, 335, 336, 315, 316 or 325, 326. Chemistry of constituents of living systems. Regulation of processes of living organisms.
438. **Valency and Molecular Structure (3:3:0)**. Prerequisite: CHEM 347, 348. An introduction to the current theories of atomic and molecular structure and the nature of chemical bonding.
445. **Inorganic Chemistry (4:3:3)**. Prerequisite: CHEM 347, 348. A survey of modern topics in organic chemistry, including coordination compounds, non-aqueous solvents, and the chemistry of the transition elements.
4312. **Instrumental Analytical Methods (3:2:3)**. Prerequisite: CHEM 251, 347, 348. Theories and applications of instrumental methods of chemical analysis.

## FOR GRADUATES

- 511, 512. **Seminar (1:1:0 each)**. Prerequisite: Graduate standing in chemistry. Required of all entering graduate students majoring in chemistry.
- 531, 532. **Research (3 each)**. May be repeated for additional credit.
5221. **Laboratory Techniques in Modern Organic Chemistry I (2:0:6)**. Prerequisite: Graduate standing; parallel registration in CHEM 5323 required. Synthetic and analytical techniques of organic chemistry.
5222. **Laboratory Techniques in Modern Organic Chemistry II (2:0:6)**. Prerequisite: CHEM 5321, 5323; parallel registration in CHEM 5324 required. A continuation of synthetic and analytical techniques of organic chemistry.
5301. **Advanced Inorganic Chemistry I (3:3:0)**. Prerequisite: CHEM 445. 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.
5303. **Modern Inorganic Chemistry (3:3:0)**. Prerequisite: CHEM 347, 348 or 5340, 5341, and graduate standing. Advanced survey of modern topics in inorganic chemistry, including atomic and molecular structures, chemical bonding, coordination chemistry, non-aqueous solvents, descriptive chemistry of the elements. May not be taken for credit by chemistry majors.
5304. **Topics in Inorganic Chemistry (3:3:0)**. Prerequisite: Consent of instructor. Special areas of inorganic chemistry not commonly included in other courses. May be repeated for additional credit.
5312. **Modern Techniques of Chemical Analysis (3:2:3)**. Prerequisite: CHEM 251 and graduate standing. Measurement of physical properties related to chemical structure and reaction with emphasis on the newer, rapidly developing techniques.
5314. **Advanced Analytical Chemistry (3)**. Prerequisite: CHEM 251, 347, 348. General principles and special methods of analytical chemistry.
5315. **Spectrographic Analysis I. Emission Spectra (3:2:3)**. Prerequisite: Consent of instructor. PHYS 331 is recommended. Qualitative and quantitative analysis using emission spectra.

5316. **Spectrographic Analysis II. Absorption Spectra** (3:2:3). Identification of compounds and analysis of mixtures by means of their absorption spectra.
5317. **Selected Topics in Analytical Chemistry** (3:3:0). Prerequisite: Consent of instructor. May be repeated for additional credit.
5321. **Advanced Organic Chemistry I** (3:3:0). Prerequisite: CHEM 335, 336, 325 or 315, 326 or 316. 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.
5323. **Modern Principles of Organic Chemistry I** (3:3:0). Prerequisite: Graduate standing; parallel registration in CHEM 5221 required. A survey of modern organic chemistry with emphasis on reactions and contemporary theory. Primarily intended for graduate minors in chemistry; may not be included in the degree program of a graduate student majoring in chemistry.
5324. **Modern Principles of Organic Chemistry II** (3:3:0). Prerequisite: CHEM 5323 and parallel registration in CHEM 5222 required. A continuation of CHEM 5323. Primarily intended for graduate minors in chemistry; may not be included in the degree program of a graduate student majoring in chemistry. Will serve as the prerequisite for other graduate courses in organic chemistry.
5325. **Topics in Organic Chemistry** (3:3:0). Prerequisite: CHEM 5321. May be repeated for additional credit.
5327. **Physical Organic Chemistry I** (3:3:0). Prerequisite: CHEM 5321. Properties and reactions of organic compounds and the mechanisms of organic reactions considered from the standpoint of the principles of physical chemistry.
5328. **Physical Organic Chemistry II** (3:3:0). Prerequisite: CHEM 5327. A continuation of CHEM 5327.
5330. **Biochemistry I** (3:2:3). Prerequisite: CHEM 341 or 325, 326, 335, 336 or the equivalent. Properties of biological compounds. Chemical processes in living systems. For advanced study by graduate students with majors outside the department.
5331. **Biochemistry II** (3:2:3). Prerequisite: CHEM 5330. Properties of biological compounds. Chemical processes in living systems. For advanced study by graduate students with majors outside the department.
5334. **Topics in Biological Chemistry** (3:3:0). May be repeated for additional credit.
5335. **Physical Biochemistry** (3:3:0). Prerequisite: CHEM 347, 348, 433, or the equivalents. Classical and statistical thermodynamics of biological systems, biological information theory, structures of biopolymers, chemical kinetics of enzyme reactions, and relaxation kinetics for fast reactions.
5336. **Biomedical Mechanisms** (3:3:0). Prerequisite: CHEM 433 and 434. Mechanisms of biochemical reactions, particularly electron transfer processes. Quantum mechanical description of biological energy conversion.
5337. **Enzymes** (3:3:0). Prerequisite: CHEM 436 and 437 or CHEM 433 and 434. Structure, mode of action, and kinetics of enzymes.
5338. **Biomedical Methods** (3:1:6). Prerequisite: CHEM 436 and 437 or CHEM 433 and 434. Techniques used in biochemical research. Includes purification of an enzyme and use of radioactive isotopes.
5340. **Physical Chemistry Principles I** (3:3:0). Prerequisite: CHEM 141, 142, PHYS 143, 241, MATH 151, 152 or their equivalents and graduate standing. A foundation course, for the graduate student minoring in physical chemistry, covering a wide range of principles. Prerequisite for other courses in physical and inorganic chemistry. May not be included in degree programs of students majoring in chemistry.
5341. **Physical Chemistry Principles II** (3:3:0). Prerequisite: CHEM 5340. A foundation course, for the graduate student minoring in physical chemistry, covering a wide range of principles. Prerequisite for other graduate courses in physical and inorganic chemistry. May not be included in degree programs of students majoring in chemistry.
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 problem of chemical structure and reactivity.
5344. **Kinetics of Chemical Reactions** (3:3:0). Prerequisite: CHEM 347, 348. Kinetics and mechanisms of chemical reactions in homogeneous and heterogeneous systems.
5345. **X-Rays and Crystal Structure** (3:3:0). Prerequisite: CHEM 347, 348. The determination of crystal structure, chemical properties, and physical properties by X-ray methods.
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-equilibrium conditions.
5347. **Chemical Thermodynamics** (3:3:0). Prerequisite: CHEM 347, 348. Equilibrium thermodynamics in chemical systems influenced by various physical variables, with an introduction to irreversible thermodynamics.
5348. **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 Classical and Romance Languages

This department supervises the *Bachelor of Arts* degree programs in FRENCH, LATIN, and SPANISH, and the *Master of Arts* programs in FRENCH and SPANISH. The department also participates in the BILINGUAL SECRETARIAL and LATIN AMERICAN AREA STUDIES programs leading to the *Bachelor of Arts* degrees.

An undergraduate major in French, Latin, or Spanish consists of 30 hours at the 200 level and above. French majors are required to complete the following courses as part of the major program: 330, 331, 332, 430, 4321, and 6 hours of 400-level literature courses. Spanish majors must take 436, 4316, 4317, and

either 4326 or 4327; those Spanish majors in the bilingual secretarial program are required to complete 438 in addition.

A minor may be obtained in French, Greek, Italian, Latin, Portuguese, or Spanish. Normally, a minimum of 18 hours in one language is required, including at least 3 hours at the 400 level; however, students who present three or four units of a single foreign language from high school may enter courses in the 300 series in the same language and complete a 12-hour minor by offering 6 of 300 courses and 6 of 400 courses. This 12-hour minor also fulfills the foreign language requirement for the Bachelor of Arts degree.

Students who wish to major or minor in one of these languages should consult the chairman of the department. 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 is required.

Courses numbered 131 or 141 suppose no previous study in the language. 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 330 or 331 course.

To fulfill the general Bachelor of Arts requirement for any major, students must complete 12-14 semester hours in the same language. Courses at the 100 level may not be used to satisfy this requirement if a student has studied the language offered for two or more years in high school. 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.

The maximum number of hours a student may count toward the Bachelor of Arts degree in one language area is 51 except that students who complete a secondary school teaching certificate in two languages in the same area may take a total of 57 hours. The three language areas recognized are Classical languages (Latin and Greek), Romance languages (French, Italian, Portuguese, and Spanish), and Germanic and Slavonic languages (German and Russian). Courses in Classics, Linguistics, Arabic, and Chinese are not to be counted within these totals.

**Teacher Education.** For purposes of certification, teaching fields are offered in French, Latin, and Spanish. The minimum standard program requires 24 hours of courses numbered 200 and above which must include 9 hours of 400 courses. Students seeking certification in French or Spanish must complete LING 4311 as part of the teaching field.

**Programs in Linguistics and Comparative Literature.** This department cooperates in the interdepartmental programs in linguistics and comparative literature at the graduate level. See section entitled Special and Interdepartmental Programs on page 73.

## Courses in Arabic.

### FOR UNDERGRADUATES

- 131, 132. A Beginning Course in Arabic (3:3:0 each).  
231, 232. A Second Course in Arabic (3:3:0 each). Prerequisite: ARAB 131 and 132, or the equivalent. Reading, cultural background, conversation, and composition.

## Courses in Classics.\*

### FOR UNDERGRADUATES

131. Latin and Greek Terminology (3:3:0). Analysis of English words by study of Latin and Greek roots, prefixes, and suffixes.  
331. Greek Classics in Translation (3:3:0). Epic, tragedy, comedy, lyric poetry, philosophy, history, oratory, science, and biography in translation.  
332. Latin Classics in Translation (3:3:0). Comedy, epic, lyric and elegiac poetry, satire, tragedy, philosophy, history and invective in translation.  
335. Introduction to Classical Mythology (3:3:0). Classical myths, their significance in the ancient world and influence on modern literature.

## Courses in French.

### FOR UNDERGRADUATES\*\*

- 141, 142. A Beginning Course in French (4:3:2 each).  
231, 232. A Second Course in French (3:3:0 each). Prerequisite: FREN 141 and 142, or two units of high school French. Reading, cultural background, conversation, and composition.

\* Courses in Classics do not require prerequisites in Greek or Latin and may not be counted toward the foreign language requirement.

\*\* FREN 331 and 332, or the equivalent, are prerequisites for all courses in the 400 series. All of these courses are conducted in French.

330. **French Conversation (3:3:0).** Prerequisite: FREN 231 and 232, or the equivalent. Designed to increase vocabulary and attain oral fluency. May be taken concurrently with 331 or 332. Required of French majors.
- 331, 332. **French Life and Literature (3:3:0 each).** Prerequisite: FREN 231 and 232, or the equivalent. A survey of French literature; conversation, composition, and grammar review. Required of French majors.
430. **Advanced Grammar and Composition (3:3:0).** Review of important grammatical constructions and idioms, with written practice. Required of French majors.
431. **Advanced French Conversation (3:3:0).** Designed to increase fluency in the spoken language.
432. **A Survey of French Literature I (3:3:0).** A survey of the major French literary works from the Song of Roland to 1800.
433. **The Novel of the Nineteenth Century I (3:3:0).** The novel from the Romantic to the Naturalistic Movement.
434. **The Novel of the Nineteenth Century II (3:3:0).** The novel from Naturalism to 1914.
435. **The Literature of the Sixteenth Century (3:3:0).** Readings in sixteenth century French literature. May be repeated for credit with consent of instructor.
436. **French Poetry (3:3:0).** Designed to cover readings in French poetry as a genre. May be repeated for credit with consent of instructor.
437. **Twentieth Century Novel (3:3:0).** A survey of the novel from Proust to Robbe-Grillet.
438. **Twentieth Century Drama and Poetry (3:3:0).** A survey of poetry from Baudelaire to Char and of drama from Cocteau to Ionesco. May be repeated for credit with consent of instructor.
4311. **The Classical Theater (3:3:0).** A study of the drama from 1636 to 1700.
4312. **Eighteenth Century Literature (3:3:0).** A survey of eighteenth century works including Montesquieu, Diderot, Voltaire, and Rousseau.
4315. **Drama of the Eighteenth and Nineteenth Centuries (3:3:0).** A survey of the major dramatists of this period.
4316. **French Classicism (3:3:0).** A survey of French seventeenth century prose and poetry.
4321. **Phonetics and Diction (3:3:0).** Theory and practice of the principles of pronunciation and intonations. Individual laboratory exercises. Required of French majors.

## FOR GRADUATES

- 531, 532. **Research in French (3 each).** May be repeated for credit.
533. **Studies in Medieval Language and Literature (3:3:0).** Prerequisite: Graduate standing. Reading, linguistic analysis, and philological interpretation of selected Old French texts. May be repeated for credit.
534. **The Romantic Movement in France (3:3:0).** Prerequisite: Graduate standing. A detailed study of French romanticism in all genres: its origins, its creations, and its influences.
5312. **Studies in French Language and Literature I (3:3:0).** Prerequisite: Consent of department chairman. The contents of this course, through concentration on a literary genre, school, or linguistic topic, will vary to meet the needs of the particular group of students. May be repeated for credit.
5313. **Studies in French Language and Literature II (3:3:0).** Prerequisite: Consent of department chairman. The contents of this course, through concentration on a literary genre, school, or linguistic topic, will vary to meet the needs of the particular group of students. May be repeated for credit.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

## Courses in Greek.

## FOR UNDERGRADUATES

- 131, 132. **A Beginning Course in Greek (3:3:0 each).**
- 231, 232. **A Second Course in Greek (3:3:0 each).** Prerequisite: GRK 131 and 132, or the equivalent. Reading, cultural background, conversation, and composition.
430. **Individual Problems in Greek (3).** Prerequisite: GRK 231 and 232, or the equivalent. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Independent reading under guidance of a staff member.

## FOR GRADUATES

- 531, 532. **Research in Greek (3 each).** May be repeated for credit.

## Courses in Italian.

## FOR UNDERGRADUATES

- 131, 132. **A Beginning Course in Italian (3:3:0 each).**
- 231, 232. **A Second Course in Italian (3:3:0 each).** Prerequisite: ITAL 131 and 132, or equivalent. Reading, cultural background, conversation, and composition.
330. **Italian Conversation (3:3:0).** Prerequisite: ITAL 231 and 232, or the equivalent. This course is designed to increase vocabulary and attain fluency in the spoken language.
430. **Individual Problems in Italian (3).** Prerequisite: ITAL 231 and 232, or the equivalent. Contents will vary to meet the needs of the students. May be repeated for credit with the consent of the instructor. Independent work under guidance of a staff member.
435. **Readings in Italian Language and Literature I (3:3:0).** Prerequisite: ITAL 231 and 232, or the equivalent. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor.
436. **Readings in Italian Language and Literature II (3:3:0).** Prerequisite: ITAL 231 and 232, or the equivalent. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Selected Italian writers.

## FOR GRADUATES

- 531, 532. **Research in Italian (3 each).** May be repeated for credit.

## Courses in Latin.

## FOR UNDERGRADUATES\*

- 131, 132. **A Beginning Course in Latin (3:3:0 each).**

\* LAT 331 and 332, or the equivalent, are prerequisites for all courses in the 400 series, but concurrent registration with 431 is permitted.



- 231, 232. **A Second Course in Latin** (3:3:0 each). Prerequisite: LAT 131 and 132, or two units of high school Latin. Review; selected readings from standard authors.
- 331, 332. **Introduction to Latin Life and Literature** (3:3:0 each). Prerequisite: LAT 231 and 232, or three or four units of high school Latin. Reading in Cicero and Vergil.
431. **Advanced Composition and Grammar Review** (3:3:0). Practice in Latin prose composition. Required of Latin majors.
433. **Caesar** (3:3:0). Reading of significant portions of the writings of Julius Caesar together with a study of their meaning and relevance in their setting. Recommended for high school teachers.
434. **Latin Historians** (3:3:0). Reading of significant portions of Sallust, Livy, Tacitus, and Ammianus Marcellinus; a study of ancient historiography.
435. **Readings in Latin Literature I** (3:3:0). 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.
436. **Readings in Latin Literature II** (3:3:0). 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.
437. **Roman Comedy** (3:3:0). Reading of several plays of Plautus and Terence; internal and historical criticism of Roman comedy.
438. **Roman Satire** (3:3:0). Readings of Horace and Juvenal together with both historical and internal criticism.
439. **Latin Lyric Poetry** (3:3:0). Selections from the lyrics of Horace and Catullus and special emphasis on internal criticism.

#### FOR GRADUATES

- 531, 532. **Research in Latin** (3 each). May be repeated for credit.

### Courses in Portuguese.

- 131, 132. **A Beginning Course in Portuguese** (3:3:0 each).
- 231, 232. **A Second Course in Portuguese** (3:3:0 each). Prerequisite: PORT 131 and 132, or the equivalent. Reading, cultural background, conversation, and composition.
430. **Individual Problems in Portuguese** (3). Prerequisite: PORT 231 and 232, or the equivalent. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Independent work under guidance of a staff member.
- 435, 436. **Readings in Portuguese and Brazilian Language and Literature I, II** (3:3:0 each). Prerequisite: PORT 231 and 232, 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 Portuguese and Brazilian writers. Conducted in Portuguese.

#### FOR GRADUATES

- 531, 532. **Research in Portuguese** (3 each). May be repeated for credit.

### Courses in Spanish

#### FOR UNDERGRADUATES\*

- 141, 142. **A Beginning Course in Spanish** (4:3:2 each).
- 231, 232. **A Second Course in Spanish** (3:3:0 each). Prerequisite: SPAN 141 and 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). Prerequisite: SPAN 231 and 232, or the equivalent. History, geography, literary masterpieces, and customs of Spain and Spanish America. Grammar review, composition, and conversation based on readings. Conducted in Spanish.
431. **Nineteenth Century Prose** (3:3:0). The novel and the essay of the periods of Romanticism and of Realism.
432. **Nineteenth Century Prose** (3:3:0). The novel and the short story from the Naturalistic Movement to and including the Generation of 1898.
433. **Modern Drama and Poetry** (3:3:0). The romantic and social drama, some of the poetry of Garcia Gutierrez, Duque de Rivas, and Zorrilla.
434. **Modern Drama and Poetry** (3:3:0). The Realistic Movement in the drama from Benavente to World War I.
436. **Advanced Composition and Conversation** (3:3:0). May be taken concurrently with 331 or 332. Written and oral Spanish. Required of Spanish majors.
438. **Commercial Spanish** (3:3:0). Prerequisite: SPAN 436. Oral and written Spanish with special attention to accurate and idiomatic expressions currently in use in the business and technical fields. Required of majors in the Spanish bilingual secretarial program.
4312. **The Prose of the Golden Age** (3:3:0). The important prose writers from 1499 to 1650.
4313. **The Prose of the Golden Age** (3:3:0). Cervantes and his "Don Quixote."
4314. **The Drama of the Golden Age** (3:3:0). Reading of representative plays of the seventeenth century, including works of Lope de Vega, Tirso de Molina, Guillen de Castro, and Mira de Amescua.
4315. **The Drama of the Golden Age** (3:3:0). Reading of representative plays of the seventeenth century, including works of Ruiz de Alarcón, Calderón, Rojas Zorrilla, and Moreto.
4316. **A Survey of Spanish Literature** (3:3:0). The history of Spanish literature in the Middle Ages and Renaissance. Required of Spanish majors.
4317. **A Survey of Spanish Literature** (3:3:0). The history of Spanish literature from the 18th through the 20th century. Required of Spanish majors.
- 4318, 4319. **Readings in Contemporary Spanish Literature** (3:3:0 each). A survey of the literary scene in Spain from 1898 to the present.
4321. **The Latin American Novel I** (3:3:0). A survey of the novel of Latin America to the end of the nineteenth century.
4322. **The Latin American Novel II** (3:3:0). A survey of the novel of Latin America from the period of the Mexican Revolution to the present.
4323. **The Latin American Short Story** (3:3:0). The rise and development of the Latin American short story from the period of Independence to the present.

\* SPAN 331 and 332, or the equivalent, are prerequisites for all courses in the 400 series. All of these courses are conducted in Spanish.

- 4324, 4325. *Readings in Spanish American Literature and Civilization* (3:3:0 each). The content of these courses will vary to meet the needs of the students. May be repeated for credit with the consent of the instructor.
4326. *Survey of Spanish American Literature* (3:3:0). The history of Spanish American literature from colonial days to the Modernist Movement. Spanish majors must take either 4326 or 4327.
4327. *Survey of Spanish American Literature* (3:3:0). The history of Spanish American literature from the Modernist Movement to the present. Spanish majors must take either 4326 or 4327.
- 4328, 4329. *Spanish Civilization* (3:3:0). Prerequisite: Consent of instructor. A study of the various phases of pre-Hispanic and Spanish civilizations in Mexico: history, arts, language, literature, and customs. Offered in Mexico each summer.

## FOR GRADUATES

- 531, 532. *Research in Spanish* (3 each). May be repeated for credit.
533. *History of the Spanish Language* (3:3:0). Prerequisite: One year of Latin or equivalent. The development of the Spanish language from its earliest forms to the present.
534. *Old Spanish* (3:3:0). The reading and linguistic analysis of early texts.
535. *Metrics* (3:3:0). The structure and development of Spanish prosody.
536. *Stylistics* (3:3:0). Study and practice in the elements of prose style and form.
537. *Bibliography and Methods of Research* (3:3:0). Systematic study of bibliographical materials, methods, and problems in the field of Hispanic research.
- 538, 539. *Summer Language Institute* (3:3:0 each). Prerequisite: Graduate standing. Advanced study of the area, civilization, language, and culture. Offered in Mexico each summer.
5310. *Methods of Literary Criticism* (3:3:0). Theories and practices of literary criticism in Spanish.
- 5312, 5313. *Studies in Spanish and Spanish American Literature* (3:3:0). Prerequisite: Consent of department chairman. The nature and content of these courses will vary to meet the needs of individual students. Credit given as often as course is repeated.
5314. *Medieval Literature* (3:3:0). Spanish literature from its earliest monuments to the end of the Middle Ages.
5315. *Renaissance Literature* (3:3:0). A survey of Spanish Renaissance literature.
5316. *Cervantes* (3:3:0). Prerequisite: Graduate standing. A detailed study of the major and minor works of Miguel de Cervantes Saavedra.
5317. *Seminar in Golden Age Literature* (3:3:0). May be repeated for credit.
5318. *Eighteenth Century Literature* (3:3:0). A history of Spanish literature in the eighteenth century.
5319. *Studies in Modern and Contemporary Spanish Literature* (3:3:0). Prerequisite: Graduate standing. Representative literature of Spain in the modern and contemporary periods. May be repeated for credit.
5320. *Seminar in Modern Spanish Literature* (3:3:0). May be repeated for credit.
5321. *Studies in the Latin American Novel* (3:3:0). Prerequisite: Graduate standing. The rise and development of the novel in Latin America during the nineteenth and twentieth centuries. May be repeated for credit.
5322. *Seminar in Latin American Literature* (3:3:0). May be repeated for credit.
5323. *Modernism* (3:3:0). Prerequisite: Graduate standing. A detailed study of Spanish American Modernism in all genres: its origins, its creations, and its influences.
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 Linguistics.

## FOR UNDERGRADUATES

4311. *Applied Linguistics for Modern Foreign Languages* (3:3:0). Prerequisite: FREN, GERM, or SPAN 331 and 332, and 6 semester hours of education. Instruction in linguistic analysis as related to the teaching of foreign languages. Required of majors and minors seeking teacher certification. May be repeated for credit in a different language.

## FOR GRADUATES

530. *Romance Linguistics* (3:3:0). Prerequisite: Consent of department chairman. Origin and history of the Romance languages; emphasis on the main traits of phonology, morphology, and syntax.
5311. *Linguistic Techniques in Teaching Romance Languages* (3:3:0). Prerequisite: Consent of department chairman. Study of language teaching materials. Linguistic analysis and preparation of drills based on current texts.
5335. *Spanish and English as Second Languages 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 and 332 or the equivalent. The linguistic basis for the teaching of Spanish and English as second languages to elementary school children.

## Department of English

This department supervises the following degree programs in ENGLISH: *Bachelor of Arts, Master of Arts, Doctor of Philosophy.*

Through the sponsorship of the local chapter of Sigma Tau Delta, national English honorary, and the Graduate English Club, awards are presented annually for the best freshman essay, for the highest scholastic average in English of a graduating senior English major, and for the most outstanding master's thesis. In addition, prizes in creative writing are offered, and the winning entries are published in the *Harbinger*, department literary magazine.

English majors should report to the department chairman or the chairman of undergraduate studies in English to be assigned a major professor for

academic advisement. ENG 131, 132, or 133, 134 (see "Special Provisions for Entering Freshmen," below) and 231, 232, are prerequisites 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, 335, 3313, 3314, 433, 434, 4331, 336H, 431H
  - II. English literature after 1700: 338, 339, 3315, 3322, 3327, 4337
  - III. American literature: 3323, 3324, 3325, 3326, 3329, 4341, 4343, 337H, 432H
  - IV. Comparative literature, language, linguistics: 331, 332, 334, 3337, 3338, 438, 439, 4332, 4333, 4336, 4343, 4344, 4345, 4349, 4355
- B. A concentration of two additional courses in one of the four groups listed above.
- C. One additional course selected from the four groups.

English minors must offer 18 hours, including at least 6 hours of advanced work. For electives, students who have completed their degree requirements in English may select any 300- or 400-level course. To receive credit toward graduation, a student who is an English major or minor must receive at least a C on all advanced courses in English.

**Special Provisions for Entering Freshmen.** Six hours of freshman English (131, 132 or 133, 134) are prerequisites for all sophomore courses (231, 232, 233) except under the advanced placement conditions described in the Admissions section of this catalog.

**Teacher Education.** Students seeking a provisional certificate with English as a teaching field may satisfy the requirement in English through either the Bachelor of Arts degree or the Bachelor of Science in Education. The grade of C on all advanced courses is a minimum requirement. Students seeking certification with the degree of Bachelor of Arts will consult with the chairman of undergraduate studies; students seeking certification in English with the Bachelor of Science in Education will consult with the chairman of teacher certification in English.

For the English major seeking the degree of Bachelor of Arts and teacher certification on the secondary level, the program will include seven advanced courses as follows:

- A. At least one course from each of the following:
  - I. English literature before 1700: 330, 333, 335, 3313, 3314, 336H, 433, 434, 4331, 431H
  - II. English literature after 1700: 338, 339, 3315, 3322, 3327, 4337
  - III. Comparative literature, literary criticism, methods: 331, 332, 334, 4332, 4333, 4336, 4343, 4344, 4345, 4349, 4355
  - IV. Language: 3337, 3338, 438, 439
- B. At least two courses from the following: 3323, 3324, 3325, 3326, 3329, 3341, 4341, 4343, 337H, 432H
- C. One additional course from the groups listed under A or B above.

For students seeking the degree of Bachelor of Arts with a major other than English but who wish to be certified to teach English on the secondary level, the program will include six advanced courses as follows:

- A. At least one course from each of the following:
  - I. English literature before 1700: 330, 333, 335, 3313, 3314
  - II. English literature after 1700: 338, 339, 3315, 3322
  - III. Language: 3337, 3338, 438, 439
  - IV. Comparative literature, literary criticism, methods: 331, 332, 4332, 4333, 4336, 4343, 4344, 4345, 4349, 4355
- B. One course from the following: 3323, 3324
- C. One course from the following (a student may elect to take both courses under B above and omit C): 3325, 3326, 3329, 3341, 4341, 4343, 337H, 432H

For the student seeking the degree of Bachelor of Science in Education with certification to teach English on the secondary level, the program will include six advanced courses as follows:

- A. At least one course from each of the following:
  - I. English literature before 1700: 330, 333, 335, 3313, 3314

- II. English literature after 1700: 338, 339, 3315, 3322
- III. Language: 3337, 3338, 438, 439
- IV. Comparative literature, literary criticism, methods: 331, 332, 4332, 4333, 4336, 4343, 4344, 4345, 4349, 4355
- B. One course from the following: 3323, 3324
- C. One course from the following (a student may elect to take both courses under B above and omit C): 3325, 3326, 3329, 3341, 4341, 4343, 337H, 432H

For students seeking the degree of Bachelor of Arts with a major in English and with certification to teach on the elementary level, the program will include the following:

- A. Completion of the requirements for the degree of Bachelor of Arts with a major in English.
- B. Completion of courses and requirements in professional education as described in the section on Teacher Education in this catalog.
- C. Completion of specific courses under Plan I or Plan II (selected from those contained in the program for an English major) as follows:
  - Plan I. English Specialization. One course required from each of the following groups:
    1. 3323, 3324, 3329
    2. 3337, 3338, 438, 439
    3. 4337, 4349
  - Plan II. English Specialization. One course required from each of the following groups:
    1. 335, 3313, 3314
    2. 3323, 3324, 3329
    3. 3337, 3338, 438, 439
    4. 4337, 4349

Students seeking the degree of Bachelor of Science in Education with elementary certification in English may elect either Plan I or Plan II as follows:

- Plan I. English Specialization. One course required from each of the following groups:
  1. 3323, 3324, 3329
  2. 3337, 3338, 438, 439
  3. 4337, 4349
- Plan II. English Specialization. One course required from each of the following groups:
  1. 335, 3313, 3314
  2. 3323, 3324, 3329
  3. 3338, 3337, 438, 439
  4. 4337, 4349

NOTE: Substitutions of English courses in any certification plan described above may be made only with the permission of the Department of English.

**Programs in Linguistics and Comparative Literature.** This department cooperates in the interdepartmental programs in linguistics and comparative literature at the graduate level. See section entitled Special and Interdepartmental Programs on page 73.

**Honors in English.** In cooperation with the Honors Program of the College of Arts and Sciences, the department offers honors courses for students of superior ability. The smaller honors classes emphasize the ethical, intellectual, and aesthetic values of great literature in an effort to stimulate individual creative reading, thinking, and writing. The following courses are offered specifically for honors students.

- 135H. Freshman Honors Composition and Literature (3:3:0). Ideas and essays.
- 136H. Freshman Honors Composition and Literature (3:3:0). Themes and forms.
- 235H. Sophomore Honors Literature (3:3:0). Literary modes and critical approaches.
- 236H. Sophomore Honors Literature (3:3:0). Aesthetic theories and views of the human condition as reflected in literature.
- 336H. Junior Honors Seminar (3:3:0). Studies in English literature.
- 337H. Junior Honors Seminar (3:3:0). Studies in American literature.
- 431H. Senior Honors Seminar (3:3:0). Seminar in English literature. Intensive study of a restricted topic.
- 432H. Senior Honors Seminar (3:3:0). Seminar in American literature.

## Courses in English.

## FOR UNDERGRADUATES

- 131, 132. College Rhetoric (3:3:0 each). Training in correct and effective writing and in efficient, accurate reading.
- 133, 134. Advanced Composition and Literature for Freshmen (3:3:0 each). Designed for those who demonstrate competence in English composition as measured by the College Board Examination.
- 135H. Freshman Honors Composition and Literature (3:3:0). Ideas and essays.
- 136H. Freshman Honors Composition and Literature (3:3:0). Themes and forms.
- 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.
- 235H. Sophomore Honors Literature (3:3:0). Literary modes and critical approaches.
- 236H. Sophomore Honors Literature (3:3:0). Aesthetic theories and views of the human condition as reflected in literature.
330. Early English Literature: "Beowulf" through Malory (3:3:0).
331. Short Story (3:3:0). The short story as a literary form.
332. Introduction to Literary Criticism (3:3:0). Theories and traditions of literary criticism.
333. English Literature of the Seventeenth Century (3:3:0).
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 will in no way duplicate that of the first. May be repeated once for credit with the permission 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).
3313. Renaissance Drama (3:3:0). Drama exclusive of Shakespeare.
3314. Literature of the English Renaissance (3:3:0). Poetry and prose from 1500 to 1603.
3315. Victorian Literature (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.
3326. American Literature of the Twentieth Century (3:3:0).
3327. English Novel to 1832 (3:3:0). Representative works of major English novelists to 1832.
3328. English Novel After 1832 (3:3:0). Representative works of major English novelists after 1832.
3329. Major American Poets (3:3:0). Introduction to American poetic traditions through a study of representative works of major American poets.
3337. Advanced Grammar (3:3:0).
3338. Introduction to Linguistic Science (3:3:0).
3341. Survey of American Folklore (3:3:0).
- 431H, 432H. Senior Honors Seminar (3:3:0 each).
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.
439. Historical-Comparative Linguistics (3:3:0). Prerequisite: Advanced undergraduate standing. Principles of historical linguistics, the comparative method, and language families of the world.
4331. Pre-Shakespearean Drama (3:3:0). From the beginnings of English drama through Marlowe.
4332. History of Literary Criticism (3:3:0).
4333. Philosophical Ideas in Literature (3:3:0). The evolution of philosophical ideas in English and American literature. May be repeated once for credit with permission of department.
4336. Teaching English in Secondary Schools (3:3:0). Prerequisite: Two advanced courses in English.
4337. English Literary History: A Synthesis (3:3:0). A comprehensive view of English literature from the fourteenth through the twentieth centuries.
4338. Exposition for Advanced Students (3:3:0).
4341. Regional Literature of the United States (3:3:0).
4342. Modern European Drama (3:3:0).
4343. Modern American Drama (3:3:0).
4344. Comparative Literature (3:3:0). Comparative themes and motifs in the history of ideas.
4345. Comparative Literature (3:3:0). Comparative studies in types and genres.
4349. Ancient and Medieval Literature (3:3:0).
4355. Modern Continental Literature (3:3:0).

## 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. Beowulf (3:3:0).
538. Studies in Early English Romantics (3:3:0).
539. Studies in the Neo-Classical Age (3:3:0).
5311. Studies in Seventeenth Century Literature (3:3:0).

\* Graduate courses may be repeated for credit with permission of department as topics vary.



5312. Studies in Drama (3:3:0).  
 5313. Studies in Modern European Literature (3:3:0).  
 5314. Studies in Literary Criticism (3:3:0).  
 5315. Studies in Folklore (3:3:0).  
 5318. Studies in Eighteenth Century American Literature (3:3:0).  
 5319. Studies in Shakespeare (3:3:0).  
 5322. Studies in Modern British Literature (3:3:0).  
 5323. Studies in Nineteenth Century American Literature (3:3:0).  
 5324. Studies in Twentieth Century American Literature (3:3:0).  
 5325. American Novel to 1900 (3:3:0).  
 5326. American Novel since 1900 (3:3:0).  
 5327. Studies in the English Novel (3:3:0).  
 5329. Studies in Modern Poetry (3:3:0).  
 5335. Principles of Language (3:3:0).  
 5337. Studies in Linguistics (3:3:0).  
 5338. Linguistic Analysis I: Syntax (3:3:0). Prerequisite: ENG 3338 or 5335.  
 5339. Linguistic Analysis II: Phonology (3:3:0). Prerequisite: ENG 5338 or consent of instructor.  
 5341. Studies in Bibliography (3:3:0).  
 5351. Studies in Later Victorian Literature (3:3:0).  
 5381. Studies in Later English Romanticism (3:3:0).  
 5391. Studies in the Age of Johnson (3:3:0).  
 630. Master's Report (3).  
 731, 732. Research (3 each).  
 831. Doctor's Dissertation (3). Enrollment required at least four times.  
 931. Master's Thesis (3). Enrollment required at least twice.

## Department of Geosciences

This department supervises the following degree programs: *GEOGRAPHY, Bachelor of Arts; GEOLOGY, Bachelor of Arts or Bachelor of Science, Master of Science, Doctor of Philosophy; GEOPHYSICS, Bachelor of Science*. Options for specialization in the undergraduate geology program are as follows: General Geology Option, Paleontology Option, and Ground Water Option.

The program leading to the Bachelor of Arts degree in general geology is designed to provide a broad liberal arts background and basic training in the principles of geology; the programs leading to the degree of Bachelor of Science provide more intensive training in the geosciences and related disciplines.

GEOL 143, 144, 241, 242, 331, 332, 335, 336, 363 and CHEM 141, 142 are required courses in the geology Bachelor of Arts degree program. Specific requirements of the Bachelor of Science degree programs are given in the curriculum tables. A two-year course of study in a foreign language is required in all degree programs.

The Bachelor of Arts degree program in geography requires completion of 30 semester hours of geography; individual programs are developed through conferences with the adviser.

A minor is required in all programs. The minor field for the Bachelor of Arts programs can be selected from a wide range of disciplines; the minor for a Bachelor of Science degree program must be in biology, chemistry, mathematics, or physics.

Grades below C in required courses of either the major or minor of a geoscience degree program are not accepted by the department in fulfillment of the degree requirements. Grades below C are not accepted in fulfillment of a minor in the geosciences.

The department is a participating member of the Organization for Tropical Studies. Information on courses and research opportunities in this multi-discipline program can be obtained by writing to the department.

### Geology Curriculum, B.S. Degree.

FIRST YEAR			
Fall		Spring	
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
GEOL 143, Phys. Geol.	4	GEOL 144, Hist. Geol.	4
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
<hr/>		<hr/>	
17		17	
SECOND YEAR			
Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
PHYS 141, Gen. Phys.	4	PHYS 142, Gen. Phys.	4
GEOL 241, Mineral. & Petro.	4	GEOL 242, Mineral. & Petro.	4
Foreign Language 141	4	Foreign Language 142	4
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
<hr/>		<hr/>	
16-17		16-17	

**SUMMER SESSION**  
(Following Junior Year)

GEOL 363, Field Geology 6

**THIRD YEAR**

Fall		Spring	
GEOL 331, Geomorphology	3	GEOL 332, Struct. Geol.	3
GEOL 335, Paleontology	3	GEOL 336, Paleontology	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Foreign Language 231	3	Foreign Language 232	3
Electives	6	Electives	6
	<hr/> 18		<hr/> 18

**FOURTH YEAR**

Fall		Spring	
GEOL 4314, Stratigraphy	3	GEOL 432, Opt. Mineral. & Petro.	3
GEOL 431, Opt. Mineral. & Petro.	3	GEOL 4315, Stratigraphy	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Electives	6	Electives	6
	<hr/> 15		<hr/> 15

**Geology Major, Paleontology Curriculum, B.S. Degree.**

**FIRST YEAR**

Fall		Spring	
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
GEOL 143, Phys. Geol.	4	GEOL 144, Hist. Geol.	4
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	<hr/> 17		<hr/> 17

**SECOND YEAR**

Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
BIOL 141, Botany	4	BIOL 142, Zoology	4
GEOL 241, Mineral. & Petro.	4	GEOL 242, Mineral. & Petro.	4
Foreign Language 141	4	Elective	3
P.E., Band, or Basic ROTC	1-2	Foreign Language 142	4
	<hr/> 16-17	P.E., Band, or Basic ROTC	1-2
			<hr/> 19-20

**THIRD YEAR**

Fall		Spring	
GEOL 331, Geomorphology	3	GEOL 332, Struct. Geol.	3
GEOL 335, Paleontology	3	GEOL 336, Paleontology	3
BIOL 333, Bio-ecology	3	ZOOL 336, Comp. Invert. Zool.	3
Foreign Language 231	3	Foreign Language 232	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Elective	3	Elective	3
	<hr/> 18		<hr/> 18

**SUMMER SESSION**  
(Following Junior Year)

GEOL 363, Field Geology 6

**FOURTH YEAR**

Fall		Spring	
GEOL 4314, Stratigraphy	3	GEOL 4315, Stratigraphy	3
GEOL 436, Micropaleontology	3	GEOL 435, Strat. Paleo.	3
Biology or Zoology	3	Biology or Zoology	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Elective	3	Elective	3
	<hr/> 15		<hr/> 15

**Geology Major, Ground Water Curriculum, B.S. Degree.**

**FIRST YEAR**

Fall		Spring	
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
GEOL 143, Phys. Geol.	4	GEOL 144, Hist. Geol.	4
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	<hr/> 17		<hr/> 17

## SECOND YEAR

Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
PHYS 141, Gen. Phys.	4	PHYS 142, Gen. Phys.	4
GEOL 241, Mineral. & Petro.	4	GEOL 242, Mineral. & Petro.	4
MATH 235, Anal. Geom. & Calc. III	3	Foreign Language 142	4
Foreign Language 141	4	P.E., Band, or Basic ROTC	1-2
P.E., Band, or Basic ROTC	1-2		16-17

19-20

## THIRD YEAR

Fall		Spring	
GEOL 331, Geomorphology	3	GEOL 332, Struct. Geol.	3
GEOL 335, Paleontology	3	GEOL 336, Paleontology	3
C E 233, Statics	3	C E 3351, Mech. of Fluids	3
MATH 332, Diff. Equat. I	3	GEOL 337, Ground Water	3
Foreign Language 231	3	Foreign Language 232	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3

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SUMMER SESSION  
(Following Junior Year)

GEOL 363, Field Geology 6

## FOURTH YEAR

Fall		Spring	
GEOL 4314, Stratigraphy	3	GEOL 4315, Stratigraphy	3
GEOL 431, Opt. Mineral. & Petro.	3	GEOL 432, Opt. Mineral. & Petro.	3
C E 4355, Ground Water Hydrol.	3	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Electives	6
Elective	3		15

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## Geophysics Curriculum, B.S. Degree.

## FIRST YEAR

Fall		Spring	
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
GEOL 143, Phys. Geol.	4	GEOL 145, Phys. Geosci.	4
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
HIST 231, Hist. of U.S. to 1877	3	PHYS 143, Prin. of Phys.	4
GOVT 231, Amer. Govt., Org.	3	P.E., Band, or Basic ROTC	1
P.E., Band, or Basic ROTC	1		17

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## SECOND YEAR

Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
HIST 232, Hist. of U.S. since 1877	3	GEOL 332, Struct. Geol.	3
Elective	3	Elective	3
MATH 235, Anal. Geom. & Calc. III	3	GOVT 232, Amer. Govt., Funct.	3
PHYS 241, Prin. of Phys.	4	PHYS 242, Prin. of Phys.	4
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2

17-18

## THIRD YEAR

Fall		Spring	
PHYS 335, Elec. & Magnetism	3	PHYS 341, Electronics	4
CHEM 141, Gen. Chem.	4	PHYS 336, Elec. & Magnetism	3
Foreign Language 141	4	CHEM 142, Gen. Chem.	4
Electives	6	Foreign Language 142	4
	17	Elective	3

17

SUMMER SESSION  
(Following Junior Year)

GEOL 363, Field Geology 6

## FOURTH YEAR

Fall		Spring	
MATH 335, Higher Math. for Engrs. & Scis. I	3	MATH 336, Higher Math. for Engrs. & Scis. II	3
PHYS 434, Mechanics	3	PHYS 435, Mechanics	3
Foreign Language 231	3	Foreign Language 232	3
G PH 3321, Geophys. Meth.	3	G PH 3322, Geophys. Meth.	3
G PH 4321, Earth Seis.	3	G PH 4322, Earth's Grav. Field	3
	15	G PH 4323, Appl. of Geophys.	3

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## Courses in Atmospheric Science.

## FOR UNDERGRADUATES

231. Meteorological Instruments and Observations (3:2:3).  
 332. Physical Climatology (3:3:0).  
 333. Atmospheric Physics (3:3:0).  
 341. General Meteorology (4:3:3).

- 421. Undergraduate Seminar (2:2:0).
- 431. Atmospheric Thermodynamics (3:3:0).
- 433. Dynamic Meteorology (3:3:0).
- 441. Synoptic Meteorology (4:3:3).
- 442. Synoptic Laboratory (4:0:12).

FOR GRADUATES

- 530. Advanced Problems in Atmospheric Science (3:3:0). Prerequisite: Graduate standing and consent of instructor. Solution of special problems relating to atmospheric science.
- 5311. Biometeorology (3:3:0). Prerequisite: Graduate standing and consent of instructor. A physical description of atmospheric processes, their interaction with and influence on the biosphere.

Courses in Geochemistry.

FOR GRADUATES

- 531. Geochemistry I (3:3:0).
- 532. Geochemistry II (3:3:0).
- 533. Selected Topics in Geochemistry (3:3:0).
- 534. Advanced Problems in Geochemistry (3:1:6).

Courses in Geography.

FOR UNDERGRADUATES

- 1451. Introduction to Geography (4:3:2).
- 1452. Weather and Climate (4:3:2).
- 2351. Regional Geography of the World (3:3:0).
- 3251. Cartography and Graphics (2:1:3).
- 3337. Economic Geography (3:3:0).
- 3352. Geography of the United States and Canada (3:3:0).
- 3355. Field Methods (3:2:3).
- 4351. Land Use Planning (3:3:0).
- 4352. Urban Geography (3:3:0).
- 4353. Conservation of Natural Resources (3:3:0).
- 4354. Historical Geography of the United States (3:3:0).
- 4355. Geography of Texas (3:3:0).
- 4356. Geography of the American Southwest (3:3:0).
- 4357. Geography of Arid Lands (3:3:0).
- 4358. Geography of the Middle East (3:3:0).
- 4361. Geography of Europe (3:3:0).
- 4362. Geography of the Union of Soviet Socialist Republics (3:3:0).
- 4363. Geography of South America (3:3:0).
- 4364. Geography of Mexico and the Caribbean Lands (3:3:0).
- 4365. Geography of Asia (3:3:0).
- 4366. Geography of Africa (3:3:0).
- 4367. Geography of the Far East (3:3:0).
- 4368. Geography of Australia, New Zealand, and Oceania (3:3:0).
- 4369. Readings in Geography (3:3:0).
- 4370. Seminar in Geographic Thought and Methodology (3:3:0).

FOR GRADUATES

- 531. Seminar in Geographic Thought and Methodology (3:3:0).
- 532. Seminar in Regional Geography (3:3:0).
- 533. Seminar in Historical and Cultural Geography (3:3:0).
- 534. Seminar in Urban and Economic Geography (3:3:0).
- 535. Seminar in the Conservation of Natural Resources (3:3:0).
- 5310. Readings in Geography (3:3:0).

Courses in Geology.

FOR UNDERGRADUATES

- 143. Physical Geology (4:3:2).
- 144. Historical Geology (4:3:2).
- 145. Physical Geoscience (4:3:2).
- 233. General Geology for Engineers (3:2:3).
- 235. Earth Science I—Common Rocks and Minerals (3:2:3). Primarily for persons preparing to teach Earth Science.
- 241. Mineralogy and Petrography I (4:2:6). Prerequisite: CHEM 141, 142.
- 242. Mineralogy and Petrography II (4:2:6). Prerequisite: GEOL 241.
- 331. Geomorphology (3:2:3).
- 332. Structural Geology (3:2:3).
- 333. Earth Science II—Survey of Paleontology (3:2:3). Prerequisite: GEOL 144. Primarily for persons preparing to teach Earth Science.
- 334. Earth Science III—Land Forms and Structures (3:2:3). Prerequisite: GEOL 144. Primarily for persons preparing to teach Earth Science.
- 335, 336. General Paleontology I & II (3:2:3 each). Prerequisite: GEOL 144.
- 337. Ground Water (3:3:0).
- 363. Field Geology (6). Summer sessions only.
- 411. Undergraduate Seminar (1:1:0).
- 431, 432. Optical Mineralogy & Petrology (3:1:6 each). Prerequisite: GEOL 242.
- 433. Petroleum Geology I (3:3:0). Prerequisite: GEOL 332.
- 434. Petroleum Geology II (3:2:3). Prerequisite: GEOL 433.
- 435. Stratigraphic Paleontology (3:2:3).
- 436. Micropaleontology (3:1:6).
- 4313. Lunar and Planetary Science (3:3:0).
- 4314. Principles of Stratigraphy (3:3:0).
- 4315. Paleozoic, Mesozoic, Cenozoic Stratigraphy (3:3:0).
- 4317. Earth Science IV—The Earth's Interior and Atmosphere (3:3:0). Primarily for persons preparing to teach Earth Science.
- 4318. The Geology of Texas (3:3:0).
- 4319. Introductory Economic Geology (3:3:0). Prerequisite: GEOL 144, 235 or 242.

## FOR GRADUATES

- 511. Seminar (1:1:0).
- 521. Clay Mineralogy (2:1:3).
- 531. Advanced Physical Geology (3:3:0).
- 532. Advanced Historical Geology (3:3:0).
- 533. Petrology of Igneous Rocks (3:3:0).
- 534. Petrology of Metamorphic Rocks (3:3:0).
- 535, 536. Advanced Work in Specific Fields (3 each).
- 537. Sedimentation (3:2:3).
- 538. Geology of the Southwest (3:3:0).
- 539. Vertebrate Paleontology (3:2:3).
- 541. X-Ray Diffraction and Analysis (4:3:3).
- 542. X-Ray Crystallography (4:3:3).
- 563. Advanced Field Geology (6).
- 5311. Stratigraphic Micropaleontology (3:2:3).
- 5312. Economic Geology (3:2:3).
- 5313. Application of Geology in Engineering Projects (3:2:3).
- 5316. Aerial Photo Interpretation (3:2:3).
- 5324. Advanced Sedimentation (3:2:3).
- 5327. Problems in Paleontology (3:2:3).
- 5328. Advanced Structural Geology (3:2:3).
- 631. Master's Thesis (3). Enrollment required at least twice.
- 731, 732. Research (3 each). Required of all doctoral candidates.
- 831. Doctor's Dissertation (3). Enrollment required at least four times.

## Courses in Geophysics.

## FOR UNDERGRADUATES

- 321. Geophysical Instruments (2:0:6).
- 3321. Geophysical Methods, Gravity and Magnetism (3:3:0).
- 3322. Geophysical Methods, Seismic and Electrical (3:3:0).
- 4321. Earthquake Seismology (3:2:3).
- 4322. The Earth's Gravity Field (3:3:0).
- 4323. Applications in Geophysics (3:1:6).

## FOR GRADUATES

- 531. Wave Propagation in Layered Media (3:3:0).
- 532. Introduction to the Theory of Elastic Waves (3:3:0).
- 533. Selected Topics in Geophysics (3:3:0).
- 534. Advanced Problems in Geophysics (3:1:6).

## Department of Germanic and Slavonic Languages

This department supervises the *Bachelor of Arts* and *Master of Arts* programs in GERMAN. In addition, the department participates in the BILINGUAL SECRETARIAL program leading to the *Bachelor of Arts* degree.

An undergraduate major in German consists of 30 hours at the 200 level and above. A minor may be obtained in German or Russian. The minimum requirement is 18 hours in one language; this includes at least 3 hours at the 400 level. Students who present three or four units of German from high school may enter the German course numbered 331 and acquire a 12-hour minor by completing 6 hours of 300 courses and 6 hours of 400 courses in German. With this 12-hour minor the foreign language requirement for the Bachelor of Arts degree is also fulfilled.

The maximum number of hours a student may count toward the Bachelor of Arts degree in one language area (German and Russian) is 51, with one exception (see statement under Classical and Romance Languages). Courses in Chinese and Linguistics will not be counted in the total.

Students wishing to major in German, or to minor in German or Russian, should consult the chairman of the department.

Courses numbered 141 have no prerequisite of study of the language. Any student who has had two years (i.e., two units) of German in high school, and who wishes to continue the study of that language, should register for GERM 231. In the case of Russian, he should enroll in the 233 course. Persons who have had three or four years of German in high school, and who wish to continue it, should take GERM 331.

A student is expected to complete 12-14 hours in the same language. Thus if he has studied German or Russian for two or more years in high school, courses at the 100 level may not be used to satisfy this requirement. No student from a German- or Russian-speaking country who graduated from a secondary school in his native land may receive credit for a course in his native language numbered below 400.

**Teacher Education.** For certification purposes, a teaching field is offered in German, with a minimum standard program requiring 24 hours of courses numbered 200 and above. These must include 9 hours of courses on the 400 level and LING 4311.



**Programs in Linguistics and Comparative Literature.** This department cooperates in the interdepartmental programs in linguistics and comparative literature at the graduate level. See section entitled Special and Interdepartmental Programs on page 73.

### Courses in Chinese.

#### FOR UNDERGRADUATES

- 131, 132. **A Beginning Course in Chinese (3:3:1 each).** Oral practice, elementary reading, and grammar.  
 231, 232. **A Second Course in Chinese (3:3:0 each).** Reading, cultural background, conversation, and composition.

### Courses in German.

#### FOR UNDERGRADUATES

- 141, 142. **A Beginning Course in German (4:3:2 each).** Oral practice, elementary reading, and grammar.  
 231, 232. **A Second Course in German (3:3:0 each).** Prerequisite: GERM 141, 142, or two units of high school German. Reading, cultural background, conversation, composition. GERM 231, 232 and 233, 234 may not both be counted toward a degree.  
 233, 234. **Scientific German (3:3:0 each).** Prerequisite: GERM 141, 142, or two units of high school German. Reading of specially prepared scientific texts with grammar review. For premedical and science students. GERM 231, 232 and 233, 234 may not both be counted toward a degree.  
 331, 332. **German Life and Literature (3:3:0 each).** Prerequisite: GERM 231, 232 or 233, 234, or equivalent. Representative short stories, novels, dramas, and lyrics. Composition and conversation based on readings. Conducted in German.  
 431. **Advanced Grammar, Composition, and Conversation (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent, or concurrent with 331 or 332. Review of grammatical constructions and phonetic structure. Practice in pronunciation, composition, and conversation. Required of German majors. Conducted in German.  
 433. **Nineteenth Century Drama (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent. Readings in drama from Romanticism to Naturalism, beginning with Tieck and including Hauptmann. Conducted in German.  
 434. **Nineteenth Century Prose and Poetry (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent. Readings in narrative prose and lyric poetry from Romanticism through Realism to Impressionism. Conducted in German.  
 435, 436. **Readings in German Language and Literature I, II (3:3:0 each).** Prerequisite: GERM 331 and 332, or equivalent. Readings in a field of language or literature: Classical Period, Romanticism, Contemporary Period, development of the language. May be repeated for credit with consent of instructor. Conducted in German.  
 437. **The Contemporary German Play (3:3:0).** Prerequisite: GERM 331 or equivalent and consent of instructor. Intensive analysis of several plays, with emphasis on problems of staging; one public performance; special stress on German pronunciation and conversational expression. May be repeated for credit with change in content.  
 4311. **Eighteenth Century Literature (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent. Extensive reading in eighteenth century literature from Rationalism through Classicism, emphasizing Lessing, Goethe, and Schiller. Conducted in German.  
 4312. **Goethe (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent. Intensive study of certain works of Goethe, especially his masterpiece, *Faust*. Conducted in German.  
 4315. **A Survey of German Literature I (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent. History of German literature from its beginnings through the Classical Age, with representative readings. Conducted in German.  
 4316. **A Survey of German Literature II (3:3:0).** Prerequisite: GERM 331 and 332, or equivalent. History of German literature (including that of Austria and German-Switzerland) from Romanticism to the present, with representative readings. Conducted in German.

#### FOR GRADUATES

- 531, 532. **Research in German (3 each).** Prerequisite: B.A. or equivalent in German or 12 hours of advanced work in German. Graduate standing. May be repeated for credit.  
 5312, 5313. **Studies in German Language and Literature I, II (3:3:0 each).** Prerequisite: Consent of department chairman. The contents of this course, through concentration on a literary genre, school, or linguistic topic, will vary to meet the needs of the particular group of students. May be repeated for credit.  
 5316. **Middle High German (3:3:0).** Prerequisite: Graduate standing. A study of the language and literature of Germany from about 1100 to 1500.  
 5317. **The German Novelle (3:3:0).** Prerequisite: Graduate standing. A detailed study of the German Novelle from its origins to the early 1900's, with special emphasis on its development in the nineteenth century.  
 5318. **Old Icelandic (3:3:0).** Prerequisite: Graduate standing. A study of language and prose of medieval Iceland. A survey of the written remains of Continental Scandinavia will be made.  
 5321, 5322. **Seminar in Modern German Literature I, II (3:3:0 each).** Prerequisite: Graduate standing. Study of various genres of twentieth-century modern German literature, with special emphasis on its philosophical and psychological impact on the present. Conducted entirely in German. May be repeated for credit.  
 630. **Master's Report (3).**  
 631. **Master's Thesis (3).** Enrollment required at least twice.

### Courses in Russian.

#### FOR UNDERGRADUATES

- 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: RUSN 141, 142, or two units of high school Russian. Continued study of grammar, oral practice, composition, and reading.

- 331, 332. *Slavic Literature in English Translation* (3:3:0 each). Prerequisite: Consent of instructor. Special attention will be paid to outstanding works of Pushkin (Russian), Sevcenko (Ukrainian), Mickiewicz (Polish), Karel Capek (Czech), and Ivo Andric (Serbo-Croatian).
430. *Individual Studies in Slavistics* (3). Prerequisite: RUSN 234, or equivalent. Contents will vary to meet needs of students. May be repeated for credit with consent of instructor. Independent study in Slavistics under individual guidance of a staff member.

## FOR GRADUATES

- 531, 532. *Research in Russian* (3 each). Prerequisite: Graduate standing. Intensive study of an author or his major works, or of a literary period or movement. Research paper required. May be repeated for credit.

**Courses in Linguistics.**

## FOR UNDERGRADUATES

432. *Structure of the German Language* (3:3:0). Prerequisite: GERM 331 and 332, or equivalent. Phonology, morphology, and syntax of the present standard language.
431. *Applied Linguistics for Modern Foreign Languages* (3:3:0). Prerequisite: FREN, GERM, or SPAN 331 and 332, 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. May be repeated for credit in a different language.

**Department of Government**

This department supervises the following degree programs: *GOVERNMENT, Bachelor of Arts, Master of Arts, Doctor of Philosophy*. The department also participates in the *LATIN AMERICAN AREA STUDIES* program leading to the *Bachelor of Arts* degree.

The requirement for a minor in government is 18 semester hours, including the required courses, GOVT 231 and 232. The requirement for a major is 30 semester hours, including GOVT 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, Far Eastern, Middle Eastern, and African)  
 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)

The Department of Government serves in an advisory capacity for prelaw 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.

The Department of Government offers a special program at 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.

**Teacher Education.** The Department of Government participates in the teacher education program of the University. 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 GOVT 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 GOVT 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.

Students preparing to teach in the elementary schools may offer government as an area of academic specialization. There are two plans of aca-

demical specialization open to the prospective elementary school teacher. Under one of these plans the student must complete 18 hours of government, including GOVT 231 and 232, and courses in the fields of American government and politics, international relations, and comparative government. Under the second plan, the student must complete 24 hours in government, including GOVT 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 Chairman of the Department of Government.

A student must maintain at least an average of C in government courses which apply to major, minor, and teaching field requirements in this department.

### Courses in Government.

#### FOR UNDERGRADUATES

231. American Government, Organization (3:3:0).
232. American Government, Functions (3:3:0). GOVT 231 and 232 or the equivalent thereof are required of all candidates for a degree and are prerequisites to all advanced courses.
3310. The Scope and Methods of Political Science (3:3:0).
3321. The Political Process (3:3:0).
3331. Great Political Thinkers (3:3:0).
3341. The Administrative Process (3:3:0).
3351. The Judicial Process (3:3:0).
3361. International Politics (3:3:0).
3371. Comparative Government (3:3:0).
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).
4326. Intergovernmental Relations (3:3:0).
4327. The American Presidency (3:3:0).
4331. Ancient and Medieval Political Theory (3:3:0).
4332. Modern Political Theory (3:3:0).
4333. Contemporary Political Theory (3:3:0).
4334. American Political Theory (3:3:0).
4341. Fiscal Administration (3:3:0).
4342. Personnel Administration (3:3:0).
4343. Local Administration (3:3:0).
4344. The Government of Metropolitan Areas (3:3:0).
4345. Administrative Organization and Management (3:3:0).
4346. Policy and Administration (3:3:0).
4351. Constitutional Law-Powers (3:3:0).
4352. Constitutional Law-Limitations (3:3:0).
4353. Administrative Law and Regulations (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).
4365. Problems in National Security (3:3:0).
4366. International Relations of the Latin American Republics (3:3:0).
4367. International Politics II (3:3:0).
4370. Politics of the Developing Areas (3:3:0).
4371. Political Systems of Brazil, Argentina, and Chile (3:3:0).
4372. Government of the Union of Soviet Socialist Republics (3:3:0).
4373. Governments of Western Europe (3:3:0).
4374. Governments of Mexico and the Caribbean (3:3:0).
4375. South American Governments (3:3:0).
4376. Major Governments of Asia (3:3:0).
4377. African Governments and Politics (3:3:0).
4378. Middle Eastern Governments and Politics (3:3:0).
4379. British Government (3:3:0).
4381. Teaching Social Science 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 and Politics (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 and Institutions (3:3:0).
538. Seminar in Parties and Politics (3:3:0).
539. Seminar in National Security Affairs (3:3:0).
5320. Scope and Methods of Political Science (3:3:0).
5321. Advanced American Government and Politics (3:3:0).
5331. Advanced Political Theory (3:3:0).
5332. Survey Research (3:3:0). The use of survey research in political science. Questionnaire and sample design, execution of field work, coding, and analysis of data.
5333. Empirical Theory Building (3:3:0). An advanced course designed to assist the advanced graduate student in unifying theory and empirical research at the practical level.
5334. Causal Modelling (3:3:0). Research design and measurement in political science with special emphasis on multivariate procedures, path analysis, structural equations and identification, and the use of computers.

5341. Advanced Public Administration (3:3:0)  
 5351. Advanced Constitutional Law (3:3:0).  
 5361. Advanced International Relations (3:3:0).  
 5371. Advanced Comparative Government and Politics (3:3:0).  
 631. Master's Thesis (3). Enrollment required at least twice.  
 731, 732. Research (3 each).  
 831. Doctor's Dissertation (3). Enrollment required at least four times.

## Department of Health, Physical Education, and Recreation for Men

This department supervises a basic physical education program for all men students in the University as well as the following degree programs: *Bachelor of Arts* degrees in PHYSICAL EDUCATION or RECREATION; *Bachelor of Science in Education* degrees in ELEMENTARY or SECONDARY EDUCATION; *Bachelor of Science in Physical Education*; and *Master of Education* degrees in PHYSICAL EDUCATION.

During the first year, students majoring or minoring in the department must file a physical examination form in the office of the chairman of the department. The form for this examination should be secured from this department. Physical education majors are allowed to take elective work in physical education. Physical education courses recommended as electives are 131, 434, 437, or 438.

**Basic Physical Education Program.** All male students who are required to complete satisfactorily 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.

**Bachelor of Science in Physical Education.** The student who desires to major in physical education and to teach in the public schools could elect this degree. The earning of this degree qualifies the student to teach physical education on either the elementary or secondary level or to earn an all-level certificate. The student should follow the proper table for secondary certification and become familiar with the teacher education program.

The student who does not desire to teach in elementary or secondary schools, but wants to major in physical education, health education, or recreation, should elect this degree. The student should follow the curriculum as outlined for noncertification in physical education.

**Bachelor of Science in Education.** The student who desires to teach physical education could elect this degree. 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 the accompanying table for secondary certification and should become familiar with the teacher education program as discussed in this catalog.

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, 332, 3311, 433, 436, 437.

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 Provisional Certificate are P E 133, 221,\* 222,\* 230, 233, 321,\* 322,\* 332, 3311, 433, 436, 437, and 438. Academic specialization courses for students seeking a Provisional Certificate—Secondary are P E 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 biology, English, foreign language (including two 400-level courses), government, history, or mathematics. Specific courses must be approved by the chairman of the department concerned. The student must complete 24 semester hours in the field 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: P E 133, 230, 332, 431, 433, 436, and 437 (18 semester hours from the courses listed).

**Bachelor of Science in Physical Education and 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. or B.S. in P.E. 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 B.A. or B.S. in P.E. degree will be met. All students majoring in recreation take a core program consisting of the following courses: REC 121, 134, 324, 331, 439, 4323, 4324, 4325, 460, and PE 223.

In addition to the core program, the student must select a major and a minor area of specialization from art, music, park administration, physical education, or theatre arts.

Requirements for major areas of specialization:

Art: ART 136 and 3333, plus 18 hours from ART 130, 131, 328, 4310 or 4311 (choose one), and ART 138, 221, 222, 3316, 3317, 3318 or 3319.

Music: 8 hours of applied music principal instrument and 2 hours of secondary instrument or ensemble (4 hours must be in upper level courses and student must attain piano proficiency); M TH 135, 136; M ED 327 or 328 and 337; M LT 331.

Physical Education: P E 133, 221, 222, 321, 322, 323, 326, 4326; SOC 339; PSY 331 or 335.

Theatre Arts: G SP 133; TH A 211, 232, 311 (repeated once), 333, 334, 335, 432, 434.

Requirements for minor areas of specialization:

Art: ART 136, 3333, plus 12 hours from art courses listed under major specialization.

Music: 5 hours of principal instrument; 2 hours of secondary instrument or ensemble (4 hours must be in upper level courses and student must attain piano proficiency); M ED 331, 327 or 328, 337; M LT 331.

Park Administration: P A 3313, 422, 432; HORT 131, 338; plus elective from the following: HORT 232, 233; P A 134, 410, 430, 431.

Physical Education: P E 131, 221, 222, 321, 322, 323, 326; SOC 339.

Theatre Arts: TH A 211, 232, 311 (repeated once), 333, 334, 335, 432.

## Secondary Education Curriculum, Physical Education, Men.

Fall		FIRST YEAR		Spring	
BIOL 141, Botany or				BIOL 142, Zoology or	
CHEM 141, Gen. Chem.	4			CHEM 142, Gen. Chem.	4
ENG 131, Coll. Rhet.	3			ENG 132, Coll. Rhet.	3
MATH 133, Coll. Algebra or				MATH 131, Trigonometry or	
MATH 135, Fund. of Math. I or				MATH 136, Fund. of Math. I or	
Foreign Language	3-4			Foreign Language	3-4
HIST 231, Hist. of U.S. to 1877 or				HIST 232, Hist. of U.S. since 1877 or	
GOVT 231, Amer. Govt., Org.	3			GOVT 232, Amer. Govt., Funct.	3
P E 133, Pers. & Comm. Health	3			P E 230, Health Ed. in El. &	
*P E 111, Intro. to P.E. Act.	1			Sec. Schools	3
**P E 221, Theory & Pract. of				**P E 222, Th. & Pract. of	
Indiv. Sports	2			Team Sports	2
		19-20		18-19	

\* Also fulfills physical education requirement.



## SECOND YEAR

Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
GOVT 231, Amer. Govt., Org. or		GOVT 232, Amer. Govt., Funct. or	
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
SOC 230, Intro. to Soc.	3	G SP 239, Spch. Devel. for	
Teaching Field II	3	Pers. Comp.	3
Elective	3	Teaching Field II	3
**P E 321, Th. & Fund. of		PSY 335, Adol. Psych.	3
Gym & Wrest.	2	**P E 322, El. Aquatics	2

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## THIRD YEAR

Fall		Spring	
S ED 330, Found. of Sec. Ed.	3	P E 431, Kinesiology	3
ED 332, Ed. Psych.	3	S ED 334, Curric. Devel. in Sec. Ed.	3
P E 332 First Aid: Care & Prev.		P E 3311, Meth. of Tchg. P.E.	
of Ath. Inj.	3	in High School	3
P E 323, Sports Officiating	2	Elective	3
Teaching Field II	6	Teaching Field II	6

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## FOURTH YEAR

Fall		Spring	
ED 462, Stud. Tchg. in Sec. Schl.	6	P E 436, Phys. Exam. & Correc. P.E.	3
P E 422, Theory & Fund. of		P E 423, Theory & Fund. of	
Baseball & Basketball	2	Football & Track	2
P E 433, Admin. of Health, P.E. &		S ED 436, Tchg. in Sec. Schls.	3
Rec. Prog.	3	P E 437, Meas. in P.E.	3
Teaching Field II	3	Teaching Field II	3
		Elective	3

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Appropriate course substitutions will be made when necessary.

\* Department requirement. Must complete work in this course, but 1 semester hour credit will not count.

\*\* Required physical education.

## Physical Education Curriculum, Men.

## FIRST YEAR

Fall		Spring	
BIOL 141, Botany	4	BIOL 142, Zoology	4
ENG 131, Coll. Rhct.	3	ENG 132, Coll. Rhct.	3
MATH 133, Coll. Algebra or		HIST 232, Hist. of U.S. since 1877 or	
MATH 135, Fund. of Math I	3	GOVT 232, Amer. Govt., Funct.	3
HIST 231, Hist. of U.S. to 1877 or		P E 133, Pers. & Comm. Health	3
GOVT 231, Amer. Govt., Org.	3	**P E 222, Theory & Pract. of	
*P E 1111, Intro. to P.E. Act.	1	Team Sports	2
**P E 221, Theory & Pract. of		P E 230 Methods of Teaching Health	
Indiv. Sports	2	in the Elem. and Secondary School	3

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## SECOND YEAR

Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
GOVT 231, Amer. Govt., Org. or		GOVT 232, Amer. Govt., Funct. or	
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Minor	3	SP 239, Spch. Devel. for	
Elective	3	Pers. Comp.	3
**P E 321, Theory & Fund. of		Minor	3
Gym. & Wrest.	2	PSY 335, Adol. Psych.	3
ZOOL 243, Human Anatomy and		**P E 322, El. Aquatics	2
Physiology	4		

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## THIRD YEAR

Fall		Spring	
P E 332, First Aid: Care & Prev.		P E 431, Kinesiology	3
of Ath. Inj.	3	P E 3311, Meth. of Tchg. P.E.	
P E 323, Sports Officiating	2	in High Schl.	3
Minor and/or approved electives,		Minor and/or approved electives,	
or Prof. Ed.	12	or Prof. Ed.	12

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## FOURTH YEAR

Fall		Spring	
P E 422, Theory & Fund. of		P E 436, Phys. Exam. & Correc. P.E.	3
Baseball & Basketball	2	P E 423, Theory & Fund. of	
P E 433, Admin. of Health, P.E.,		Football & Track	2
& Rec. Prog.	3	P E 437, Meas. in P.E.	3
P E 438, Curric. Devel. in P.E.	3	Minor and/or approved electives,	
Minor and/or approved electives,		or Prof. Ed.	9
or Prof. Ed.	6		

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Appropriate course substitutions will be made when necessary.

\* Department requirement. Must complete work in this course, but 1 semester hour credit will not count.

\*\* Required physical education.

### Courses in Basic Physical Education Program.

- 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.

### Courses in Physical Education.

#### FOR UNDERGRADUATES

- 131. **Introduction to Physical Education (3:3:0).** Philosophy, aims, objectives, principles, and potential values of physical education.
- 133. **Personal and Community Health (3:3:0).** Fundamentals of health and personal hygiene; community health problems, causes and prevention of disease in the family as related to individual and community health.
- 221. **Theory and Practice of Individual Sports (2:2:2).** Rules and fundamentals of tennis, handball, and badminton.
- 222. **Theory and Practice of Team Sports (2:2:2).** Continuation of P E 221. Rules and fundamentals of volleyball, softball, speedball, and soccer.
- 223. **First Aid (2:1:2).** American Red Cross Standard, advanced and instructor's safety course
- 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.
- 233. **Methods of Teaching Physical Education in the Elementary School (3:3:0).** Method and content course dealing with the theory and practice of physical education.
- 310. **Health Education Workshop (1).** Prerequisite: Junior standing. One week workshop devoted to the study of problems in health education with emphasis on the coordination of federal, state, and local resources in health.
- 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).** Prerequisite: Must know how to swim. 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.
- 332. **First Aid: Care and Prevention of Athletic Injuries (3:3:2).** Techniques of athletic training including conditioning, dieting, prevention and care of specific and common athletic injuries.
- 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).** Individual 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.
- 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.
- 433. **Administration of Health, Physical Education, and Recreation Programs (3:3:0).**
- 434. **Principles of Physical Education (3:3:0).** Prerequisite: Junior standing. This course sets forth the aims and objectives of physical education in the light of historical development of the subject matter area and its relationship to the general field of education. Included also is an analysis of the objectives and methods utilized in the present day programs. Also emphasized are trends in the field of physical education.
- 436. **Physical Examinations and Corrective Physical Education (3:3:0).** Practice in administering screening tests with interpretation of findings; organization 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)**
- \*\*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 school, home, industry, traffic, and recreation. Legal liability of accidents as well as insurance aspects of safety programs.
- 4331. **Teacher Training in Gymnastics (3:1:3).** Prerequisite: Junior standing. P E 4331 is a teacher-training workshop in gymnastics for elementary and secondary levels. The course is offered through the Division of Extension.

#### FOR GRADUATES

- 531. **Administration of Physical Education (3:3:0).** Principles, problems, relationships, and procedures in the supervision of elementary and high school physical education programs.
- 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, constructing, using, and maintaining facilities.

\* Course fee, \$5.

\*\* Course fee, \$12.50.

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.
537. **Seminar in Health, Physical Education, and Recreation (3:3:0).** Specific research topics will be studied in the areas of activity analysis, physiology of exercise, and psychology of sports. May be repeated once for credit.
538. **Physiology of Exercise (3:3:0).** Effect of muscular activity on body processes.
5304. **Physiological Kinesiology (3:3:0).** The study of the functional bases of human movement with particular emphasis on the muscular system.
5305. **Psychological Kinesiology (3:3:0).** The study of the principles and concepts of human behavior related to and affected by human movement with special emphasis on motor skill learning.
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, mechanics, and practice.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

### Courses in Recreation.

#### FOR UNDERGRADUATES

121. **Introduction to Recreation (2:2:0).** Orientation to the field of organized recreation in terms of its history, philosophy, development, community contributions, and career opportunities.
134. **Recreational Activities (3:1:4).** An introduction to skills and knowledges in social-recreational activities, including music, dramatics, arts and crafts, games, sports, and dance.
324. **Observation and Service in Recreation (2:0:4).** Prerequisite: Junior standing and 10 hours recreation course work. Supervised leadership assignments in public and private agencies, camps, and institutions with emphasis on leadership experiences common to such programs. May be repeated once for credit.
331. **Recreational Methods (3:3:0).** Prerequisite: REC 121, 134. Methods of presenting recreational activities, with emphasis on group organization and leadership.
439. **Organization and Administration of Recreational Programs (3:3:0).** Prerequisite: Senior standing. Patterns of organization and administration of recreation in American life with major emphasis upon municipal, county, business, and industrial programs.
460. **Professional Affiliation in Recreation (6:0:12).** Prerequisite: 90 hours, including REC 324. Practical experience in recreation planning, leadership, supervision, and program evaluation.
4323. **Outdoor Recreation (3:3:0).** Prerequisite: REC 121, 134. Outdoor recreation in the community setting, including program planning and organization, leadership, facilities, methods, and materials.
4324. **Current Trends and Problems in Recreation (3:3:0).** Prerequisite: Senior standing and REC 460 concurrently. A study of trends and specific research topics in the areas of recreation.
4325. **Recreation for the Exceptional (3:3:0).** Prerequisite: Senior standing. Recreation activities as a means of rehabilitation for the exceptional child and adult. Includes group organization, teaching techniques, and modification of activities.

### Department of Health, Physical Education, and Recreation for Women

This department supervises a basic physical education program for all women students in the University as well as the following degree programs: *Bachelor of Arts* degrees in PHYSICAL EDUCATION, DANCE, or RECREATION; *Bachelor of Science in Education* degrees in ELEMENTARY or SECONDARY EDUCATION; *Bachelor of Science* in PHYSICAL EDUCATION; and *Master of Education* degrees in PHYSICAL EDUCATION.

Each student who plans to major, minor, or specialize in physical education, dance, 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.

**Basic Physical Education Program.** To satisfy the all-university requirement of four semesters of physical education, each student is required to take P E 111. This course is designed to give the student appreciation 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 student opportunity to continue the practice and understanding of good body mechanics and total fitness through a variety of physical activities.

Students who are majoring, minoring, or specializing in physical education

should enroll for P E 123, 124, 125, and 126 in the place of the above nonprofessional courses.

**Bachelor of Science in Physical Education and Bachelor of Arts—Major in Physical Education.** Students may major or minor in physical education or dance in the B.A. and B.S. in P.E. degree program or select physical education as a teaching field for certification in the B.A. or B.S. in P.E. programs. The courses in physical education required for the major in the B.A. degree are the same as those listed for the teaching field in the B.S. in P.E. degree as outlined in this catalog. The curricula for these degrees lead to certification and are designed to give a broader emphasis to the area of physical education. The curriculum for the nonteaching major in the B.S. in P.E. degree is outlined in this catalog. In earning the secondary or all-level certificate, the physical education student following the B.A. degree must fulfill the same requirements for certification as those outlined for the Bachelor of Science in Physical Education degree.

**Bachelor of Science in Education—Major or Specialist in Physical Education.** The curricula for these degrees are designed to meet the requirements for certification in Texas. The earning of either of these degrees qualifies the student to teach physical education on either the elementary or the secondary level or to earn an all-level certificate. The student enrolled in any one of these levels should become familiar with the teacher education program.

The student who desires to teach on the secondary level must take P E 131, 133, 230, 328, 329, 431, 436, 437, 4311. In addition the student must take P E 111 (major section), 123, 124, 125 and 126, which satisfy the all-university requirement of four semesters of physical education.

Students who wish to obtain an all-level certificate in order to qualify to teach physical education at the elementary and secondary levels may also follow this curriculum. In addition to the courses listed in this curriculum, the student must take P E 233 and meet other requirements as outlined by the College of Education.

The student who selects physical education as an area of specialization on the elementary level may follow one of the following plans:

Plan I. P E 131, 230, 233, 328, 329, 436, 437.

Plan II. P E 131, 230, 233, 328, 329, 436, 437, 438, 4326.

All elementary physical education specialists must meet the all-university requirement of four semesters of physical education by taking P E 123, 124, 125, and 126 or equivalent courses.

**Bachelor of Science in Physical Education and Bachelor of Arts—Major in Dance.** These curricula are designed to prepare students who are interested in the performing and fine arts or in teaching in private schools of dance or at the college level.

The core program includes the following courses: P E 132, 224, 324, 326, 327, 329, 3313, 410, 424, 425, 431, and 113, Dance Techniques.

**Bachelor of Science in Physical Education and Bachelor of Arts—Major in Recreation.** The student who is interested in positions of leadership in recreation, rather than in teaching, should select this major. The general requirements of the B.S. in P.E. or the B.A. degree will be met.

The core program includes the following courses: REC 121, 134, 324, 331, 439, 4323, 4324, 4325, 460 and P E 223.

In addition to the core, the student must select a major and a minor area of specialization from art, theatre arts, music, park administration, or physical education. Requirements for major areas of specialization are as follows:

Art: ART 136 and 3333; also 18 hours from ART 130, 131, 328, 4310 or 4311 (choose one); ART 138, 221, 222, 3316, 3317, 3318 or 3319.

Theatre Arts: G SP 133; TH A 211, 232, 311 (repeated once), 333, 334, 335, 432 and 434.

Music: Applied music principal instrument 8 semester hours and secondary instrument or ensemble 2 semester hours (must attain piano proficiency; 4 of above hours must be upper level courses); M TH 135 and 136; M ED 327 or 328, and 337; and M LT 331.

Physical Education: P E 123, 124, 125, 126, 322, 323, 326, 328, 329; SOC 339; and PSY 331 or 335.

Requirements for minor areas of specialization are as follows:

Art: ART 136, 3333 and 12 semester hours from courses listed for major specialization.

Theatre Arts: TH A 211, 232, 311 (repeated once), 333, 334, 335, and 432.

Music: Principal instrument, 5 hours; secondary instrument or ensemble, 2 hours (must attain piano proficiency and 4 of above hours must be upper level courses); M ED 231, 327 or 328, 337; and M LT 331.

Park Administration: HORT 131, 338; P A 3313, 422, 432; and select one from following: HORT 232, 233; P A 134, 410, 430, 431.

Physical Education: P E 123, 124, 125, 126, 322, 323, 326, 328, 329.

**Minor in Health, Physical Education, Recreation, and Dance.** Students seeking a minor in the department will complete work in one of the following programs:

Health Education: P E 133, 230, 436, 431 or 437, 4326 and 3 hours of an advanced elective.

Physical Education: P E 131, 230, 233 or 4311, 328, 329, 436, 431 or 437.

Recreation: REC 121, 134, 331, 439, 4323, 4324, and 4325.

Dance: P E 132, 224, 324, 424, 425, 431, and Dance Techniques (four semesters).

Minors in physical education must meet the all-university requirement of four semesters of physical education by taking 123, 124, 125, and 126 or equivalent courses.

### Bachelor of Science in Physical Education, Secondary, Women\*\*\*

Fall		FIRST YEAR		Spring	
BIOL 141, Botany	4			BIOL 142, Zoology	4
ENG 131, Coll. Rhet.	3			ENG 132, Coll. Rhet.	3
Mathematics	3			Elective	3
P E 131, Intro. to P.E.	3			P E 133, Pers. & Comm. Health	3
P E 111*, Body Cond.	1			P E 125*, Team Sports	2
P E 113*, Folk Dance	1			P E 113, Modern Dance	1
P E 114, Track & Field	1			P E 112**, Swimming	1
	16			P E 114, Gymnastics	1
					18
Fall		SECOND YEAR		Spring	
ZOOL 243, Human Anat. & Physiol.	4			G SP 239, Speech Dev.	3
ENG 231, Mast. of Lit.	3			ENG 232, Mast. of Lit.	3
HIST 231, Hist. of U.S. to 1877	3			HIST 232, Hist. of U.S. since 1877	3
GOVT 231, Amer. Govt., Org.	3			GOVT 232, Amer. Govt., Funct.	3
P E 230*, Health Ed.	3			P E 223, First Aid	2
P E 123*, Indiv. Sports	2			P E 124*, Indiv. Sports	2
	18			P E 126*, Team Sports	2
					18
Fall		THIRD YEAR		Spring	
S ED 330, Found. of Sec. Ed.	3			S ED 334, Curric. Devel. in Sec. Ed.	3
ED 332, Ed. Psych.	3			PSY 335, Adol. Psych.	3
Teaching Field II	3			Teaching Field II	6
P E 323, Sports Officiating	2			Elective	3
P E 326, Methods of Teach. Dance	2			P E 329*, Tech. of Sports	2
P E 328*, Tech. of Sports	2				
P E 431, Kinesiology	3				
	18				17
Fall		FOURTH YEAR		Spring	
Teaching Field II or Elective	9			S ED 436, Tchng. in Sec. Schls.	3
P E 436, Phys. Exams & Correc. P.E.	3			S ED 462, Stud. Tchng. Sec. Schls.	6
P E 437, Meas. in P.E.	3			Teaching Field II or Elective	6
P E 4311, P.E. for Jr. & Sr. High Schls.	3				
	18				15

\* Must be taken in major sections.

\*\* May be waived by proficiency test.

\*\*\* Students wishing to qualify to teach in both elementary and secondary schools should consult the Chairman of the Department of Health, Physical Education, and Recreation for Women.

### Bachelor of Science in Physical Education, Nonteaching, Women.\*\*

FIRST YEAR			
Fall		Spring	
BIOL 141, Botany	4	BIOL 142, Zoology	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Mathematics	3	Elective	3
P E 131, Intro. to P.E.	3	P E 230*, Health Ed. or	
P E 133, Pers. & Comm. Health	3	P E 233, Meth. of Tchg. P.E.	
P E 111*, Body Cond.	1	in El. Schl.	3
		***P E 125, Team Sports	2
		***P E 124, Indiv. Sports	2
	17		17



## SECOND YEAR

Fall		Spring	
ZOOL 243, Human Anat. & Physiol.	4	ENG 232, Mast. of Lit.	3
ENG 231, Mast. of Lit.	3	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	GOVT 232, Amer. Govt., Funct.	3
GOVT 231, Amer. Govt., Org.	3	Elective	3
G SP 239, Spch. Devel. for Per. Comp.	3	SOC 230, Intro. to Soc.	3
***P E 123, Indiv. Sports	2	***P E 126, Team Sports	2

## THIRD YEAR

Fall		Spring	
PSY 230, Gen. Psych. I	3	PSY 335, Adol. Psych. or	
Minor	6	PSY 331, Child Psych.	3
Elective	3	Minor	6
P E 328, Tech. of Sports	2	Elective	3
REC 331, Rec. Methods	3	P E 329, Tech. of Sports	2
		P E 3313, Hist. of the Dance	3

## FOURTH YEAR

Fall		Spring	
Minor or Electives	9	Minor or Electives	9
P E 431, Kinesiology	3	P E 436, Phys. Exams & Correc. P.E.	3
P E 433, Admin. of Health, P.E. & Rec. Prog.	3	P E 4326, Safety Ed.	3
REC 4323, Outdoor Rec	3		

18

\* Must be taken in major sections.

\*\* Nonteaching major. Students who wish to obtain a major in physical education but who do not wish to be certified to teach should follow this curriculum.

\*\*\* Satisfies one semester of the University physical education requirement.

## Courses in Basic Physical Education.

## FOR UNDERGRADUATES

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).

## Courses in Physical Education.

## FOR UNDERGRADUATES

123. Individual Sports (2:0:4). Skills, strategies, and rules in selected individual and dual sports.
124. Individual Sports (2:0:4). Skills, strategies, and rules in selected individual and dual sports.
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.
127. Rhythmic Activities for the Elementary School (2:0:4).
128. Games For Elementary Schools (2:0:4).
131. Introduction to Physical Education (3:3:0). Philosophy, aims, objectives, principles, and potential values of physical education.
132. Introduction to Dance (3:3:0). A history of dance forms, primitive, classical, and contemporary, and a study of the physical structure and history of the theatre.
133. Personal and Community Health (3:3:0). Fundamentals of health and personal hygiene; community health problems; causes and prevention of disease in the family as related to individual and community health.
223. First Aid (2:1:2). American Red Cross Standard, advanced and instructor's safety course.
224. Beginning Theory and Composition (2:1:2). Prerequisite: Dance Techniques. A study of choreographic forms, styles, and principles.
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.
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 education.
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.
324. Accompaniment for Dance (2:1:2). Prerequisite: Dance Techniques. An introduction to music literature; rhythmic analysis and percussion accompaniment.
326. Methods of Teaching Modern, Folk, and Social Form (2:1:2). Prerequisite: Folk Dance, Social Dance, Dance Techniques. Basic principles and procedures in teaching dance.
327. Ethnic Dance (2:1:2). Prerequisite: P E 132. A survey of primitive, Oriental, and European character dance forms.
328. Technique of Sports (2:1:2). Prerequisite: P E 123, 124. Emphasis on skills, skill analysis, and officiating.
329. Technique of Sports (2:1:2). Prerequisite: P E 126.
333. Dance Production Activities (3:0:6). Prerequisite: Consent of instructor. Participation in dance productions as performer or choreographer. May be repeated once for credit.
3208. Techniques of Elementary Games (2:1:2).
3209. Techniques of Elementary Rhythms (2:1:2).
3313. History of the Dance (3:3:0). History and philosophy of dance and the relationship of dance to allied arts.
410. Senior Recital (1:0:2). Prerequisite: P E 425. Advanced choreographic problems including selection of music and costume; presentation of original composition.
424. Advanced Theory and Composition (2:1:2). Prerequisite: P E 224. Advanced elements of form and methods of recording dance, including film and notation.

425. **Production Planning (2:1:2).** Prerequisite: THA 334 and 211, P E 324. Organization and presentation of dance lecture-demonstrations and problems.
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.
433. **Administration of Health, Physical Education, and Recreation Programs (3:3:0).**
436. **Physical Examinations and Corrective Physical Education (3:3:0).** Practice in administering screening tests with interpretation of findings; organization 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.
438. **Curriculum Development in Physical Education (3:3:0).**
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.
4326. **Safety Education (3:3:2).** Prevention of accidents in home, industry, and recreation.
- 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.
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 taken three times for credit.
537. **Seminar in Health, Physical Education, and Recreation (3:3:0).** Specific research topics will be studied in the areas of activity analysis, physiology of exercise, and psychology of sports. May be repeated once for credit.
538. **Physiology of Exercise (3:3:0).** Effect of muscular activity on body processes.
5304. **Physiological Kinesiology (3:3:0).** The study of the functional bases of human movement with particular emphasis on the muscular system.
5305. **Psychological Kinesiology (3:3:0).** The study of the principles and concepts of human behavior related to and affected by human movement with special emphasis on motor skill learning.
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, mechanics, and practice.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

### Courses in Recreation.

#### FOR UNDERGRADUATES

121. **Introduction to Recreation (2:2:0).** Orientation to the field of organized recreation in terms of its history, philosophy, development, community contributions, and career opportunities.
134. **Recreational Activities (3:1:4).** An introduction to skills and knowledges in social-recreational activities, including music, dramatics, arts and crafts, games, sports, and dance.
324. **Observation and Service in Recreation (2:0:4).** Prerequisite: Junior standing and 10 hours recreation course work. Supervised leadership assignments in public and private agencies, camps, and institutions, with emphasis on leadership experiences common to such programs. May be repeated once for credit.
331. **Recreational Methods (3:3:0).** Prerequisite: REC 121, 134. Methods of presenting recreational activities, with emphasis on group organization and leadership.
439. **Organization and Administration of Recreational Programs (3:3:0).** Prerequisite: Senior standing. Patterns of organization and administration of recreation in American life with major emphasis upon municipal, county, business, and industrial programs.
460. **Professional Affiliation in Recreation (6:0:12).** Prerequisite: 90 hours, including REC 324. Practical experience in recreation planning, leadership, supervision, and program evaluation.
4323. **Outdoor Recreation (3:3:0).** Prerequisite: REC 121, 134. Outdoor recreation in the community setting, including program planning and organization, leadership, facilities, methods, and materials.
4324. **Current Trends and Problems in Recreation (3:3:0).** Prerequisite: Senior standing and REC 460 concurrently. A study of trends and specific research topics in the areas of recreation.
4325. **Recreation for the Exceptional (3:3:0).** Prerequisite: Senior standing. Recreation activities as a means of rehabilitation for the exceptional child and adult. Includes group organization, teaching techniques, and modification of activities.

### Department of History

This department supervises the following degree programs: *HISTORY, Bachelor of Arts, Master of Arts, Doctor of Philosophy*. The department also participates in the *LATIN AMERICAN AREA STUDIES* program leading to the *Bachelor of Arts* degree.

A history student may consider a career in teaching in colleges and universities or in the public schools; in regional and local historical society work; in archives and records management; and in business and industry in po-

sitions where a broad liberal arts foundation is required. In addition, career opportunities in historical park administration may be developed in conjunction with the Department of Park Administration, Horticulture, and Entomology in the College of Agricultural Sciences.

The courses recommended for the undergraduate degree program are HIST 131, 132, 231, 232, and 18 semester hours in advanced history. For a minor program in history the recommended courses are HIST 131, 132, 231, 232, and 6 semester hours in advanced history including 3 hours at the 400 level. With departmental consent, 3 advanced hours in related disciplines may be counted toward the major.

All courses numbered above 300 are advanced courses; departmental approval or 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 programs leading to the master's and doctor's degrees are described in the *Graduate School Catalog*.

**Teacher Education.** In the teacher certification programs, history may be used as a teaching field at the secondary level, as an area of specialization at the elementary level, and as a part of the broad field of social sciences. Certification is possible through either the Bachelor of Science in Education degree or the Bachelor of Arts degree route.

For all three certification programs the department requires HIST 131, 132, 231, 232, and 6 advanced hours in American History. In addition, 3 more advanced hours in history are required to fulfill the Plan I elementary program, and 6 more advanced hours are needed to fulfill the 24-hour requirements of the Plan II elementary program and the teaching field of the secondary program.

## Courses in History.

### FOR UNDERGRADUATES

131. 132. Development of Civilizations (3:3:0 each).
231. History of the United States to 1877 (3:3:0).
232. History of the United States since 1877 (3:3:0).
330. History of Texas (3:3:0).
332. History of England to 1714 (3:3:0).
333. History of England since 1714 (3:3:0).
335. Development of Historical Writing (3:3:0).
3317. History of United States Military Affairs to 1865 (3:3:0).
3318. History of United States Military Affairs since 1865 (3:3:0).
430. English Colonial America to 1763 (3:3:0).
431. English Colonial America after 1763 (3:3:0).
432. 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 (3:3:0).
435. The Jacksonian Era (3:3:0).
436. Social and Cultural History of the United States to 1865 (3:3:0).
437. Social and Cultural History of the United States since 1865 (3:3:0).
438. History of American Immigration (3:3:0).
4311. The Old South (3:3:0).
4312. The South since the Civil War (3:3:0).
4313. Social and Cultural History of the Southwest (3:3:0).
4314. Civil War and Reconstruction (3:3:0).
4316. The Caribbean Area from Discovery to the Present (3:3:0).
4317. South America: The Southern Republics (3:3:0).
4318. South America: The Bolivarian Countries (3:3:0).
4321. South America before Independence (3:3:0).
4322. South America since Independence (3:3:0).
4323. Spanish North America (3:3:0).
4324. Mexico since Independence (3:3:0).
4325. History of Brazil (3:3:0).
4326. Contemporary Issues in Latin America (3:3:0).
4327. The American Frontier to 1803 (3:3:0).
4328. The Trans-Mississippi West from 1803 (3:3:0).
4329. The Plains Indians (3:3:0).
4330. American Urban History (3:3:0).
4331. History of American Science Policy (3:3:0). The politics and attitude of the American government toward scientific endeavor from independence to the present.
4332. History of Theology in America (3:3:0).
4334. Economic History of the United States to 1865 (3:3:0).
4335. Economic History of the United States since 1865 (3:3:0).
4336. The United States, 1900-1929 (3:3:0).
4337. The United States, 1929-1945 (3:3:0).
4338. Diplomatic History of the U.S. to 1900 (3:3:0).
4339. Diplomatic History of the U.S. since 1900 (3:3:0).
4340. History of the Negro in America (3:3:0).
4341. Modern Germany (3:3:0).
4342. The Habsburg Monarchy, 1867 to the Peace Settlements of World War I (3:3:0).

- 4343. Eastern Europe since the First World War (3:3:0).
- 4344. Tudor England (3:3:0).
- 4345. Stuart England (3:3:0).
- 4346. Twentieth Century Britain (3:3:0).
- 4347. Constitutional History of England to 1485 (3:3:0).
- 4348. Constitutional History of England since 1485 (3:3:0).
- 4349. The British Empire (3:3:0).
- 4351. The Near East in Modern Times (3:3:0).
- 4354. The Far East (3:3:0).
- 4355. Africa to 1500 (3:3:0).
- 4356. Africa since 1500 (3:3:0).
- 4357. The History of Islamic Peoples and Lands (3:3:0).
- 4359. Czarist Russia (3:3:0).
- 4360. History of the Ancient Mediterranean World to 241 B.C. (3:3:0).
- 4361. History of the Ancient Mediterranean World, 241 B.C. to 395 A.D. (3:3:0).
- 4362. The Early Middle Ages (3:3:0).
- 4363. The Renaissance (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).
- 4366. Europe, 1815-1870 (3:3:0).
- 4367. Europe, 1870-1918 (3:3:0).
- 4368. Europe between World Wars I and II (3:3:0).
- 4369. Europe since 1939 (3:3:0).
- 4372. The Reformation (3:3:0).
- 4374. Modern Russia (3:3:0).
- 4376. European Intellectual History in the 19th and 20th Centuries (3:3:0).
- 4377. The High Middle Ages (3:3:0).
- 4378. The Late Middle Ages and The Northern Renaissance (3:3:0).
- 4379. Senior Honors (3:3:0). Prerequisite: Participate in the Honors Program and 24 hours of history.
- 4381. United States History, 1877 to 1900 (3:3:0).
- 4382. The United States, 1945 to the Present (3:3:0).
- 4385. European Economic History to 1750 (3:3:0).
- 4386. Contemporary Far East (3:3:0).
- 4399. Studies in Major Historical Issues (3:3:0).

## FOR GRADUATES

Graduate courses may be repeated with departmental consent.

- 531. Readings and Research (3:3:0).
- 534. Historical Methods and Historiography (3:3:0). Required of all master's candidates.
- 535. Historians and Historical Literature (3:3:0). Required of all doctoral candidates.
- 5311. Studies in Southern History (3:3:0).
- 5312. Studies in Recent United States History (3:3:0).
- 5313. Studies in United States Social and Cultural History (3:3:0).
- 5314. Studies in the Frontier & 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).
- 5318. Studies in Renaissance and Reformation History (3:3:0).
- 5319. Studies in Afro-Asian History (3:3:0).
- 5321. Studies in British History (3:3:0).
- 5322. Studies in United States Diplomatic History (3:3:0).
- 5323. Studies in American Constitutional History (3:3:0).
- 5324. Studies in English Colonial American History (3:3:0).
- 5325. Studies in American Economic History (3:3:0).
- 5327. Studies in Texas History (3:3:0).
- 5328. Studies in Latin American History (3:3:0).
- 5329. Studies in Ancient History (3:3:0).
- 5330. Studies in American Urban History (3:3:0).
- 5335. History Appreciation for Teachers (3:3:0).
- 631. Master's Thesis (3). Enrollment required at least twice.
- 633. Seminar in Southwestern History (3:3:0).
- 634. Seminar in American History (3:3:0).
- 635. Seminar in European History (3:3:0).
- 636. Seminar in Latin American History (3:3:0).
- 731, 732. Research (3 each).
- 831. Doctor's Dissertation (3). Enrollment required at least four times.

## Department of Journalism

The Department of Journalism directs the *Bachelor of Arts* and *Master of Arts* degree programs in JOURNALISM.

Majors or 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. To enroll in JOUR 231, which is a basic prerequisite for advanced work in journalism, a student must be able to type.

A student minoring in journalism must present JOUR 130, 231, and 338 in the minimum of 18 required hours.

Students majoring in journalism are required to complete 32-33 semester hours, with a minimum of 18-20 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 and choose his courses accordingly.

The following are the required courses for all majors.

- JOUR 130. Introduction to Mass Communications
- JOUR 231. News Writing
- JOUR 338. Copyreading

**Additional Requirements for the News-Editorial Sequence.**

- JOUR 232. News Writing
- JOUR 336. Advanced Reporting
- JOUR 430. Law of the Press

Student may elect 14-15 hours from the following:

- JOUR 131. Introduction to News Analysis
- JOUR 233. Feature Writing
- JOUR 320. Typography
- JOUR 335. History of Journalism
- JOUR 3313. Photojournalism
- JOUR 3318. Writing for Radio and Television
- JOUR 3321. Magazine Writing and Editing
- JOUR 3322. Magazine Writing and Editing
- JOUR 3325. Principles of Promotion and Public Relations
- JOUR 433. Public Opinion and Propaganda
- JOUR 434. Elements of Newspaper Management
- JOUR 436. Public Opinion and Public Issues
- JOUR 4311. The Press in a Democratic Society
- JOUR 4314. Seminar
- JOUR 4315. Advanced Photojournalism

**Additional Requirements for the Advertising Sequence.**

- JOUR 320. Typography
- JOUR 3351. Advertising Media
- MKT 334. Principles of Advertising
- MKT 4311. Advertising Practices

\*Student may elect 12 hours from the following:

- JOUR 3313. Photojournalism
- JOUR 3325. Principles of Promotion and Public Relations
- JOUR 430. Law of the Press
- JOUR 433. Public Opinion and Propaganda
- JOUR 434. Elements of Newspaper Management
- ART 321. Problems in Visual Communications

ECO 235 and PSY 230 or PHIL 230 or SOC 230 are also required for a major in journalism.

The following journalism courses may be counted as satisfying the School of Arts and Sciences requirement of 6 hours of social science other than major or minor.

- JOUR 335. History of Journalism
- JOUR 430. Law of the Press
- JOUR 433. Public Opinion and Propaganda
- JOUR 436. Public Opinion and Public Issues
- JOUR 4311. The Press in a Democratic Society

**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.

The following Journalism courses constitute the required courses for the secondary teaching field (Plan I):

- JOUR 130. Introduction to Mass Communications
- JOUR 231. News Writing
- JOUR 320. Typography
- JOUR 338. Copyreading

\* A student in the advertising sequence, with the advice and consent of his adviser, may substitute a course from the editorial sequence for which he has the prerequisite. Such substitution may apply only in the 12 elective hour block.



## JOUR 3313. Photojournalism

## JOUR 432. Journalism for the High School Teacher

The student may elect seven (7) hours from the following for a total of 24 hours:

- JOUR 232. News Writing
- JOUR 233. Feature Writing
- JOUR 335. History of American Journalism
- JOUR 339. Editing and Layout
- JOUR 411. A, B, C. Special Problems in Journalism
- JOUR 430. Law of the Press

**Courses in Journalism.**

## FOR UNDERGRADUATES

- 130. **Introduction to Mass Communications (3:3:0).** A broad survey of communications agencies in modern life, with particular emphasis on newspapers, magazines, radio, television, and the motion picture.
- 131. **Introduction to News Analysis (3:3:0).** Study of major news stories of the day and function of mass communications media in American life. Introduction for journalism and non-journalism majors to an intelligent following of current events as presented in the newspaper, news magazines, radio, and television.
- 231, 232. **News Writing (3:2:3 each).** JOUR 231 is prerequisite to all higher journalism courses for majors and minors. Majors and minors enrolled in this course are required to work on the University Daily.
- 233. **Feature Writing (3:3:0).**
- 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.
- 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: JOUR 231, 232. A course in the interrelation and writing of news on social, political, and economic topics. Instruction in techniques of specialized reporting given through off-campus laboratory assignments.
- 338. **Copyreading (3:2:3).**
- 339. **Editing and Layout (3:2:3).**
- 3312. **Nonfiction Writing (3:3:0).** For non-journalism majors wishing to do research in their own fields. Students write features and articles for possible inclusion in professional publications in their individual specialties.
- 3313. **Photojournalism (3:1:6).** Varied assignments of news and feature pictures. Lecture and laboratory cover picture processing, practice, and study of picture editing.
- 3318. **Writing for Radio and Television (3:2:3).** Training in writing news, continuity and public affairs for broadcast by radio or television. TELE 331 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).**
- 3351. **Advertising Media (3:2:3).** A study of the various advertising media to provide journalism, advertising, and advertising art students with a knowledge of the use of advertising media, methods of selection, and the skills and background required for media buying. Course will also cover methods of testing media effectiveness in newspapers, radio, television, and magazines, in addition to miscellaneous media, i.e., transient, outdoor, direct mail, etc. Field trips.
- 411. **Special Problems in Journalism (1).** Prerequisite: Senior or graduate classification, juniors only with consent of department chairman. 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.
- 432. **Journalism for the High School Teacher (3:3:0).** Study and practice with the problems met by a publication supervisor in directing newspapers and yearbooks, functions of 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 press in its formation and how the press is influenced by public opinion. Propaganda analysis; the purpose, devices, and effects of propaganda and censorship.
- 434. **Elements of Newspaper Management (3:3:0).** Organization field of service, personnel, equipment, production, community relations, labor relations, accounting, field trips, investigative projects.
- 436. **Public Opinion and Public Issues (3:3:0).** A broad synthesis course of 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 great problems.
- 4311. **The Press in a Democratic Society (3:3:0).** A study of the newsman's role in analyzing major and continuing issues for the public. Special emphasis will be on state and local government, civil rights, labor, business, and religion.
- 4314. **Seminar (3:3:0).** Prerequisite: Senior standing. A seminar in problems of American journalism.

4315. **Advanced Photojournalism (3:2:3).** Individual or group investigation into selected areas of photography; instruction and use of 16 mm movie cameras in news filming techniques; lectures in color photography, portraiture, advanced techniques with various types of cameras. For students interested in newspaper, magazine, television news, and advertising photography.

#### FOR GRADUATES

530. **Seminar in Education for Journalism (3:3:0).** Prerequisite: Graduate standing. History of education for journalism with emphasis on current philosophies. Journalism and the liberal arts; areas of specialization; critical investigation and evaluation of curriculum, teacher preparation and student guidance.
531. **Seminar in Modern Editing (3:3:0).** Prerequisite: Graduate standing. Critical and analytical approach to the problems of editing newspapers, magazines, and radio-television news copy; audience analysis; legibility formulas; intelligibility scales; study of space age communications devices.
532. **Seminar in Public Opinion and Propaganda (3:3:0).** Prerequisite: Graduate standing. Study of the developing literature in this field of specialization. Bases of public opinion and propaganda. Opinion-making processes of governments, political parties, pressure groups, and other organized groups.
533. **Seminar in Legal Problems of Mass Communications (3:3:0).** Prerequisite: Graduate standing. Reading and research in law of libel, privileged areas, privacy, and other legal problems facing the mass media.
534. **Methods of Research (3:3:0).** Prerequisite: Graduate standing. The tools and methods of research; qualitative and quantitative measures; testing of data for reliability and validity; interpretation of research findings.
535. **Administration of Communication Media (3:3:0).** Prerequisite: Graduate standing. Problems of executive planning and management of newspapers, magazines, and broadcast media; personnel and labor problems; study of state and federal laws affecting the industries.
536. **Problems in Investigative Reporting (3:3:0).** Prerequisite: Graduate standing. A seminar in public affairs reporting at the local, state, and regional levels. In-depth study of social, political, and economic questions; preparation of articles in these areas.
537. **Seminar in the Press and Society (3:3:0).** Prerequisite: Graduate standing. Examination of the news media in terms of their social significance and their effects upon people and institutions. Evaluations of press performance.
538. **Advanced Graphic Arts Design and Production Control (3:2:3).** Prerequisite: Graduate standing. Preparation of copy for all forms of letterpress, photo offset, engraving, rotogravure; silk screen; deep etch lithography; process color; scheduling, costing, and production supervision and management.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

### Department of Mathematics

This department supervises the following degree programs: **MATHEMATICS, Bachelor of Arts or Bachelor of Science, Master of Arts or Master of Science, Doctor of Philosophy.**

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 the accompanying table. For curriculum leading to the Bachelor of Arts, follow the general pattern for that degree described in the Arts and Sciences section of this catalog. MATH 434 and 4321 are required for all degrees in mathematics. French, German, or Russian must be taken by the mathematics major to satisfy the foreign language degree requirement for the Bachelor of Science degree, and are recommended for the Bachelor of Arts degree.

The department adviser must approve the 6 hours of advanced work (courses numbered 300 and above) required of all minors. For either a major or a minor in mathematics a student must have a grade of C or better for each course in mathematics counted toward the degree.

Beginning science, mathematics, and engineering students will be allowed to enroll directly in MATH 151 (Analytic Geometry and Calculus I) only if their test scores on the advanced Achievement Test in Mathematics or on other suitable placement tests indicate reasonable proficiency in algebra and trigonometry. Those students not qualifying for MATH 151 will be advised to take preparatory mathematics courses. Mathematics majors who are required to take preparatory mathematics 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 151 are encouraged to take preparatory mathematics courses in summer school.

Arts and Sciences students, exclusive of science and mathematics majors, may use any combination of mathematics courses other than MATH 1310 and

1311 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 1315 is recommended as a terminal course for the student with a good background in high school mathematics; MATH 135 is an excellent terminal course for the average student.

**Teacher Education.** The Department of Mathematics cooperates with the College of Education in offering programs for teacher certification in mathematics at both the elementary and secondary school levels. The student preparing to teach in the secondary school may select mathematics as a teaching field and complete the program for teacher certification in mathematics for secondary education. The student preparing to teach in the elementary school may select mathematics as an area of academic specialization under Plan I (18 hours) or Plan II (24 hours), elementary education. The student should consult the Department of Mathematics concerning the teacher certification program.

Semester hour requirements and normal course options for the teaching field in mathematics at the secondary level are as follows:

1. 6 semester hours selected from MATH 131, 133, 1315, 233.
2. MATH 151, 152.
3. 12 hours of approved junior and senior level courses, including MATH 431.

### Mathematics Curriculum, B.S. Degree.

#### FIRST YEAR

Fall		Spring	
*MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Foreign Language	3-4	Foreign Language	3-4
**Science elective	4	**Science elective	4
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
<hr/>		<hr/>	
16-17		16-17	

#### SECOND YEAR

Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	MATH 332, Diff. Equations	3
MATH 233, Lin. Alg.	3	MATH 339, Foundations of Algebra	3
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Foreign Language	3	Foreign Language	3
Science	3-4	Science	3-4
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
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16-18		16-18	

#### THIRD AND FOURTH YEARS

Fall		Spring	
Math electives	6	MATH 4321, El. Mod. Algebra	3
MATH 434, Adv. Calc.	3	GOVT 232, Amer. Govt., Funct.	3
GOVT 231, Amer. Govt., Org.	3	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Math electives	6
Science	9	Science	9
Approved electives	6	Approved electives	6
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30		30	

\* The course list should be consulted for admission requirements for MATH 151. If a student is required to take MATH 131 and 133 prior to enrollment in MATH 151, the result will be an increase of 6 hours of mathematics in his major requirements.

\*\* Science electives must be chosen from courses offered in biology, chemistry, physics, or geosciences, but not from the field selected as a minor. Eight hours of science electives must be in one field.

### Courses in Mathematics.

#### FOR UNDERGRADUATES

131. **Trigonometry (3:3:0).** Prerequisite: Admission granted on the basis of placement test scores. Trigonometric functions; radians; logarithms; solutions of triangles; composite angles; identities; trigonometric equations; complex numbers; De Moivre's Theorem.
133. **College Algebra (3:3:0).** Prerequisite: Admission granted on the basis of placement test scores. Inequalities; determinants; theory of equations; binomial theorem; progressions; mathematical induction.
- 135, 136. **Fundamentals of Mathematics I, II (3:3:0 each).** Basic concepts in elementary mathematics. Number sets and operations; algebraic structures; elementary functions.
- 137, 138. **Introductory Mathematical Analysis (3:3:0 each).** Prerequisite: Two units of high school mathematics. Introductory logic; set theory; real number properties; inequalities; equations; relations; functions; vectors; matrices; linear programming; probability; progressions; analytic geometry; elementary calculus.
151. **Analytical Geometry and Calculus I (5:5:0).** Prerequisite: Satisfactory placement test scores, or the equivalent of MATH 1315. Introduction to analytical geometry; Limits; the derivative; the definite integral; applications.

152. **Analytical Geometry and Calculus II (5:5:0).** Prerequisite: MATH 151. Logarithms; polar coordinates; parametric equations; differentiation; maxima and minima; rectilinear and curvilinear motion; formal integration; definite integrals; applications.
1310. **Structure of Arithmetic for Elementary Teachers (3:3:0).** Intuitive development of the real number system; fundamental operations and concepts of arithmetic; a set-theoretic approach.
1311. **Algebra for Elementary Teachers (3:3:0).** Algebraic structure of the real number system; groups; rings; fields; mathematical systems; topics in elementary number theory.
1315. **Introductory College Mathematics (3:3:0).** Prerequisite: Admission granted on the basis of placement test scores. Review of trigonometry and college algebra; rational functions; simple transcendental functions; coordinate geometry.
233. **Linear Algebra (3:3:0).** Prerequisite: MATH 152. Finite-dimensional vector spaces; linear transformations and matrices; quadratic forms; eigenvalues and eigenvectors; vector spaces over the complex numbers.
235. **Analytical Geometry and Calculus III (3:3:0).** Prerequisite: MATH 152. Partial differentiation; infinite series; indeterminate forms; hyperbolic functions; functions of several variables; multiple integrals.
332. **Differential Equations I (3:3:0).** Prerequisite: MATH 233 and 235. Solutions of ordinary differential equations; geometric and physical applications.
334. **History of Mathematics (3:3:0).** Prerequisite: MATH 152. Historical development of mathematics; history of the applications of mathematics; impact of mathematics on the development of our culture and civilization.
335. **Higher Mathematics for Engineers and Scientists I (3:3:0).** Prerequisite: MATH 235 or concurrent registration with departmental permission. Ordinary differential equations; Laplace transforms.
336. **Higher Mathematics for Engineers and Scientists II (3:3:0).** Prerequisite: MATH 332 or 335. Fourier series; partial differential equations.
337. **College Geometry (3:3:0).** Prerequisite: MATH 151. Directed segments and angles; similitude; inversion; geometry of the triangle, quadrilateral, and circle.
339. **Foundations of Algebra and Analysis (3:3:0).** Prerequisite: MATH 233. Fundamental concepts of abstract algebra and analysis.
3318. **Finite Mathematical Structures (3:3:0).** Prerequisite: MATH 151. Logical development of mathematical structures; compound statements and truth tables; sets and functions; probability theory; Markov chains; applications in the physical and social sciences.
430. **Synthetic Projective Geometry (3:3:0).** Prerequisite: MATH 337 or consent of the instructor. Fundamental theorems of projective geometry treated synthetically.
431. **Teaching of Mathematics in the Secondary Schools (3:3:0).** Prerequisite: 12 semester hours of college mathematics and consent of instructor.
432. **Differential Equations II (3:3:0).** Prerequisite: MATH 332. Partial differential equations, and boundary value problems.
- 434, 435. **Advanced Calculus (3:3:0 each).** Prerequisite: MATH 339 or equivalent. 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 152. Prime numbers; congruences; theorems of Fermat, Euler, and Wilson; residues; reciprocity law; Diophantine Equations.
- 4310, 4311. **Introduction to Numerical Analysis I, II (3:3:0 each).** Prerequisite: MATH 332 or 335. Interpolation; approximations; numerical integration and differentiation; roots of polynomial equations; numerical quadrature; solution of ordinary differential equations.
4313. **Probability (3:3:0).** Prerequisite: MATH 152. Permutations and combinations; additive and multiplicative laws of probability; expectation; Bayes' theorem; continuous and discontinuous distribution functions; applications.
- 4314, 4315. **Mathematical Statistics (3:3:0 each).** Prerequisite: MATH 235. Frequency functions; moments; probability; correlation and regression; testing hypotheses; small sample distributions; analysis of variance; non-parametric methods; sequential analysis.
4316. **Introductory Point-Set Topology (3:3:0).** Prerequisite: MATH 339. Axiomatic treatment of topological spaces; connectedness; compactness; separation properties; metric spaces.
4317. **Actuarial Mathematics (3:3:0).** Prerequisite: MATH 151. Theory of mortality tables; life annuities, premiums; terminal reserves; joint-life annuities and insurance; applications.
4319. **Elementary Functions of Complex Variables (3:3:0).** Prerequisite: MATH 235. The complex number system; functions of a complex variable; differentiation; elementary functions; and contour integration.
4321. **Elementary Modern Algebra (3:3:0).** Prerequisite: MATH 339. Groups; integral domains; rings and fields.
4324. **Matrix Theory (3:3:0).** Prerequisite: MATH 152. Matrices and determinants; rank; equivalence; transformations; vector spaces; characteristic equation of a matrix.
4325. **Computational Methods of Linear Algebra (3:3:0).** Prerequisite: MATH 4324. Numerical methods involved in the solution of linear systems; matrix inversions; eigenvalue problems; ill-conditioned matrices.
4327. **Mathematical Programming (3:3:0).** Prerequisite: MATH 152. Linear inequalities; linear programming algorithms; networks; parametric and discrete linear programming; non-linear and dynamic programming; optimal decision techniques; application.
- 4328, 4329. **Statistical Methods I, II (3:2:2 each).** Prerequisite: Completion of mathematics requirements for respective majors or consent of instructor. Methods of analyzing data; statistical concepts and models; estimation; tests of significance; linear regression and correlation; introduction to analysis of variance; introduction to multiple comparisons; factorials; individual degrees of freedom; multiple regression; covariance.
4331. **Introduction to Difference Equations (3:3:0).** Prerequisite: MATH 235. The calculus of finite differences; solutions of difference equations; Bernoulli and Euler numbers; polynomials.
4332. **Selected Topics (3:3:0).** Prerequisite: Consent of instructor. Selected topics in upper division mathematics.
4391. **Vector Analysis (3:3:0).** Prerequisite: MATH 235. Scalar and vector products; gradient; divergence; curl; curvilinear coordinates; applications.
4392. **Tensor Analysis (3:3:0).** Prerequisite: MATH 4391 or consent of instructor. Analytical treatment of tensors and extensors and their properties; Riemann-Christoffel Tensors; applications.

- 511, 512. Seminar (1:1:0 each). Prerequisite: Graduate standing in mathematics. May be repeated for credit.
531. Advanced Problems (3:3:0). Prerequisite: Graduate standing in mathematics. May be repeated for credit.
- 532, 533. Intermediate Analysis I, II (3:3:0 each). Prerequisite: Graduate standing. Introduction to mathematical analysis; includes integration theory; theory of limits; infinite processes.
- 534, 535. Theory of Numbers I, II (3:3:0 each). Prerequisite: MATH 437. Diophantine equations; binary quadratic forms; algebraic numbers; theory of number-theoretic functions; partitions; the prime number theorem.
- 536, 537. Modern Algebra I, II (3:3:0 each). Prerequisite: MATH 4321 or consent of instructor. Groups; rings; fields; linear algebra; Galois theory.
538. Foundations of Mathematics (3:3:0). Prerequisite: Graduate standing in mathematics. Selected topics in algebra; the number system; the axiomatic approach to mathematics.
539. Dimension Theory (3:3:0). Prerequisite: MATH 5317 or consent of instructor. Dimension; dimension of Euclidean spaces; covering and imbedding theorems; mappings in spheres; dimension and measure.
- 5312, 5313. Functions of a Complex Variable I, II (3:3:0 each). Prerequisite: MATH 434 or 4319. The extended complex plane elementary transformations; power series; complex integration; Taylor and Laurent expansions; meromorphic and entire functions; the calculus of residues.
- 5314, 5315. Functions of a Real Variable I, II (3:3:0 each). Prerequisite: MATH 533 or equivalent. The real number system, set and measure theory; properties of Riemann and Lebesgue integrals.
- 5316, 5317. Topology I, II (3:3:0 each). Prerequisite: MATH 4316. Point set theory; introduction to combinatorial topology.
5318. Operational Calculus (3:3:0). Prerequisite: MATH 434. The convolution of continuous functions; extension to operators and the operational calculus, the Laplace transform and the convolution transform.
5319. Fourier Analysis (3:3:0). Prerequisite: MATH 5315. Orthogonal series; convergence and summability of Fourier series; Fourier transforms.
- 5321, 5322. Methods of Applied Mathematics I, II (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). Prerequisite: MATH 432, 435, or consent of instructor.
- 5325, 5326. Partial Differential Equations I, II (3:3:0 each). Prerequisite: MATH 432, 435, or consent of instructor.
- 5329, 5330. Numerical Analysis I, II (3:3:0 each). Prerequisite: MATH 4311. Stability and error analysis; numerical solution of ordinary and partial differential equations; integral equations.
- 5331, 5332. Advanced Topics in Analysis I, II (3:3:0 each). Prerequisite: Consent of instructor.
- 5333, 5334. Functional Analysis I, II (3:3:0 each). Prerequisite: MATH 5314. Normal linear spaces and their abstract completions. Closed graph theorem. Theorem of uniform boundedness. Hahn-Banach theorems. Weak topologies; adjoints; resolvents; convex sets and related topics.
- 5335, 5336. Advanced Mathematics for Teachers I, II (3:3:0 each). Prerequisite: Consent of instructor. Selected topics in mathematics.
- 5337, 5338. Topics in Numerical Analysis I, II (3:3:0 each). Prerequisite: MATH 5330, 4325. Current advanced topics in numerical analysis; research work using computers.
5339. Advanced Linear Algebra (3:3:0). Prerequisite: MATH 4321. Abstract vector spaces; multilinear forms; linear transformations; tensor products of transformations; proper values; conical forms; unitary spaces; matrix inequalities; singular values of transformations; topics in linear algebra.
- 5341, 5342. Advanced Topics in Algebra I, II (3:3:0 each). Prerequisite: Consent of instructor.
- 5345, 5346. Algebraic Topology I, II (3:3:0 each). Prerequisite: MATH 537 and 5317 or consent of instructor. Categories, functors; homotopy; fundamental group; covering spaces; homology; the Eilenberg-Steenrod axioms; cohomology; products; higher homotopy groups; obstruction theory; related topics.
- 5347, 5348. Riemann Surface Theory I, II (3:3:0 each). Prerequisite: MATH 5313 or consent of instructor. Manifolds; Riemann surface of an analytic function; covering manifolds; combinatorial topology; differential and integrals on Riemann surfaces; uniformization.
5349. Nonparametric Statistical Inference (3:3:0). Prerequisite: MATH 4315. Statistical inference; asymptotic distribution theory; tests on permutation of observation; rank order statistics; nonparametric tolerance limits; theory of runs.
5351. Advanced Topics in Geometry (3:3:0). Prerequisite: Consent of instructor.
5352. Differentiable Manifolds (3:3:0). Prerequisite: MATH 4316 or consent of instructor. Differentiable mappings; manifolds; differential forms and the Grassmann algebra.
- 5353, 5354. Theory of Generalized Functions I, II (3:3:0 each). Prerequisite: MATH 5312 and 5314 or consent of instructor. Schwartz distribution and their properties; analytic representations; Fourier transforms of distributions; linear topological spaces; distributions and kernels.
- 5355, 5356. Theory of Groups I, II (3:3:0 each). Prerequisite: MATH 536 or consent of instructor. Composition series; Abelian and solvable groups; direct and sub-direct products; nilpotent groups; permutation groups; and selected topics.
- 5357, 5358. Theory of Rings I, II (3:3:0 each). Prerequisite: MATH 536 or consent of instructor. Modules; chain conditions; radicals; semi-simplicity; commutative rings; algebras; tensor products; and selected topics.
- 5361, 5362. Advanced Topics in Topology I, II (3:3:0 each). Prerequisite: MATH 5317 and consent of instructor.
5371. Design of Experiments (3:3:0). Prerequisite: MATH 4315. Principles of design and analysis of experiments; Latin squares; split plots; incomplete block designs; efficiency.
5372. Theory of Linear Statistical Models (3:3:0). Prerequisite: MATH 4315. Multivariate normal; covariance matrix and operations; distribution of quadratic forms; general linear hypothesis of full and non-full rank; specific linear models.
5373. Stochastic Processes (3:3:0). Prerequisite: MATH 4313. Study of processes which develop in time according to probabilistic laws; Brownian motion and life and death processes; stochastic models; Markov processes; Ergodic theorems.



- 5374, 5375. **Advanced Mathematical Statistics I, II** (3:3:0 each). Prerequisite: MATH 4315. Topics selected from analysis of variance and design of experiments; multivariate analysis; sampling from finite populations; nonparametric methods; sequential analysis.
- 5376, 5377. **Advanced Probability I, II** (3:3:0 each). Prerequisite: MATH 4313, 5314, and 5315. Measure and integration, axiomatic foundations of probability theory; random variables; distributions and their characteristic functions; stable and infinity divisible laws; limit theorems for sums of independent random variables; conditioning; Martingales.
5378. **Statistical Multivariate Analysis** (3:3:0). Prerequisite: MATH 4315, 4324 or consent of instructor. Multivariate normal distribution; estimation of the mean vector and covariance matrix; distribution of sample correlation coefficients; the generalized  $T^2$  statistic; classification; distribution of the sample covariance matrix.
5379. **Statistical Sampling Theory** (3:3:0). Prerequisite: MATH 4315. Theory of simple random sampling; stratified random sampling; cluster sampling; ratio estimates; regression estimates; other sampling methods.
630. **Master's Report** (3).
631. **Master's Thesis** (3). Enrollment required twice.
731. **Research** (3:3:0). Prerequisite: Consent of chairman of department. Research in advanced mathematics. Can be repeated for credit.
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.
- 231, 232. **General Astronomy** (3:3:0 each). Prerequisite: MATH 131 or equivalent. The solar, stellar, and galactic systems, studied with attention to technical details.

## Department of Music

The curricula of the Department of Music offer the undergraduate student a choice of three degrees: *Bachelor of Music*, *Bachelor of Music Education*, and *Bachelor of Arts*. The recommended curricula for the *Bachelor of Music* (Applied Music, Music History and Literature, and Music Theory) and *Bachelor of Music Education* degrees are set forth in the accompanying tables. The *Bachelor of Arts* curriculum is flexible. Graduate degrees offered are *Master of Music* (Performance or Music Theory) and *Master of Music Education*. Graduate students are referred to the *Catalog of the Graduate School*.

The following general regulations govern all work in the Department of Music.

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 University are Applied Music (vocal or instrumental, class or private instruction), all levels; M LT 238, 239, 231, 232, M EN 110-1, 310-1 (Tech Choir), 111-3, 311-3 (Chamber Music), 110-4, 310-4 (Tech Music Theater), 110-5, 310-5, 110-6, 310-6 (Tech Singers), 111-1, 311-1 (Orchestra), 113-A, 313-A (Tech Band), 313-C (Tech Stage Band.)

Students seeking the degree *Bachelor of Science in Education* with elementary certification, and with an academic specialization in music, may take the following in music:

### Plan I

M AP (Principal Instrument or Voice) 115, 116, 215, 216, 325, 326.  
(It is urged that this study begin in the freshman year.)

M AP (Secondary Instrument or Voice) 115, 116 or 1113, 1114 or 1123, 1124 or M EN 110 twice.

M TH 136.

M ED 327.

M LT 331.

The music specialization student substitutes M TH 135 for M ED 231 and M ED 327 for M ED 232.

### Plan II

M AP (Principal Instrument or Voice) 115, 116, 215, 216, 325, 326. (It is urged that this study begin in the freshman year.)

M AP (Secondary Instrument or Voice) 115, 116 or 1113, 1114 or 1123, 1124 or M EN 110 twice.

M TH 136.

M ED 327, 337, 439.

M LT 331.

Substitute M TH 135 for M ED 231.

Entering freshman music majors should have studied previously and should have attained technical proficiency in applied music sufficient to qualify for a grade level appropriate to his particular degree plan. A grade level in applied music will be assigned at an audition during orientation week. For information on applied music grade levels see the applied music handbook, available from the Music Department. Grade level graduation requirements in applied music vary according to the student's degree and major. All music students will have their work in their principal applied music studies periodically reviewed by the faculty.

Entering freshmen may receive credit for college level work accomplished prior to entering the University. 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 the College of Arts and Sciences during the first semester of the freshman year. 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 examination.

Students transferring from other institutions will be administered placement examinations in applied music and in music theory.

The student must earn a minimum grade of C to qualify for successive levels of freshman and sophomore theory.

All students whose principal instrument is not keyboard must pass piano proficiency examinations. All students enrolled in keyboard must have practical experience in accompanying as designated by the Department of Music. All piano majors are required eight semesters of piano ensemble. Organ majors and piano principals are required four semesters of piano ensemble.

**Recital Requirements.** Candidates for music education or performance degrees are required to present a 1/2 length recital. In addition, applied music majors are required to present a full length senior recital. (Applied piano majors with pedagogy emphasis are required to present only a 3/4 length recital.) Permission to present each recital must be obtained from an examining jury at least two weeks prior to the recital.

Attendance at 20 student, faculty, and major organization performances is required of all music majors each semester. Failure to meet this requirement may result in an increase in the number of hours needed to complete degree requirements.

**Courses in Applied Music.** Additional fees for applied music are shown in this catalog under Miscellaneous Special Fees. Laboratory hours shown for applied music courses are student-teacher contact hours. Applied music students are required to practice a minimum of 3 clock hours per week for each semester-hour credit.

### **Applied Music—Piano Curriculum.**

#### **FIRST YEAR**

<b>Fall</b>		<b>Spring</b>	
M AP 111, Keyboard Skills	1	M AP 112, Keyboard Skills	1
M AP 145, Piano	4	M AP 146, Piano	4
M LT 131, Intro. to Mus. Lit.	3	M LT 132, Intro. to Mus. Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
M EN 111-2, Accompanying	1	M EN 111-2, Accompanying	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
<hr/>		<hr/>	
17		17	

#### **SECOND YEAR**

<b>Fall</b>		<b>Spring</b>	
M AP 211, Keyboard Skills	1	M AP 212, Keyboard Skills	1
M AP 245, Piano	4	M AP 246, Piano	4
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
M LT 231, Hist. of Music	3	M LT 232, Hist. of Music	3
M EN 111-2, Accompanying	1	M EN 111-2, Accompanying	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
<hr/>		<hr/>	
17-18		17-18	

## THIRD YEAR

Fall		Spring	
M AP 345, Piano	4	M AP 346, Piano	4
M TH 333, Form & Comp.	3	M TH 334, Form and Comp.	3
M ED 327 or 328, Ch. Cond. or Instr. Cond.	2	M LT 436, Keyboard Lit.	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
M LT 435, Keyboard Lit.	3	Elective	3
M EN 311-2, Accompanying	1	M EN 311-2, Accompanying	1
	16		17

## FOURTH YEAR

Fall		Spring	
M AP 445, Piano	4	M AP 446, Piano	4
Elective	3	M TH 427, Instrumentation	2
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
M TH 435, Counterpoint	3	M ED 433, Piano Pedagogy	3
M EN 311-2, Accompanying	1	M EN 311-2, Accompanying	1
	14		13

## Applied Music—Organ Curriculum.

## FIRST YEAR

Fall		Spring	
M AP 145, Organ	4	M AP 146, Organ	4
M AP 115, Piano	1	M AP 116, Piano	1
M LT 131, Intro. to Music Lit.	3	M LT 132, Intro. to Music Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	17		17

## SECOND YEAR

Fall		Spring	
M AP 245, Organ	4	M AP 246, Organ	4
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
M LT 231, Hist. of Music	3	M LT 232, Hist. of Music	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	16-17		16-17

## THIRD YEAR

Fall		Spring	
M AP 345, Organ	4	M AP 346, Organ	4
M AP 327, Church Service Playing	2	M TH 334, Form and Comp.	3
M TH 333, Form and Comp.	3	M ED 328, Instrumental Cond.	2
M ED 327, Choral Conducting	2	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Elective	3
Elective	3	Ensemble	1
Ensemble	1		16
	18		

## FOURTH YEAR

Fall		Spring	
M AP 445, Organ	4	M AP 446, Organ	4
M TH 435, Counterpoint	3	M TH 427, Instrumentation	2
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Music Elective	3	Music Elective	3
M EN 311-2, Accompanying	1	M EN 311-2, Accompanying	1
Ensemble	1	Ensemble	1
	15		14

## Applied Music—Voice Curriculum.

## FIRST YEAR

Fall		Spring	
M AP 125, Voice	2	M AP 126, Voice	2
Applied Music (piano)	1	Applied Music (piano)	1
M LT 131, Intro. to Music Lit.	3	M LT 132, Intro. to Music Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
ITAL 131, Beg. Italian	3	ITAL 132, Beg. Italian	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	18		18

## SECOND YEAR

Fall		Spring	
M AP 235, Voice	3	M AP 236, Voice	3
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
GERM 141, Beg. German	4	GERM 142, Beg. German	4
M LT 231, Hist. of Music	3	M LT 232, Hist. of Music	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
<hr/> 19-20		<hr/> 19-20	

## THIRD YEAR

Fall		Spring	
M AP 345, Voice	4	M AP 346, Voice	4
M TH 333, Form and Comp.	3	M TH 334, Form and Comp.	3
M ED 327, Choral Cond.	2	M LT 337, The Art Song	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
FREN 141, Beg. French	4	FREN 142, Beg. French	4
Ensemble	1	Ensemble	1
<hr/> 17		<hr/> 18	

## FOURTH YEAR

Fall		Spring	
M AP 445, Voice	4	M AP 446, Voice	4
M TH 435, Counterpoint	3	M TH 427, Instrumentation	2
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
M ED 437, Vocal Pedagogy	3	Elective	3
Ensemble	1	Ensemble	1
<hr/> 14		<hr/> 13	

## Applied Music—Wind Instrument or Percussion Curriculum.

## FIRST YEAR

Fall		Spring	
M AP 145, Major Instr.	4	M AP 146, Major Instr.	4
Applied Music (piano)	1	Applied Music (piano)	1
M LT 131, Intro. to Mus. Lit.	3	M LT 132, Intro. to Mus. Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
<hr/> 17		<hr/> 17	

## SECOND YEAR

Fall		Spring	
M AP 245, Major Instr.	4	M AP 246, Major Instr.	4
Applied Music (piano)	1	Applied Music (piano)	1
M LT 231, Hist. of Music	3	M LT 232, Hist. of Music	3
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
<hr/> 17-18		<hr/> 17-18	

## THIRD YEAR

Fall		Spring	
M AP 345, Major Instr.	4	M AP 346, Major Instr.	4
M TH 333, Form and Comp.	3	M TH 334, Form and Comp.	3
M ED 328, Instr. Cond.	2	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Elective	3
Elective	3	Ensemble	1
Ensemble	1	<hr/>	
<hr/> 16		14	

## FOURTH YEAR

Fall		Spring	
M AP 445, Major Instr.	4	M AP 446, Major Instr.	4
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
M TH 435, Counterpoint	3	Elective	6
M TH 427, Instrumentation	2	Ensemble	1
Elective	3	<hr/>	
Ensemble	1	14	
<hr/> 16			

**Applied Music—Stringed Instrument Curriculum.**

<b>FIRST YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 145, Major Instrument	4	M AP 146, Major Instrument	4
Applied Music (piano)	1	Applied Music (piano)	1
M TH 143, Beginning Theory	4	M TH 144, Beginning Theory	4
M LT 131, Intro. to Mus. Lit.	3	M LT 132, Intro. to Mus. Lit.	3
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
M EN 111-1, Sym. Orch.	1	M EN 111-1, Sym. Orch.	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	17		17
<b>SECOND YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 245, Major Instrument	4	Elective	1
M AP 213, Strings	1		18-19
M TH 243, Intermed. Theory	4	M AP 246, Major Instrument	4
ENG 231, Mast. of Lit.	3	M AP 214, Strings	1
M LT 231, Hist. of Music	3	M TH 244, Intermed. Theory	4
M EN 111-1, Sym. Orch.	1	ENG 232, Mast. of Lit.	3
Elective	1	M LT 232, Hist. of Music	3
P.E., Band, or Basic ROTC	1-2	M EN 111-1, Sym. Orch.	1
	18-19	P.E., Band, or Basic ROTC	1-2
<b>THIRD YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 345, Major Instrument	4	M AP 346, Major Instrument	4
M TH 333, Form and Comp.	3	M TH 334, Form and Comp.	3
M ED 328, Instrumental Conducting	2	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Elective	3
Elective	3	M EN 311-1, Sym. Orch.	1
M EN 311-1, Sym. Orch.	1	M EN 311-3, Chamber Mus.	1
M EN 311-3, Chamber Mus.	1		15
	17		
<b>FOURTH YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 445, Major Instrument	4	M AP 446, Major Instrument	4
M TH 435, Counterpoint	3	M TH 427, Instrumentation	2
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Elective	3	Elective	3
M EN 311-1, Sym. Orch.	1	M EN 311-1, Sym. Orch.	1
M EN 311-3, Chamber Mus.	1	M EN 311-3, Chamber Mus.	1
	15		14

**Music Education Curriculum.\***

<b>FIRST YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 125, Prin. Instr.	2	M AP 126, Prin. Instr.	2
**Applied Music, Sec. Instr.	1	**Applied Music, Sec. Instr.	1
M LT 131, Intro. to Mus. Lit.	3	M LT 132, Intro. to Mus. Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Math. or science	3-4	Math. or science	3-4
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	18-19		18-19
<b>SECOND YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 225, Prin. Instr.	2	M AP 226, Prin. Instr.	2
**Applied Music, Sec. Instr.	1	**Applied Music, Sec. Instr.	1
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Foreign Language	4	Foreign Language	4
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	19-20		19-20
<b>THIRD YEAR</b>			
<b>Fall</b>		<b>Spring</b>	
M AP 325, Prin. Instr.	2	M AP 326, Prin. Instr.	2
**Applied Music, Sec. Instr.	1	**Applied Music, Sec. Instr.	1
**Applied Music, Sec. Instr.	1	**Applied Music, Sec. Instr.	1
M TH 333, Form and Comp.	3	M TH 334, Form. & Comp.	3
M ED 328, Instr. Cond.	2	M ED 327, Choral Cond.	2
M ED 338, Sec. Tchg. of Mus.	3	M ED 336, Sec. Inst. Meth.*	3
S ED 330, Found. of Sec. Ed.*	3	HIST 231, Hist. of U.S. to 1877	3
ED 332, Ed. Psych.	3	S ED 334, Curric. Devel. in Sec. Ed.	3
Ensemble	1	Ensemble	1
	19		19



## FOURTH YEAR

Fall		Spring	
M LT 231, Hist. of Music	3	M LT 232, Hist. of Music	3
S ED 436, Tchg. in Sec. Schls.*	3	M TH 427, Instrumentation	2
S ED 462, Stud. Tchg. in Sec. Schls.*	6	Academic electives	6
HIST 232, Hist. of U.S. since 1877	3	Free electives	2-4
Ensemble	1	Ensemble	1
	18		14-16

\* Secondary certificate (voice, keyboard, orchestra, or band instrument). For an all-level (music) certificate, elementary emphasis, the student should substitute M ED 337 for M ED 336 and substitute the sequence E ED 3331, ED 332, E ED 3344 or E ED 3345, S ED 334, E ED 431, and S ED 432 for that shown above. M ED 429 may be substituted for M ED 328, and M ED 439 should be taken in the spring semester of the junior year.

\*\* Choice of secondary instrument depends upon the student's principal instrument.

## Music History and Literature Curriculum.

## FIRST YEAR

Fall		Spring	
M AP 125, Prin. Instr.	2	M AP 126, Prin. Instr.	2
M AP 1123, Piano	1	M AP 1124, Piano	1
M LT 131, Intro. to Mus. Lit.	3	M LT 132, Intro. to Mus. Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	18		18

## SECOND YEAR

Fall		Spring	
M AP 225, Prin. Instr.	2	M AP 226, Prin. Instr.	2
M AP 2123, Piano	1	M AP 2124, Piano	1
M LT 231, Hist. of Mus.	3	M LT 232, Hist. of Mus.	3
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	18-19		18-19

## THIRD YEAR

Fall		Spring	
M AP 325, Prin. Instr.	2	M AP 326, Prin. Instr.	2
M LT 4311, Mus. of the Mid. Ages or		M LT 4312, Mus. of the Ren. Pd. or	
M LT 4313, Mus. of the Bar. Pd.	3	M LT 4314, Mus. of the Clas. Pd.	3
M TH 333, Form and Comp.	3	M TH 334, Form. and Comp.	3
Foreign Language (German or		Foreign Language	4
French recommended)	4	Elective	3
Ensemble	1	Ensemble	1
Elective	3		16
	18		

## FOURTH YEAR

Fall		Spring	
M AP 425, Prin. Instr.	2	M AP 426, Prin. Instr.	2
M LT 4311, Mus. of the Mid. Ages or		M LT 4314, Mus. of the Clas. Pd. or	
M LT 4313, Mus. of the Bar. Pd.	3	M LT 4312, Mus. of the Ren. Pd.	3
Foreign Language	3	Foreign Language	3
Ensemble	1	Ensemble	1
M LT 332, Hist. of Opera or		M LT 333, Hist. of Opera or	
M LT 4315, Mus. of the Rom. Pd.	3	M LT 4316, Mus. of the Twen. Cen.	3
Elective	3	Elective	3
	15		15

## Music Theory Curriculum.

## FIRST YEAR

Fall		Spring	
M AP 125, Prin. Instr.	2	M AP 126, Prin. Instr.	2
Applied Music, Sec. Instr.	1	Applied Music, Sec. Instr.	1
M LT 131, Intro. to Mus. Lit.	3	M LT 132, Intro. to Mus. Lit.	3
M TH 143, El. Theory	4	M TH 144, El. Theory	4
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
Foreign Language (Fr., Germ., Ital.)	4	Foreign Language (Fr., Germ., Ital.)	4
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1
	19		19

## SECOND YEAR

Fall		Spring	
M AP 225, Prin. Instr.	2	M AP 226, Prin. Instr.	2
Applied Music, Sec. Instr.	1	Applied Music, Sec. Instr.	1
M TH 243, Intermed. Theory	4	M TH 244, Intermed. Theory	4
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Foreign Language (Fr., Germ., Ital.)	3	Foreign Language (Fr., Germ., Ital.)	3
M LT 231, Hist. of Music	3	M LT 232, Hist. of Music	3
Ensemble	1	Ensemble	1
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
18-19		18-19	

## THIRD YEAR

Fall		Spring	
M AP 325, Prin. Instr.	2	M AP 326, Prin. Instr.	2
M TH 333, Form & Comp.	3	M TH 334, Form & Comp.	3
M ED 327, Choral Cond.	2	M ED 328, Instr. Cond.	2
M TH 435, Counterpoint	3	M TH 436, Counterpoint	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Ensemble	1	Ensemble	1
Music Theory elective	2-3	Music Theory elective	2-3
16-17		16-17	

## FOURTH YEAR

Fall		Spring	
M AP 425, Prin. Instr.	2	M AP 426, Prin. Instr.	2
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Elective	3	Elective	3
M TH 427, Instr.	2	M TH 428, Orchestration	2
M TH 432, Fund. of Comp.	3	M TH 433, Fund. of Comp.	3
M TH 430, Ped. of Th. (elementary)	3	M TH 431, Ped. of Th. (intermed.)	3
Ensemble	1	Ensemble	1
17		17	

A keyboard instrument may be the principal or secondary emphasis, but must be taken four years. Also the student must complete one semester each in the study of three orchestral instruments: strings, woodwinds, brass. This should begin in the first year.

## Courses in Applied Music.

Applied music instruction is offered in Baritone, Bassoon, Clarinet, Cornet or Trumpet, Double Bass, Flute, French Horn, Harp, Harpsichord, Oboe, Organ, Percussion, Piano, Saxophone, Trombone, Tuba, Viola, Violin, Violoncello, Voice.

## FOR UNDERGRADUATES

- 111, 112, 211, 212. **Keyboard Skills (1:0:2 each)**. Sight reading and ensemble skills. Required of all piano majors for 4 semesters.
- 113, 114. **Percussion (1:0:3 each)**. Beginning and intermediate experience on the snare drum; introduction to all other percussion instruments, with emphasis on teaching techniques.
- 1113, 1114. **Voice (1:0:3 each)**. Correct posture and studies for breath control; development of resonance; study of vowel formation; vocalization. Simple songs. Laboratory ensemble experience.
- 1123, 1124. **Piano (1:0:3 each)**. Sight reading, melodic transposition, and harmonization. Laboratory ensemble experience.
- 213, 214. **Strings (1:0:3 each)**. Ability to play scales on violin, viola, cello, and bass. Laboratory ensemble experience.
- 2113, 2114. **Voice (1:0:3 each)**. Continuation of M AP 1113 and 1114. Laboratory ensemble experience.
- 2123, 2124. **Piano (1:0:3 each)**. Sight reading, major and minor scales, repertoire suited to individual majors. Laboratory ensemble experience.
- 313, 314. **Brass Instruments (1:0:3 each)**. Fundamentals of playing and teaching brass instruments. Laboratory ensemble experience.
327. **Church Service Playing (2:0:2)**. Prerequisite: M AP 226 (Organ) or equivalent. Literature, modulation, improvisation, hymn playing, and transcription for church services.
- 413, 414. **Woodwinds (1:0:3 each)**. Fundamentals of playing and teaching woodwinds. Laboratory ensemble experience.
- Applied Music. 115, 116, 215, 216, 315, 316. **Instrument or Voice (1:0:1/2 each)**.
- Applied Music. 125, 126, 145, 146, 225, 226, 235, 236, 245, 246, 325, 326, 345, 346, 425, 426, 435, 436, 445, 446. **Instrument or Voice (2:0:1; 3:0:1; 4:0:1)**.

## FOR GRADUATES

- Applied Music. 515, 525, 535, 545. **Instrument or Voice (1:0:1/2; 2:0:1; 3:0:1; 4:0:1)**.
530. **Pedagogy of Applied Music (3:3:0)**. Advanced study in the pedagogy of applied instrumental or vocal masterworks from easy-moderate to difficult. Emphasis in the pedagogy of interpretation, technique, and memorization.
533. **Applied Music Literature (3:3:0)**. Prerequisite: The undergraduate music literature courses required on the B.M. or B.M.E. degree. Advanced study of literature for the various applied music areas. Individual research projects and class performance.
630. **Master's Report (3)**.
660. **Master's Recital and Report (6)**. Master of Music Recital: full length program of standard works from the concert repertory, encompassing several styles of periods of musical composition. Master's Report: a paper of research or documentation of the works performed on the Master of Music Recital.

**Courses in Music Education.****FOR UNDERGRADUATES**

231. **Music for Classroom Teachers (3:3:0).** Prerequisite: Sophomore standing. For elementary education majors. Rudiments of music using a vocal and keyboard approach. Elementary music reading.
232. **Elementary Music Principles, Practices, and Materials (3:3:0).** Prerequisite: M ED 231 or equivalent. For elementary education majors. Emphasis on music activities for elementary school children.
237. **Choral Methods and Techniques (2:2:0).** Prerequisite: 4 semesters of voice. Fundamental techniques of choral conducting. Rehearsal techniques.
238. **Instrumental Conducting (2:2:0).** Prerequisite: M TH 244 or equivalent. Baton techniques, score reading, and interpretation.
336. **Secondary Instruments and Methods (3:3:0).** Prerequisite: Junior standing and M AP 226. Study of instruments, repertoire, organization, and administration of 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.
338. **Secondary School Teaching and Supervision of Music (3:3:0).** Prerequisite: Junior standing. For music majors. Teaching procedures and vocal music materials for junior and senior high school.
429. **Children's Literature in Music (2:2:0).** Prerequisite: Junior classification. A study in depth of the present-day materials involving the listening program in the elementary schools. Methods for presenting the elements of music to young children are explored.
433. **Piano Pedagogy (3:3:0).** Prerequisite: M AP 326 or 346 (Piano). Teaching procedures for prospective piano teachers, including rudiments, techniques, and materials.
437. **Voice Pedagogy (3:3:0).** Prerequisite: M AP 326 or 346 (Voice). Teaching procedures for prospective voice teachers, including exercises, styles, and student teaching.
439. **Developing Creative Musical Programs in the Elementary Schools (3:3:0).** Prerequisite: Junior standing; enrollment in or completion of MED 337. Study of the creative process in music. Exploring the roles of composer, performer, listener, and critic as experienced by elementary school children.
437. **Choral Conducting (3:2:2).** Prerequisite: MED 327 or equivalent. Study and performances of representative choral works of all periods. Participation in a major choral organization required. An individual study course.
4318. **Instrumental Conducting (3:2:2).** Prerequisite: MED 328 or equivalent. Study and performance of instrumental works of all periods. Participation in a major instrumental ensemble required. An individual study course.

**FOR GRADUATES**

- 513, 523, 535. **Workshop of Contemporary Trends in Elementary Music Education (1:0:2; 2:0:4; 3:0:6).** For graduates in elementary education and for specialists in music at the elementary level. Music activities for elementary school students stressing techniques and materials developed at recent national seminars.
- 530, 531. **Seminar in Music Education (3:3:0 each).** Evaluation of philosophy, curricula, principles, practices, and materials. Special studies allow concentration in the field of the student's major activity.
532. **Choral Music Workshop (3:3:0).** Prerequisite: Departmental approval. Emphasis upon the organization and development of choral organizations in the public schools, including tone production, rhythmic precision, balance, blend, diction. Individual and group project required.
533. **Instrumental Music Workshop (3:3:0).** Departmental approval. Emphasis upon the organization and development of instrumental groups in the public schools, and upon development of performance excellence by these groups.
534. **Marching Band Direction (3:3:0).** Planning, charting, scoring, and rehearsing for marching band shows, contests, and festivals. Study of marching band styles.
537. **Instrumental Repertoire (3:3:0).** Literature for small and large instrumental ensembles.
- 538, 539. **Instrumental Conducting Techniques and Analysis (3:0:3 each).** Structural analysis and study of conducting problems in major instrumental works. Individual instruction courses. Participation in a major instrumental ensemble required.
- 5311, 5312. **Advanced Choral Methods and Techniques (3:0:3 each).** An individual study course in advanced choral methods, including a detailed study of the techniques used in achieving a satisfactory performance of choral literature from the Renaissance to the Romantic and Romantic to Contemporary periods. Participation in a major choral organization required.
5335. **Music for Children (3:3:0).** Prerequisite: 6 semester hours in music education or two years' teaching experience in elementary grades. A creative approach to child development through various music activities in grades 1-6.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

**Courses in Music Ensemble.**

Each ensemble may be taken for four successive years, since the literature studied will cover a cycle of that period of time. Four semester hours of M EN 113 may be substituted for required physical education.

**FOR UNDERGRADUATES**

110. Sec. 1. **Tech Choir (1:0:5).** Prerequisite: Audition.
110. Sec. 2. **Women's Chorus (1:0:2).** Prerequisite: Audition.
110. Sec. 3. **Men's Chorus (1:0:2).** Prerequisite: Audition.
110. Sec. 4. **Music Theater (1:0:5).** Prerequisite: Audition.
110. Sec. 5. **Tech Singers (1:0:5).** Prerequisite: Audition.
110. Sec. 6. **Tech Singers (1:0:3).**
111. Sec. 1. **Symphony Orchestra (1:0:5).** Prerequisite: Audition.
111. Sec. 2. **Accompanying (1:0:2).**

111. Sec. 3. Chamber Music (1:0:2). Restricted to duet, trio, or quartet ensemble.
113. Sec. A. Tech Band (1:0:5). Prerequisite: Audition.
113. Sec. B. Varsity Band (1:0:3). Prerequisite: Audition.
113. Sec. E. Varsity Band (1:0:3).
113. Sec. F. Varsity Band (1:0:3).
310. Sec. 1. Tech Choir (1:0:5). Prerequisite: Junior standing, audition.
310. Sec. 2. Women's Chorus (1:0:2). Prerequisite: Junior standing, audition.
310. Sec. 3. Men's Chorus (1:0:2). Prerequisite: Junior standing, audition.
310. Sec. 4. Music Theater (1:0:5). Prerequisite: Junior standing, audition.
310. Sec. 5. Tech Singers (1:0:3). Prerequisite: Audition.
310. Sec. 6. Tech Singers (1:0:3).
311. Sec. 1. Symphony Orchestra (1:0:5). Prerequisite: Junior standing, audition.
311. Sec. 2. Accompanying (1:0:2).
311. Sec. 3. Chamber Music (1:0:2).
311. Sec. 4. Brass Ensemble.
311. Sec. 5. Woodwind Ensemble.
311. Sec. 6. Percussion Ensemble (1:0:2).
311. Sec. 7. Harp Ensemble (1:0:2).
313. Sec. A. Tech Band. (1:0:5). Prerequisite: Junior standing, audition.
313. Sec. B. Varsity Band. (1:0:3). Prerequisite: Junior standing, audition.
313. Sec. C. Stage Band (1:0:3).
313. Sec. D. Stage Band (1:0:3).
313. Sec. E. Varsity Band (1:0:3). Prerequisite: Junior standing.
313. Sec. F. Varsity Band (1:0:3). Prerequisite: Junior standing.

#### FOR GRADUATES

510. Graduate Ensemble (1:0:5). Instruction and demonstration of ensemble technic in performance situations. Preparation of and participation in performed material is required.
  - Sec. 1. Chorus
  - Sec. 2. Orchestra
  - Sec. 3. Band
  - Sec. 4. Music Theater
  - Sec. 5. Chamber Music
  - Sec. 6. Collegium Musicum
- Military Band. Part of Basic ROTC. For particulars, inquire of the officer in command.

### 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.
- 231, 232. History of Music (3:3:0 each). Prerequisite: M LT 131, 132. Historical survey of the music of Western civilization from ancient times to the present.
- 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. This course satisfies the fine arts or humanities requirement on various degree plans.
331. Music Literature (3:3:0). For elementary education majors specializing in music. Media, styles, and forms of various periods. Material for elementary grades.
- 332, 333. History of Opera (3:3:0 each). Prerequisite: M LT 131, 132, and 231, 232. History and literature of Opera. 1st semester: origins and development through Mozart; 2nd semester: 19th and 20th Century Opera.
335. American Music (3:3:0). American Music. Survey of music in the United States from the early seventeenth century to the present.
337. The Art Song (3:3:0). Prerequisite: M LT 131, 132 and 231, 232. Historical and analytical survey of art song from the Baroque period to the present. Emphasis upon the nineteenth century German Lied and French Melodie.
- 435, 436. Keyboard Literature I, II (3:3:0 each). A survey of keyboard literature from earliest times to the present. Class performance and listening.
4311. Music of the Middle Ages (3:3:0). Prerequisite: M LT 131, 132 and 231, 232. A survey of music from Gregorian Chant to c.1450.
4312. Music of the Renaissance Period (3:3:0). Prerequisite: M LT 131, 132 and 231, 232. A survey of music from c.1450 to c.1600.
4313. Music of the Baroque Period (3:3:0). Prerequisite: M LT 131, 132 and 231, 232. A survey of history and literature of music from c.1600 to c.1750.
4314. Music of the Classic Period (3:3:0). Prerequisite: M LT 131, 132 and 231, 232. Music of Haydn, Mozart, Beethoven, and their contemporaries.
4315. Music of the Romantic Period (3:3:0). Prerequisite: M LT 131, 132, and 231, 232. A survey of music from about 1825 to 1900.
4316. Music of the Twentieth Century (3:3:0). Prerequisite: M LT 131, 132 and 231, 232. A study of trends and developments in music since 1900.

#### FOR GRADUATES

531. Music Bibliography and Research (3:3:0). Bibliographical studies and research methodology.
532. Choral Repertoire (3:3:0). Analysis of choral works of all periods for both small and large ensembles.
- 533, 534, 535, 536. Seminar in the History and Literature of Music I, II, III, IV (3:3:0 each). Musical, historical, and esthetic problems: I, Medieval Period, II, Renaissance Period, III, Baroque Period, IV, Classic-Romantic Period.
- 537, 538. Seminar in the History of Opera (3:3:0 each). Studies in the development of opera during the 17th, 18th, and 19th centuries.

### Courses in Music Theory.

#### FOR UNDERGRADUATES

131. Introduction to Music Theory (3:3:0). Emphasis on simple melody, rhythm, harmony, singing, and keyboard studies.

- 135, 136. **Fundamentals of Music (3:3:0 each).** For elementary education majors specializing in music. Sight-singing in unison and parts, melodic and harmonic dictation, keyboard work; major and minor keys; primary and secondary chords; modulations to related keys.
- 143, 144. **Elementary Theory (4:3:2 each).** Melody, intervals, four-voice chords and non-harmonic material in major and minor tonalities; modulation; keyboard; sight-singing; melodic and harmonic dictation.
- 243, 244. **Intermediate Theory (4:3:2 each).** Prerequisite: M TH 144 or equivalent. Analysis, written work, keyboard and dictation in four-voice texture including diatonic and altered triads, sevenths, Augmented Sixths; small contrapuntal forms; sight-singing.
321. **Score-Reading (2:2:0).** Prerequisite: Junior classification. Reading of open score (piano score, string quartet, octavo, full orchestra) at the piano. Comprehension of clefs and instrumental transpositions are involved.
331. **Arranging (3:3:0).** Techniques of band arranging; jazz idioms; arranging for small combo and stage band; laboratory performances of student arrangements.
- 333, 334. **Form and Composition (3:3:0 each).** Prerequisite: M TH 244 or equivalent. Homophonic and larger forms; analysis and synthesis of Classical, Romantic, Impressionist and Contemporary styles; harmonic and non-harmonic elements; analysis-performance reports.
410. **Collegium Musicum (1:1:0).** Discussion and informal performance of music from the Christian era to the present. Supervised analysis. May be repeated for credit.
- 427, 428. **Instrumentation, Orchestration (2:2:0 each).** Prerequisite: M TH 244 or equivalent. Properties of woodwind, brass, string, and percussion instruments; transposition; techniques and mechanics of scoring within sections leading to full orchestral and band scoring.
- 430, 431. **Pedagogy of Theory (3:3:0 each).** Prerequisite: Senior classification. Study of the correlation of dictation, written harmony, keyboard, and singing at the collegiate level; formation of syllabus; observation; practice teaching.
- 432, 433. **Fundamentals of Composition (3:3:0 each).** Prerequisite: Senior classification. Original writing in small forms for voice, solo instruments, and small ensembles; development of individual style. Select student works may be performed during the annual Festival of Contemporary Music. May be repeated for credit.
- 435, 436. **Modal Counterpoint (3:3:0 each).** Prerequisite: M TH 244 or equivalent. Vocal counterpoint of sixteenth century; mass motet, madrigal; solo vocal writing in the modes; synthesis in two-to-six-voice textures; group sight-reading of the literature.

## FOR GRADUATES

- 521, 522. **Styles (2:2:0 each).** A study of the development of harmonic, melodic, rhythmic, and tonal practices from Richard Wagner to the present.
- 524, 525. **18th Century Counterpoint and Fugue (2:2:0 each).** Prerequisite: M TH 436 or equivalent. A study of counterpoint and fugue in the music of Bach and Handel and their contemporaries. Original writing in the style. The second semester includes the fugue as found in the works of 19th century composers.
531. **Seminar in Music Theory (3:3:0).** Prerequisite: Graduate classification. History of musical practice; survey of theoretical texts, treatises, and materials from pre-Baroque to the present.
533. **Acoustics (3:3:0).** A study of the science of musical sound.
534. **Pedagogy of Theory (3:3:0).** A resume of the materials, organization, techniques, and problems of college freshman and sophomore theory courses.
- 537, 538. **Composition (3:3:0 each).** Prerequisite: M TH 433 or equivalent. Advanced work in free composition for chamber groups, orchestra, band, chorus, or the electronic media. May be repeated for credit. An individual instruction course.
631. **Master's Thesis. (3).** Enrollment required at least twice. May be an original composition for the theory and composition major.

## Department of Philosophy

The Department of Philosophy directs the *Bachelor of Arts* degree program in PHILOSOPHY.

Students majoring in philosophy must complete 30 semester hours in philosophy, including PHIL 231. Minors are required to complete 18 semester hours in philosophy. A grade average of 2.00 or better must be made in philosophy courses by majors and minors.

A maximum of 6 semester hours of credit toward a major in philosophy may be allowed for advanced courses in certain other departments provided the chairmen of the departments concerned approve the student's program.

### Courses in Philosophy.

## 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 methods. Study of Aristotelian principles, Boolean techniques, and the fundamentals of symbolic calculi.
238. **Ethics (3:3:0).** Prerequisite: Sophomore classification. Problems of individual and social conduct.
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).** Prerequisite: Junior classification. American philosophy from colonial times to the present.
334. **Contemporary Philosophy (3:3:0).** Prerequisite: Junior classification. Philosophical thought of the neo-Kantians, vitalists, neo-Hegelians, pragmatists, neo-realists, and positivists.



335. **Oriental Philosophies (3:3:0).** Prerequisite: Junior classification. Views of important philosophic 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.
338. **Intermediate Logic (3:3:0).** Prerequisite: PHIL 231 or MATH 136 or its equivalent and junior classification. A continuation of PHIL 231, with special emphasis on functional calculus, set theory, and postulational technique.
431. **Aesthetics (3:3:0).** Prerequisite: Senior classification or consent of instructor. The nature of beauty; analysis of the aesthetic experience.
432. **Philosophy of Value (3:3:0).** Prerequisite: Senior classification or consent of instructor. The nature of values; exploration of the possibility of an integrated value system.
433. **Theories of Knowledge (3:3:0).** Prerequisite: 6 hours of philosophy and senior classification or consent of the instructor. Examination of the presuppositions for reliable knowledge.
434. **Metaphysics (3:3:0).** Prerequisite: 6 hours of philosophy and senior classification or consent of instructor. Studies in rival ontologies and their relevance to current inquiry.
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

531. **Studies in Philosophical Classics (3:3:0).** Prerequisite: Graduate classification or consent of instructor. Special studies in philosophical classics. Independent work under a staff member with prior permission. May be repeated.
535. **Basic Issues in Contemporary Philosophy (3:3:0).** Prerequisite: Consent of instructor. Certain topics around which philosophical controversies emerge: rational and empirical knowledge; science and value; etc. Designed for graduate education students, but open to others.

## Department of Physics

This department supervises the following degree programs: **ENGINEERING PHYSICS**, *Bachelor of Science in Engineering Physics* (offered in conjunction with the College of Engineering); **PHYSICS**, *Bachelor of Arts* or *Bachelor of Science*, *Master of Science*, *Doctor of Philosophy*.

The undergraduate curricula in physics may lead to either a Bachelor of Arts degree or Bachelor of Science degree; the curricula in Engineering Physics, offered in conjunction with the College of Engineering, leads to a Bachelor of Science in Engineering Physics degree. The curriculum for the Bachelor of Science degree is set forth in the accompanying table; that for the Bachelor of Science in Engineering Physics appears in the appropriate section of the College of Engineering.

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, and must meet the general requirements of the degree they are seeking, as described in this catalog.

**Teacher Education.** For those students seeking secondary certification 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): PHYS 143, 241, 242, 335, 434; one course selected from PHYS 313, 314, or 315; plus two courses selected from PHYS 331, 336, 338, 341, 432, 435, or 439.

II. Science option: Students may elect a broad field science 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 Chairman of the Physics Department and should become familiar with the Teacher Education section of the catalog.

## Physics Curriculum, B.S. Degree.

		FIRST YEAR	
Fall		Spring	
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
PHYS 143, Prin. of Physics	4	PHYS 241, Prin. of Physics	4
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1

SECOND YEAR			
Fall		Spring	
PHYS 242, Prin. of Phys.	4	PHYS 331, Optics	3
MATH 235, Anal. Geom. & Calc. III	3	MATH 335, Higher Math for Engrs. & Scis. I	3
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
Science elective	3-4	GERM 142, Beg. Germ. or FREN 141, Beg. Fren.	4
GERM 141, Beg. Germ. or FREN 141, Beg. Fren.	4	Science elective	3-4
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	18-20		17-19

THIRD YEAR			
Fall		Spring	
PHYS 314, Intermed. Lab.	1	PHYS 315, Intermed. Lab.	1
PHYS 335, Elec. & Magnetism	3	PHYS 336, Elec. & Magnetism	3
PHYS 434, Mechanics	3	PHYS 435, Mechanics	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
GERM 231, Scientific Germ. or FREN 231, Sec. Course in French	3	GERM 234, Scientific Germ. or FREN 232, Sec. course in French	3
MATH 336, Higher Math. for Engrs. & Scis. II	3	Social science elective	3
	16		16
FOURTH YEAR			
Fall		Spring	
PHYS 432, Thermodynamics	3	Social Science elective	3
PHYS 437, Quantum Mech.	3	PHYS 338, Nuc. Phys.	3
MATH 434, Adv. Calculus	3	MATH 435, Adv. Calculus	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Humanities elective	3	Humanities elective	3
	15		15

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 department chairman.

## 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.
143. Principles of Physics I (4:3:3). Prerequisite: Parallel enrollment in MATH 151. Kinematics, dynamics, conservation laws, wave motion, fluids, kinetic theory, and thermodynamics.
151. Physics for the Non-Scientist (5:5:0). Qualitative course intended to acquaint the student with the basic laws and vocabulary of physics. Emphasis will be on interpreting results of current research which may reach the student through the various communications media. A minimum of mathematics will be used. The course will not fulfill the present science requirement for Arts and Sciences majors.
237. Techniques of Photography (3:2:3). Prerequisite: Sophomore standing and approval of instructor. Fundamental processes and techniques of photography for those who will later need photography as a scientific tool. Will not apply toward physics requirements.
241. Principles of Physics II (4:3:3). Prerequisite: PHYS 143 and parallel enrollment in MATH 152. Electric and magnetic fields, 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, 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.
422. Selected Topics (2:2:0). Prerequisite: Approval of department chairman. 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 chairman. 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 department chairman. Advanced topics selected by departmental recommendation. May be repeated in different areas.
531. **Advanced Topics in Quantum Mechanics I (3:3:0)**. Prerequisite: Graduate standing. The bases of quantum mechanics, the hydrogen atom, matrix representations, and approximation methods.
532. **Advanced Topics in Quantum Mechanics II (3:3:0)**. Prerequisite: Graduate standing. Angular momentum, electromagnetic interactions, identical particles, and scattering theory.
533. **Advanced Topics in Solid State Physics (3:3:0)**. Prerequisite: Graduate standing. Specific heats, ferro-electronics, conductivity, and band theory of solids.
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. Gibb's 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)**. Introduction to contemporary methods of mathematical 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. **Quantum Mechanics (3:3:0 each)**. Prerequisite: PHYS 437, 438, and 541, 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, PHYS 335, 336. Advanced treatment of Maxwell's theory, including electrostatics, magnetostatics, theory of radiation, and application of the theory to select 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 approval. Current topics in theoretical physics, which may include application 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 problems 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

This department supervises the following degree programs: **PSYCHOLOGY, Bachelor of Arts, Master of Arts, Doctor of Philosophy.**

The advanced degrees encompass a number of different areas in counseling, clinical, and experimental psychology. In addition, there is a graduate program for those wishing to earn a professional certificate in school counseling and guidance.

All undergraduate majors in psychology are required to take a core program of six courses with an additional four courses on a partial option basis. The required courses are PSY 230, 240, 437, 4316, 4317, and MATH 4328. Of the optional courses two must be taken from PSY 434, 435, or 436 and two from 433, 4322, 4323, or 4327. Psychology majors may take additional courses in the department to total 42 hours if they so desire.

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 fundamental concepts in psychology. Emphasis on heredity and environment, individual differences, personality dynamics, and group processes.
240. **General Psychology II (4:2:4).** Emphasis on experimental psychology, learning perception, motivation, and the biological bases of behavior. Introduction to laboratory approaches in the study of behavior.
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 ED 332, or CDFR 131. Emphasis is placed upon the development of the child from 6 to 12. A study of the developmental processes and environmental factors which shape the personality and affect the achievement of the child.
332. **Mental Health (3:3:0).** Prerequisite: PSY 230 or 240, or ED 332 or CDFR 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 ED 332, or CDFR 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.
343. **Statistical Methods (4:3:2).** Prerequisite: PSY 230 or 240, or ED 332. Introduction to descriptive and inferential statistics through T test and Chi-square. Emphasis is placed on statistical foundations in set and probability theory. Practice on calculators and introduction to computer functions.
432. **Personnel Testing (3:3:0).** 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.
433. **Intermediate Quantitative Methods in Psychology (3:3:0).** Prerequisite: MATH 4328 or equivalent. Review of inferential statistics including probability, small sample theory, and Chi-square. Advanced treatment of analysis of variance, nonparametric statistics and correlational methods. Emphasis will be upon application to problems of behavioral sciences.
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 hours of 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 hours of 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, 240, MATH 4328 or equivalents. A lecture-laboratory course considering the problems of experimentation in clinical, social, and experimental psychology upon animals and human subjects.
439. **Industrial Psychology (3:3:0).** Prerequisite: PSY 230 or 330. Psychological principles and methods applied to industry.
4316. **History of Psychology (3:3:0).** Prerequisite: PSY 230, 240 or equivalent. Recommended: senior standing. A survey of the history of psychology, with emphasis on the evolution of contemporary viewpoints and methods.
4317. **The Psychology of Learning (3:3:0).** Prerequisite: PSY 230, 240 or equivalent. 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. Brief survey of theories.
4318. **Industrial Training (3:3:0).** Prerequisite: PSY 330. Principles of teaching and learning; selecting instructional staff; organization and coordination of training functions.
4319. **Human Learning (3:3:0).** Prerequisite: PSY 230 or ED 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 Practices (3:3:0).** Prerequisite: 6 hours of psychology and/or consent of instructor. Review of principles. Emphasis on skill which will apply directly to interview situations, such as industrial, clinical, and vocational counseling. Demonstration, recordings, and discussion.
4322. **Motivation (3:3:0).** Prerequisite: 6 hours of psychology. An analysis of current theories in motivation and their historical development. Emphasis on recent empirical findings in the areas of primary and derived motivational states and their influence on theory. Animal and human.
4323. **Perception (3:3:0).** Prerequisite: 6 hours of psychology. A survey of the methods, findings, and principles in field of sensation and perception. Attention given to underlying neurological mechanisms associated with perception. Brief survey of theories of perception.
4324. **Cognition (3:3:0).** Prerequisite: PSY 230, 240, and consent of instructor. This course represents an emergent synthesis of the traditional areas of perception, learning, and human performance. This new area concerns itself with higher level human cognition. Data and theory for the topics of creativity, concept learning, cognitive skills, and attention will be covered.
4326. **Individual Problems Course (3).** Prerequisite: Prior permission of instructor and high scholastic achievement. Independent work under the individual guidance of a staff member.
4327. **Physiological Psychology (3:3:0).** Prerequisite: 6 hours of psychology. Recommended: BIOL 142, PSY 240 or equivalent. Introduction to neuroanatomy, electro-physiological 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 (3).** Prerequisite: 12 advanced hours of psychology and prior permission of instructor. Independent work under individual guidance of a staff member.
534. **Practicum in Psychological Testing (3:3:0).** Prerequisite: Permission of instructor. Instruction and practice in giving intelligence, aptitude, interest, and/or personality tests. Emphasis on individual tests.
539. **Occupational Information and Career Patterns (3:3:0).** Prerequisite: Graduate standing. Historical development of counseling movement, ethical factors in counseling; work and labor trends; collection, classification, and utilization of educational and vocational information for counseling purposes. Analysis of career patterns.
5311. **Projective Techniques I (3:3:0).** Prerequisite: PSY 534, and permission of instructor. 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, and permission of instructor. Study, administration, and interpretation of selected projective techniques. Rorschach and TAT.
5314. **Tests and Measurements (3:3:0).** Prerequisite: MATH 4328 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.
5316. **Introduction to Adjustment Counseling and Psychotherapy (3:3:0).** Prerequisite: PSY 435 or 436. Consideration of theories of adjustment counseling. Attitudes and orientation of the counselor in the counseling relationship, oral discussion, recordings, and role playing.
5317. **Techniques of Counseling: Career Guidance (3:3:0).** Prerequisite: PSY 534, 5316. Theories of educational-vocational counseling, utilization of tests for counseling purposes; emphasis on techniques of counseling; counseling experience; report writing.
5318. **Practicum in Techniques of Counseling (3:2:3).** Prerequisite: Prior permission of instructor. Supervised experience in interviewing, adjustment counseling, vocational counseling and/or psychological evaluation. Student works with a limited number of clients through the psychology clinic.
5319. **Behavioral Aspects of Mental Retardation (3:3:0).** Prerequisite: ED 5320 or permission of instructor. Behavioral science approaches to the problems of mental retardation—an advanced survey.
5320. **Seminar in Mental Retardation (3:3:0).** Prerequisite: Graduate standing, ED 5320 or permission of instructor. Applied research tactics in selected areas of mental retardation. In-depth discussion of procedures, controls, and interpretation. Students will design and conduct research under instructor supervision as well as disseminate experimental findings via formal publication outlets or scientific meetings. Topics varied. May be repeated for credit.
5321. **Practicum in Mental Retardation (3:1:3).** Prerequisite: Graduate standing, PSY 5320, or permission of instructor. Supervision in diagnostics, training, management, and treatment practices with cases selected from mentally retarded children and adults. Emphasis may vary and course may be repeated for credit.
5322. **Family Counseling (3:3:0).** Prerequisite: PSY 5316 and permission of instructor. A study of approaches to counseling of families with parent, child problems. Theory and practice.
5323. **Group Counseling and Psychotherapy (3:3:0).** Prerequisite: Prior permission of instructor. Designed to provide theories of approaches to group work and a personal experience with group processes. Various points of view will be studied.
5324. **Seminar in Personality Theory (3:3:0).** Prerequisite: PSY 436. A critical review of current theories of personality.
5325. **Case Studies in Vocational Rehabilitation (3:3:0).** Prerequisite: Prior permission of instructor. Critical analysis of actual cases derived from the files of the State Office of Rehabilitation and the State Commission for the Blind.
5326. **Medical Aspects of Rehabilitation (3:3:0).** Prerequisite: Prior permission of instructor. A joint medical-psychological seminar considering medical aspects and psychological components of disabling diseases and the interaction of these two factors as the individual reacts to the residual handicap. Rehabilitation emphasis.
5327. **The Psychology of Disability (3:3:0).** Prerequisite: Prior permission 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.
5328. **Seminar in Social Psychology (3:3:0).** Prerequisite: PSY 434. Contemporary attitude theory and research; systematic theory in social psychology; social structure and personality; the psychology of social movements and current research trends.
5329. **Seminar in the Psychological Analysis of Social Systems (3:3:0).** Prerequisite: Permission of instructor. Analysis of social systems, from small groups to large organizations and communities. Communication flow in organizations, structure-function relationships, social units as systems; measurement operations. May be repeated once for credit.
5330. **Attitude Organization and Change (3:3:0).** Prerequisite: PSY 434. Advanced study of the formation, organization, and change of social and interpersonal attitudes. The role of beliefs and values. Emphasis on current research and theory.
5333. **Seminar in Behavior Modification (3:3:0).** Prerequisite: PSY 4317 or permission of instructor. A critical analysis of emerging patterns of management, training, and therapy that derive from contemporary learning theory. Some practice in applying such procedures will be included.
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.
5335. **Seminar in Developmental Psychology (3:3:0).** Prerequisite: Graduate standing. Intensive study of contemporary research and issues in developmental psychology.
5336. **Advanced Child Psychology (3:3:0).** Prerequisite: Graduate standing. A survey of theoretical foundations of modern child psychology; psychoanalytic theories, social learning theories, cognitive-developmental theories, and comparative ecological theories, research strategies and appropriate models in developmental.



5337. **Play Therapy (3:3:0)**. Prerequisite: Prior permission of instructor. Study of theory and application of play techniques in diagnostic and therapeutic work with children; the child's symbolic communications through languages, art, and play materials. Review of research.
5338. **Seminar in Psychopathology (3:3:0)**. Prerequisite: PSY 435 or equivalent. Advanced study in the area of abnormal or deviant forms of behavior, including both functional and organic conditions.
5343. **Seminar in Psychometrics (3:3:0)**. Prerequisite: PSY 5314, 5347, 5348 or consent of instructor. Analyse methodological and theoretical problems in measurement and test construction.
5344. **Introduction of Mathematical Models in Psychology (3:3:0)**. Prerequisite: PSY 5348 and permission of instructor. Application of analytic methods to psychological data and model building: empirical curve-fitting, goodness-of-fit tests, and introduction to representative models.
5345. **Research Seminar in Clinical and Counseling Psychology (3:3:0)**. Prerequisite: PSY 5347 and 5348. Survey of methods and approaches to research in these areas.
5346. **Seminar in Human Factors (3:3:0)**. Prerequisite: PSY 5347, 5348, 5351, or permission of instructor. Intensive analysis of concepts associated with human factors research and theory. Original research problems will be developed by the student.
5347. **Advanced Correlational Methods and Factor Analysis (3:3:0)**. Prerequisite: Permission of instructor. Comprehensive survey of multi-variance analysis including multiple correlation and factor analysis and other correlational techniques. Review of analysis of co-variance.
5348. **Advanced Statistical Methods and Experimental Design (3:3:0)**. Prerequisite: Permission of instructor. Logical principles governing sound experimentation: Conventional designs utilizing analysis of variance. Introduction to complex analysis of variance designs, trend tests, and analysis of co-variance.
5349. **Seminar in the Teaching of Psychology (3:3:0)**. Prerequisite: Graduate standing and consent of instructor. Study of methods applied to teaching at the college level. Preparation of course materials, presentation, audio-visual aids, etc. May not be used as part of degree program.
5350. **Systems of Psychology (3:3:0)**. Prerequisite: Graduate standing. The nature of psychological systematics and theory construction, including cultural and other factors influencing system building. Consideration of major systems from the Hellenic period to the present.
5351. **Advanced Experimental Psychology (3:3:0)**. Prerequisite: PSY 437, 5347 and 5348. Advanced research techniques; each class member required to design, execute, and write up one or more original experiments. Study of methodological problems in research.
5352. **Seminar in Learning Theory (3:3:0)**. Prerequisite: PSY 4317. Current systems and theories of learning.
5353. **Seminar in Physiological Psychology (3:3:0)**. Prerequisite: PSY 4327 or equivalent. Open to graduate students in the biological sciences with credit in PSY 230 or equivalent. Current trends in psycho-physiological research.
5354. **Seminar in Perception (3:3:0)**. Prerequisite: PSY 4323 or prior permission of instructor. Major problems areas in psychology of perception, such as the study of the psycho-physiology of sensory processes; perception theory; implication theory; implications for usage in social and clinical psychology.
5355. **Seminar in Comparative Psychology (3:3:0)**. Prerequisite: Prior permission of instructor. Study of the use of subhuman 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. **Seminar in Motivation (3:3:0)**. Prerequisite: PSY 4322 or prior permission of instructor. Study of psychological, social and physiological factors in motivation. Human and animal.
5357. **Seminar in Mathematical Models of Learning (3:3:0)**. Prerequisite: PSY 5348 and 5352. Analytical techniques and their application to the formulation, experimental evaluation, and revision of mathematical models of learning in representative areas of choice, paired-associate, avoidance, stimulus sampling, probability learning, and related topics.
5358. **Electrophysiological Instrumentation (3:2:3)**. Prerequisite: PSY 4327 or consent of instructor. Open to graduate students in the biological sciences. Basic electricity and electronics applied to relay and solid-state programming, methods of recording EEG, EKG, GSR and other psycho-physiological measurements, stereotaxic surgical techniques, brain stimulation.
5359. **Advanced General Psychology (3:3:0)**. Prerequisite: Prior permission of instructor. Advanced study in general psychology. Review of relevant literature.
5360. **Seminar in Verbal Behavior (3:3:0)**. Prerequisite: Graduate standing and the consent of instructor. Study of the problems of the acquisition of language, symbolic communication, information processing, and the learning of verbal material. Psycholinguistics, Information Theory, and Meaningfulness.
5361. **Advanced Practicum in Counseling and Clinical Psychology (3:1:3)**. Prerequisite: PSY 5318, and prior permission of instructor. Supervised practice in psychodiagnostics and psychotherapy with selected cases. Emphasis on a wide variety of experience. May be repeated.
5362. **Master's Internship in Counseling and Clinical Psychology (3)**. Prerequisite: By arrangement with department chairman. Full-time supervised internship in an appropriate facility.
5363. **Doctoral Internship in Counseling and Clinical Psychology (3)**. Prerequisite: By arrangement with department chairman. Full-time supervised internship in an appropriate facility. Enrollment required four times to complete one calendar year.
5370. **Engineering Psychology (3:3:0)**. Prerequisite: Consent of instructor. 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.
5371. **Seminar in Psychopharmacology (3:3:0)**. Prerequisite: PSY 5353 or consent of instructor. Open to graduate students in biological sciences. Examination of research on behavioral effects of psychoactive drugs and the usefulness of these drugs in experimentation and therapy.
5372. **Human Performance (3:3:0)**. Prerequisite: Graduate standing. Human motor, perceptual, and verbal skills from the point of view of methods of analysis, measurement, and theory. Supervised research is part of the course requirement.
5373. **Advanced Seminar in the Physiological Basis of Learning and Memory (3:3:0)**. Prerequisite: PSY 5352, 5353, and graduate standing. PSY 5358 is recommended. An intensive review and interpretation of the recent advances in the study of the physiological substrates of learning and memory. Topics may vary. May be repeated for credit.

5374. **Advanced Seminar in Animal Learning (3:3:0).** Prerequisite: PSY 5352 and graduate standing. In depth coverage of current data area in Learning. Student review and integration under direction of instructor. Topics varied. May be repeated for credit.
5375. **Advanced Seminar in Operant Conditioning (3:3:0).** Prerequisite: Graduate standing. Operant behavior techniques as applied to different areas of research. In depth discussion of procedures, controls, and interpretation. Students will design and conduct research under the close supervision of the instructor. Topics may vary.
5376. **Seminar in Advanced Perception (3:3:0).** Prerequisite: Core Perception. The seminar will discuss in depth several selected topics in perception. Topics will vary from year to year. Topics will be selected from areas such as audition, color-vision, psychophysics, information theory and depth perception.
5377. **Advanced Seminar in Human Learning (3:3:0).** Prerequisite: PSY 5352 and graduate standing. An examination of human conditioning, verbal learning, memory, conceptual behavior, cognition, etc. Emphasis will be on both theory and current data.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
- 731, 732. **Research (3 each).**
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Sociology and Anthropology

This department supervises the following degree programs: **ANTHROPOLOGY, Bachelor of Arts; SOCIOLOGY, Bachelor of Arts, Master of Arts; SOCIAL WELFARE, Bachelor of Arts.** The department also participates in the **LATIN AMERICAN AREA STUDIES** program leading to the *Bachelor of Arts* degree.

A student majoring in sociology must complete 30 semester hours in sociology including SOC 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.

A student majoring in anthropology must complete 30 semester hours in anthropology, including ANTH 231, 232, 332, one course in prehistory, and two courses in ethnology. SOC 336, PHIL 436, and HIST 4329 (Plains Indians) may be credited toward a major in anthropology. A grade of C or better must be received in each advanced anthropology course (all courses having a number of 300 or higher) by those working for a major or minor in the subject.

**Social Welfare.** An interdepartmental major in social welfare for the B.A. degree is offered which will follow the recommendations of the National Council on Social Work Education. This program, administered by the Department of Sociology and Anthropology, will prepare students to take positions in welfare and social work agencies directly upon graduation. In addition, it is anticipated that this major (or equivalent work) will become prerequisite to professional graduate programs in social work for the Master of Social Welfare degree.

A student majoring in social welfare must complete 30 semester hours. The 12 hours required are SOC 234, 332, 333, and 439 (or an equivalent course in social research methods). The additional 18 hours should represent at least three other cooperating departments and should be chosen from the following: PSY 332, 434, 435, 4321; PHIL 238, 338; SOC 335, 431, 433, 4311, 4312, 4313; FIN 231, 335; FR 335, 433, 436. A minor of 18 hours shall be selected (preferably) from one of the departments contributing courses to the major, with no course being counted in both the major and minor. Selection of a minor should be made in consultation with the Social Welfare Adviser, Dr. Dennis E. Poplin, Room 310, Administration Building. In addition, standard requirements for the B.A. degree must be met.

**Teacher Education.** Sociology may be used as a social science in the broad field (Plan II) program for secondary teacher certification and as a field of specialization in elementary education. For specific courses, consult the Education Adviser of the department in Room 351, Administration Building.

## Courses in Sociology.

### FOR UNDERGRADUATES

230. **Introduction to Sociology (3:3:0).** Introduction to the study of human group behavior, including the forms which group life takes, the relationships of groups to other groups, the influence of groups on the individual, and the relationships of individuals to each other as members of groups.
233. **Current Social Problems (3:3:0).** Prerequisite: SOC 230 or consent of instructor. The application of the principles of group behavior and organization (as learned in SOC 230) 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.
234. **Social Welfare as an Institution (3:3:0).** Prerequisite: SOC 230 and 233. An examination of factors influencing the development of welfare services within the United States with particular emphasis upon emerging governmental programs.

235. **The Sociology of Marriage (3:3:0).** History, present status, and current problems of the marriage institution.
331. **Rural Sociology (3:3:0).**
332. **Social Work: Profession and Interventive Means (3:3:0).** Prerequisite: SOC 234 or consent of instructor. An examination of the functions, goals, and purposes of selected health and welfare agencies found within the modern American community.
333. **Field Experience in Social Work (3:3:0).** Prerequisite: SOC 234 and 332. This course provides the student with closely supervised experience in a social welfare or related agency.
334. **The Sociology of Work and Industrial Relations (3:3:0).** An analysis of the 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.
335. **Sociology of Poverty (3:3:0).** Prerequisite: Advanced standing and SOC 233. Study of the organization, culture, and problems of the poor in the United States but relevant also to the developing nations. Special emphasis will be placed upon the minority poor of the Southwest: the Mexican-Americans, the Hispano-Americans, and the Reservation Indians as well as the rural and/or urban Anglo and Negro poor.
336. **Society and Culture of Mexico (3:3:0).**
337. **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.
338. **Population Problems (3:3:0).** Prerequisite: SOC 230 and/or consent of instructor. Designed to introduce the student to the basic tools of demographic analysis and the elements of population structure. The causes and consequences of differential birth and death rates are analyzed, as are rates of population increase.
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.
431. **Law and Society (3:3:0).** Prerequisite: Advanced standing and 6 hours of sociology (including SOC 230) or consent of instructor. Study of the relationship of legal institutions to modern society; major types of law as solutions to human problems are covered.
433. **Criminology (3:3:0).** Prerequisite: SOC 230 or consent of instructor.
434. **Sociology of the Developing Nations (3:3:0).** Prerequisite: Advanced undergraduate or graduate standing. Study of the sociological problems faced by developing nations as they enter the urban, industrial, and scientific age.
435. **Collective Behavior and Social Movements (3:3:0).** Prerequisite: SOC 230 or consent of instructor. Spontaneous group behavior—that which is not organized as a part of the culture and social organization of the group: crowds and mobs, panics and public opinion, and mass behavior of all types (fads, fashions, crazes, panics, etc.); the organization of all of these in social movements.
436. **Contemporary Sociological Theories (3:3:0).** Prerequisite: 9 semester hours of sociology, including SOC 230, or consent of instructor.
437. **Social Change (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. An introduction to methods of data collection and analysis; the interpretation of social data.
4311. **The Sociology of the Person (3:3:0).** Prerequisite: SOC 230 or consent of instructor. Effects of group membership on individual behavior; emphasis on childhood and adolescent experiences in primary groups.
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.
4315. **Sociology of Religion (3:3:0).** Prerequisite: SOC 230 or consent of instructor. The sociological study of religious groups and religious systems. The social origin and the social consequences of religious beliefs. The patterns of social interaction in religious groups and their consequences for the participants. The reciprocal relationships between religious institutions and groups in the society.
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 philosophy of the past. The evolution of sociology as a discipline in the late nineteenth and early twentieth centuries.
4317. **Complex Organizations (3:3:0).** Prerequisite: SOC 230 or consent of instructor. Organizational sociology treats the nature and types of complex organizations, especially governmental and industrial bureaucracies. Analysis of relations between organizations and the larger social context, and such aspects of their internal structure as relations between formal and informal group relations, processes of communication, and mechanisms of control.

## FOR GRADUATES

531. **Sociological Theory (3:3:0).** Prerequisite: Consent of department chairman. Individual study. May be repeated once for credit.
532. **Seminar in the Person and Society (3:3:0).** Prerequisite: 12 hours of sociology or consent of instructor. Examination of symbolic interactionist theory, the process of socialization, and selected problems related to the effects of the social structure on a given person during various periods of his span.
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 instructor.
536. **Seminar in Sociological Uses of Historical Data (3:3:0).** Prerequisite: 6 hours of sociology and 6 hours of history, or consent of instructor. Analysis and use of documents, records, and other historical materials as they may be interpreted sociologically.

537. **Seminar in Demography (3:3:0).** Prerequisite: 12 hours of sociology, including SOC 438, or consent of instructor.
538. **Seminar in the Origins of Social Theory (3:3:0).** Prerequisite: Graduate standing and 12 hours advanced credit in sociology, or consent of instructor. Study of the development of sociological theory both in the United States and in Europe, varying from term to term with emphasis on Germany and Eastern Europe, France and England, the United States, or outstanding individual theorists in any of these countries. May be repeated for credit as topic varies.
539. **Seminar in Techniques of Social Measurement (3:3:0).** Prerequisite: Graduate standing and 12 hours of advanced work in sociology, including SOC 439 or equivalent. Detailed study of various techniques in sociology; precision in measurement of social variables; scale preparation and analysis. May be repeated for credit as topic varies.
5311. **Seminar in Criminology (3:3:0).** Prerequisite: Graduate standing and 12 hours of advanced sociology or consent of instructor. Critical review of current theory and research in criminology; investigation of selected aspects of criminal behavior. May be repeated for credit as topic varies.
5312. **Seminar in Urban Problems (3:3:0).** Prerequisite: Graduate standing and 12 hours of advanced sociology or consent of instructor. Extensive analysis of the process of urbanization, including health, housing, major social institutions, and welfare with emphasis upon causation and critiques of proposed solutions. May be repeated for credit as topic varies.
5313. **Seminar in Minority Relations (3:3:0).** Prerequisite: Graduate standing and 12 hours of advanced sociology or consent of instructor. Covers both American and cross-cultural study of inter-ethnic and inter-faith relations, with special attention to conflict, accommodation, acculturation, and assimilation. May be repeated for credit as topic varies.
5314. **Seminar in Comparative Sociology (3:3:0).** Prerequisite: Graduate standing and 12 hours of advanced sociology or consent of instructor. The comparative method had a place in sociology from its beginning. Contemporary social problems in industrial nations of the world as well as the so-called "underdeveloped" areas are covered. The primary focus of the seminar is upon transitional industrial and urban patterns. May be repeated for credit as topic varies.
5315. **Seminar in Social Change (3:3:0).** Prerequisite: Graduate standing and 12 hours of advanced sociology or consent of instructor. Linear and cyclical theories; analysis of the idea of progress, stage theories, dialectical materialism, and the lag hypothesis. May be repeated for credit as topic varies.
5335. **Society and Its Institutions (3:3:0).** Prerequisite: Two or more years of teaching experience in the public schools, and consent of instructor. Study of society as a network of institutions, stressing the interdependence of institutions, with special reference to problems created in the contemporary American society by changes in some of the basic institutions.
631. **Master's Thesis (3).** Enrollment required at least twice.

## Courses in Anthropology.

### FOR UNDERGRADUATES

231. **The Origin and Nature of Man (3:3:0).**
232. **Cultural Anthropology (3:3:0).**
332. **Physical Anthropology (3:3:0).**
3311. **Major Cultural Developments of the Old World (3:3:0).**
430. **Cultures and Peoples of the Southwest (3:3:0).**
431. **Field Archaeology (3:3:0).**
432. **Man and the Supernatural (3:3:0).** Prerequisite: ANTH 232 or consent of instructor.
438. **Culture and Personality (3:3:0).**
439. **Peoples and Cultures of Oceania (3:3:0).**
460. **Introduction to Field Research in Prehistory (6).** Prerequisite: ANTH 431 or consent of instructor. A field course.
461. **Archaeology of Mexico (6).** A field course.
4311. **Anthropological Linguistics (3:3:0).**
4313. **Peoples of North America (3:3:0).** Prerequisite: Consent of instructor.
4314. **Prehistory of Meso and South America (3:3:0).** Prerequisite: Consent of instructor.
4315. **Prehistory of North America (3:3:0).** Prerequisite: ANTH 231 or consent of instructor.
4316. **Peoples of Meso and South America (3:3:0).** Prerequisite: Consent of instructor.
4321. **Individual Problems in Anthropology (3:3:0).** Prerequisite: ANTH 231 and 232 or consent of instructor. Individual studies. May be repeated once for credit.
4322. **Peoples of Africa (3:3:0).** Prerequisite: Consent of instructor. An ethnographic survey of the peoples and culture areas south of the Sahara.

### FOR GRADUATES

531. **Anthropological Theory (3:3:0).** Prerequisite: 9 hours of anthropology or consent of instructor. Individual studies. May be repeated once for credit.
532. **Seminar in Anthropological Theory and History (3:3:0).** Prerequisite: Graduate standing and 9 hours of anthropology or consent of instructor. Study of the development of anthropology and its relationship to the social, biological, and physical sciences. Concentration on various phases of anthropological theory. May be repeated for credit as topic varies.
533. **Seminar in Ethnology (3:3:0).** Prerequisite: Graduate standing and 9 hours of anthropology or consent of instructor. Study of populations and cultures in various world areas: Latin America, Oceania, Africa, Middle East, etc. Substantive topics may include personality and culture or social structure. Needs of members of the seminar will influence the choice of topic. May be repeated for credit as topic varies.
5335. **Origins of Social Customs and Institutions (3:3:0).**

## Department of Speech and Theatre Arts

This department supervises the following degree programs: **SPEECH, Bachelor of Arts, Master of Arts; SPEECH PATHOLOGY AND AUDIOLOGY, Master of Science in Speech Pathology and Audiology; PUBLIC ADDRESS AND GROUP**

COMMUNICATIONS, *Bachelor of Arts, Master of Arts*; THEATRE ARTS, *Bachelor of Arts, Master of Arts*.

The Department of Speech and Theatre Arts sponsors the University Theatre season, an extensive program in intercollegiate forensic and debate, and numerous student-directed theatre and forensic activities. Several student scholarships and workshops are available in the various activities. In addition, the department also sponsors Sigma Alpha Eta, speech pathology and audiology professional; Delta Sigma Rho, national forensic honorary; and Alpha Psi Omega, national theatre honorary.

Students majoring in speech must complete the following requirements in addition to those shown for the B.A. degree in the College of Arts and Sciences. A minimum of 3 semester hours is required in each of five of the seven departmental areas (listed below). A choice may also be made between PAGC 433—History of Speech, and TH A 331—History of Theatre, one of which is required. Not more than 6 hours of Practicum in Repertory Theatre may be counted toward any major or minor in the department. Additional hours may be elected to make the total 36 to 42 hours within the department.

Requirements for the major in public address and group communications include PAGC 231, 232, 311, 312 (twice), 331, 332, 333, 432, 433, 434, G SP 133, and 3 hours in each of three other departmental areas.

Requirements for the major in theatre arts include G SP 133, TH A 131, 211, 232, 233, 311 (twice), 331, 333, 334, 335, 432, and additional electives in theatre arts to total 36 to 42 hours. A minimum of 3 hours in dance and/or fencing offered in the departments of Health, Physical Education, and Recreation will also be required.

**Teacher Education.** The teaching field for secondary level certification in speech requires G SP 133, OR I 231, PAGC 231, 311, 312, 432, 433, 434, SP E 432, OR I 311 or TELE 311, and TELE 231.

The teaching field for secondary level certification in drama includes TH A 131, 232, 233, 331, 333, 334, 335, 432, and SP E 432.

The elementary level 18-hour specialization in speech requires G SP 133, TH A 233, 434, SP E 331, OR I 331, and SPPA 332. The 24-hour area specialization in speech requires all courses named in the 18-hour area plus OR I 332 or TELE 231, and PAGC 433 or TH A 331.

The all-level speech-drama specialization area requires G SP 131 or 239, 133, OR I 331, 332, PAGC 231, 311, 333, 433, TELE 231, SPPA 332, SP E 331, 432, 433, and TH A 232, 233, 331, 333, 334, 335, 432, 434, in addition to electives.

The student seeking public school certification in speech pathology (speech therapy) will be expected to take G SP 133, 231, SPPA 231, 331, 432, 433, 437, 438, 4321, and 4322.

### Courses in General Speech.

#### FOR UNDERGRADUATES

- 131. Fundamentals of Speech (3:3:0).
- 133. Voice and Diction (3:3:0).
- 231. The Psychology of Speech (3:3:0). Human behavior in communication situations is viewed as ranging along a continuum from emotional through actional, to intellectual behavior.
- 239. Speech Development for Personal Competence (3:3:0). Prerequisite: Sophomore classification. The course deals with principles and practice of speech skills necessary for personal effectiveness. Primarily for education majors.
- 338. Business and Professional Speech (3:3:0). Prerequisite: Sophomore classification. Basic principles of speech applied to the speech needs of the professional man and woman. Practice in the construction and delivery of the various types of speeches and participation in group conferences, discussions, and interviews. For majors in other fields than speech.

#### FOR GRADUATES

- 511. Studies and Problems in Speech (1:1:0). May be repeated for credit.
- 521. Studies and Problems in Speech (2:2:0). May be repeated for credit.
- 531. Studies and Problems in Speech (3:3:0). May be repeated for credit.
- 532. Research Methods in Speech (3:3:0).
- 533. Quantitative Research Methods in Speech Communication (3:3:0). Participants will integrate principles of the philosophy of science and quantitative research methods into a study of contemporary speech-communication research, emphasizing research designs, quantitative treatments, and analysis.
- 631. Master's Thesis (3). Enrollment required at least twice.

### Courses in Oral Interpretation.

#### FOR UNDERGRADUATES

- 231. Fundamentals of Oral Interpretation (3:3:0). Major emphasis is placed on the appreciation of good literature and its effective oral interpretation from the printed page.
- 311. Oral Interpretation Activities (1:0:3). Opportunity for the student participating extensively in oral interpretation activities to secure credit for this laboratory work. Limit: 4 semester hours for speech majors and minors, 2 semester hours for others.



331. **Oral Interpretation of Children's Literature and Storytelling (3:3:0).** A methods course designed to improve the communication of literature to children from pre-school to grade 6.
332. **Group Oral Interpretation (3:3:0).** Experience in working with oral interpretation within a group. Study of theory and practice in choral reading, Readers' Theatre, and Chamber Theatre.
431. **Senior Projects in Oral Interpretation (3).** Prerequisite: Senior classification and 9 hours in the area of oral interpretation. 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. Students required, in advance of registration, to consult with the instructor and secure the department chairman's approval of the specific project to be pursued. May be repeated once for credit.
432. **Advanced Oral Interpretation (3:3:0).** Prerequisite: Junior classification and 12 hours of English. Students are advised to complete G SP 133 and/or OR I 231 before taking this course.
433. **Readers Theatre (3:0:9).** Opportunity for the student to work with oral interpretation, in theory, selecting materials to be presented in the form of readers theatre or chamber theatre productions, in organizing and presenting.

## FOR GRADUATES

531. **Studies and Problems in Oral Interpretation (3:3:0).** May be repeated for credit.
532. **History of Oral Interpretation (3:3:0).** A seminar course in the development of oral interpretation from ancient Greece to modern times.
533. **Seminar in the Theories of Oral Interpretation (3:3:0).** A seminar course in the development of modern theories and approaches to oral interpretation.
631. **Master's Thesis (3).** Enrollment required at least twice.

## Courses in Public Address and Group Communication.

## FOR UNDERGRADUATES

231. **Discussion and Debate (3:3:0).** Study of and practice in the essential tools of a democratic society; group problem-solving and methods of inquiry and advocacy.
232. **Reason in Controversy (3:3:0).** Prerequisite: PAGC 231. Evolution of argumentation with emphasis on modern viewpoints, application of theory to selected controversies.
311. **Parliamentary Procedure (1:1:0).** Principles and procedures governing deliberative groups, with practice in their usage.
312. **Forensic Activities (1:0:3).** Opportunity is offered the student who wishes to participate 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.
331. **Oral Communication in Group Processes (3:3:0).** A study of group behavior, participation, structure, and leadership, and their evaluation with particular attention to oral communication.
332. **Group Leadership (3:3:0).** An analysis of leadership and the role of authority in interpersonal relations, with emphasis on the oral component.
333. **Extemporaneous Speaking (3:3:0).** A course in the theory, preparation, delivery, and criticism of public speeches.
431. **Senior Projects in Public Address and Group Communications (3:3:0).** Prerequisite: Senior classification and 9 hours in the area of public address and group communication. 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. Students required, in advance of registration, to consult with the instructor and secure the department chairman's approval of the specific project to be pursued. May be repeated once for credit.
432. **Persuasion (3:3:0).** A study of the psychological and rhetorical principles of motivation, suggestion, and other aspects of audience psychology as used in business, radio, and public affairs.
433. **History of Speech (3:3:0).** Prerequisite: Junior classification. A study of the origin, history, and development of speech as a social function and force.
434. **Advanced Public Speaking (3:3:0).** Prerequisite: 9 hours of speech, including 3 hours primarily in public speaking.

## FOR GRADUATES

531. **Studies and Problems in Public Address and Group Communications (3:3:0).** May be repeated for credit.
532. **Advanced Discussion, Debate, and Conference Methods (3:3:0).** A study of the history and philosophy of discussion and debate and their application to specialized forms with special emphasis on newer techniques in the business and education conference, including consideration of group dynamics.
533. **Classical Rhetoric and Public Address (3:3:0).** Prerequisite: Advanced public speaking and history of speech.
534. **British and American Public Address (3:3:0).** Prerequisite: Graduate standing.
535. **Contemporary Rhetorical Theory and Practice (3:3:0).** Prerequisite: 6 semester hours of senior or graduate level courses in public address.
536. **Seminar: Oral Communications in Group Processes (3:3:0).** Prerequisite: Graduate standing and consent of instructor. A study in depth of the theories, experiments, and research dealing with the oral communication in group processes.
537. **Mediaeval and Renaissance Rhetoric and Oratory (3:3:0).** A study of mediaeval and renaissance rhetoric and oratory.
631. **Master's Thesis (3).** Enrollment required at least twice.

## Courses in Speech Education.

## FOR UNDERGRADUATES

331. **Speech in the Elementary School (3:3:0).** Principal concepts, methods, and activities in facilitating the development of spoken language in the child are studied through readings, discussions, and observations.
431. **Senior Projects in Speech Education (3).** Prerequisite: Senior classification and 9 hours in the area of speech education. 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. Students required, in advance of registration, to consult with the instructor and secure the department chairman's approval of the specific project to be pursued. May be repeated once for credit.

432. **Methods in Teaching Speech and Theatre (3:3:0).** Prerequisite: 18 hours of speech or theatre arts and 9 hours of education. Review of the areas of speech. A survey of texts and their critical analysis. Preparation of syllabi.
433. **Directing School Speech Activities (3:2:3).** Prerequisite: 12 hours of speech or education and/or teaching experience. Methods and principles involved in extracurricular speech activities, such as discussion, debate, dramatics, oral interpretation, public speaking, and radio. Students will have an opportunity to work with individuals and projects in different activities.

#### FOR GRADUATES

531. **Studies and Problems in Speech Education (3:3:0).** May be repeated for credit.
532. **Seminar in the Psychology of Speech (3:3:0).** The psychological bases of speech are reviewed, and each student conducts his own investigation of a specific problem in the psychology of speech related to his professional interests and plans and reports his findings in a written report.
533. **Seminar in College Speech Teaching (3:3:0).** The philosophy and programs peculiar to the teaching of speech fundamentals and advanced courses in institutions of higher learning will be studied, with special emphasis on the basic course.
534. **Seminar in International Speech Education (3:3:0).** Lectures, discussion, and the presentation of reports on the history, philosophy, and contributions of nations around the world in an investigation of universals in education in speech communications through a comparative speech education.
535. **Studies in the History of Speech Education (3:3:0).** A study of the sources that have contributed to the development of speech pedagogy in the modern classroom; theories, practices, events, and personalities.
- 535S. **Basic Speech for Elementary Teachers (3:3:0).** A study of the basic characteristics of speech skills and abilities necessary for effective speech, and the use of speech in classroom activities.
631. **Master's Thesis (3).** Enrollment required at least twice.

### Courses in Speech Pathology and Audiology.

#### FOR UNDERGRADUATES

231. **Speech Science and Phonetics (3:3:0).** A study of the way voice is produced and speech formed. Also included is a study of the instrumentation employed in the measurement of voice and speech and the phonetic alphabet employed to transcribe speech sounds to the printed page.
331. **Speech Anatomy and Audiology (3:3:0).** Study of the functioning of the speech mechanism and voice production. Basic to major study in speech.
332. **Speech Correction for the Classroom Teacher (3:3:0).** This course deals with speech correction methods for students training to teach in the elementary school. It acquaints them with the normal speech development of the child, and with common speech deviations. It presents methods and material which the classroom teacher may use in improving speech difficulties.
431. **Senior Projects in Speech Pathology and Audiology (3).** Prerequisite: Senior classification and 9 hours in the area of speech pathology and audiology. 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. Students required, in advance of registration, to consult with the instructor and secure the department chairman's approval of the specific project to be pursued. May be repeated once for credit.
432. **Introduction to Hearing Problems (3:3:0).** Anatomy of the ear. Definition and description of types of hearing loss and deafness. Principles and methods of clinical and classroom retraining of the hard-of-hearing through lip reading, auditory training, and speech correction.
433. **Principles of Audiometry (3:3:0).** Principles of testing hearing loss through use of various types of audiometers. Use and interpretation of audiograms. The physics of sound as related to hearing. Psychological problems of hearing. Clinical observation and practice.
434. **Speech for the Deaf (3:3:0).** Prerequisite: SPPA 236, 331, 437, or consent of instructor. This is a methods course concerned with the development of oral speech for the deaf. Emphasis is placed on the use of all sensory modalities (visual, tactual, kinesthetic, and residual hearing) as aids to speech development.
435. **Language Development for the Deaf (3:3:0).** Prerequisite: SPPA 231, 331, 437, or consent of instructor. This course is concerned with the language process of the deaf child such as levels of language, acquisition of language, and methods of teaching oral and written language.
436. **Speech Reading and Auditory Training Methods (3:3:0).** Prerequisite: SPPA 231, 331, and 432, or consent of instructor. This methods course is designed to familiarize prospective teachers of the deaf and hard-of-hearing with various methods of teaching speech reading and auditory training, and to develop specific teaching abilities in speech reading and auditory training.
437. **Speech Pathology (3:3:0).** Prerequisite: G SP 133, SPPA 231, 331, or the consent of instructor. A survey of the speech pathology field with emphasis on etiological factors responsible for speech disorders and description of clinical types.
438. **Diagnostic Procedures and Speech Correction Methods (3:3:0).** Prerequisite: G SP 133, SPPA 231, 331, 437, or the consent of instructor. An introduction to methods of evaluating defective speech and the elementary aspects of therapy to alleviate defective speech.
- 4321, 4322. **Supervised Clinical Practice in Speech Correction (3 each).** Thirty-five laboratory hours per credit hour. Prerequisite: SPPA 437, concurrent registration in SPPA 438, or permission of department chairman. Required of students desiring certification as speech therapists.
- 4323, 4324. **Supervised Clinical Practice in Audiology and Aural Rehabilitation (3 each).** Prerequisite: SPPA 432 and 433. Thirty-five laboratory hours per credit hour. Clinical

work with deaf and hard-of-hearing cases under supervision. Includes audiology and therapy. Required of students seeking certification as audiologists.

4325. **Advanced Speech for the Deaf (3:3:0).** Prerequisite: SPPA 231, 331, 434, and 437. This is a methods course at an advanced level. The course is concerned with the development of oral speech for the deaf. Emphasis is placed on the use of all sensory modalities, visual, tactual, kinesthetic, and residual hearing as aids to speech development.
4326. **Advanced Language Development for the Deaf (3:3:0).** Prerequisite: SPPA 231, 331, 434, and 437. At an advanced level this course deals with the language processes of the deaf child. It is an extension of SPPA 435.

#### FOR GRADUATES

531. **Studies and Problems in Speech Pathology and Audiology (3:3:0).** May be repeated for credit.
533. **Seminar in Speech Pathology: Stuttering (3:3:0).** Graduate classification, limited to speech correction and audiology majors, or other students who have obtained consent of instructor. A study of stuttering beyond the scope of introductory presentation. Stuttering theory and therapy studied from the view of learning theorists, psychoanalysts, and other disciplines which profess to treat stuttering.
534. **Seminar in Speech Pathology: Articulation and Voice Disorders (3:3:0).** Prerequisite: An undergraduate major in speech pathology is required or the consent of instructor. A study at the advanced level of articulation and voice disorders. The course considers etiology, diagnosis, and therapy.
535. **Seminar in Audiology: Psychophysics of Audition (3:3:0).** Prerequisite: An undergraduate major in audiology or speech pathology is required or the consent of instructor. This course considers the basic correlates of the auditory stimulus, the mechanical properties of the ear, and the psychophysiology of hearing and deafness.
536. **Seminar in Audiology: Aural Rehabilitation (3:3:0).** Graduate classification. Open to speech correction and audiology majors, or other students who have completed SPPA 432 and 433 or equivalent. A study of the language, social, and educational problems of the more severely hard-of-hearing or deaf individual and the current methods of dealing with these problems.
537. **Seminar in Audiology: Clinical Audiology (3:3:0).** Graduate classification. Limited to students who have taken SPPA 432 and 433 or equivalent. This course deals with special types of audiometry, such as aural overload audiometry, electrodermal response (EDR) audiometry, tests for selection of hearing aids, and others.
538. **Seminar in Speech Pathology: Language Problems in Children (3:3:0).** Prerequisite: An undergraduate major in speech pathology is required or consent of instructor. This course considers the nature of language disorders in children, the etiological factors responsible for language disorders in children, and the therapeutic processes involved in the treatment of language disorders in children.
539. **Seminar in Speech Pathology: Language Problems in Adults (3:3:0).** Prerequisite: An undergraduate major in speech pathology is required or consent of instructor. This course considers the nature of language disorders in adults, the etiological factors responsible for language disorders in adults, and the therapeutic processes involved in the treatment of language disorders in adults.
5311. **Instrumentation in Speech and Hearing Science (3:3:0).** Acquaints the student with instrumentations used in speech and hearing science and research; its construction and its use. An introduction into basic electronics will be a part of this course.
5312. **Speech Disorders Associated With Cleft Palate (3:3:0).** A review of the causes of cleft palate and the effects of cleft palate on speech, on personality, and on family relationships, and the therapeutic methods employed in the treatment of cleft palate.
5313. **Speech and Language Disorders Associated with Cerebral Palsy (3:3:0).** A study of the history and causes of cerebral palsy and the therapeutic procedures used to reduce the handicapping effects of cerebral palsy.
5326. **Graduate Clinical Practice: Speech (3:0:9).** Prerequisite: An adequate undergraduate background in speech therapy is required which includes 100 hours of undergraduate supervised clinical practice. Supervised clinical practice in diagnostic methodology used in speech pathology. Advanced therapy for difficult and/or complex clinic types. Thirty-five hours of lab required for each semester hour of credit.
5327. **Graduate Clinical Practice: Audiology (3:0:9).** Prerequisite: An adequate undergraduate background in audiology and aural rehabilitation is required which must include at least 100 hours of undergraduate supervised clinical practice in audiology. This course includes supervised clinical practice in audiology as well as supervision of such procedure as the teaching of lip-reading, auditory training, and speech and language for the deaf and hard-of-hearing. Students registering for this course will be expected to participate in all areas which might be included in the habilitation of aurally handicapped children and the rehabilitation of aurally handicapped adults.
631. **Master's Thesis (3).** Enrollment required at least twice.

#### Courses in Telecommunications.

##### FOR UNDERGRADUATES

231. **Introduction to Telecommunications (3:3:0).** A survey course in the origin, history, and development of radio and television. Not for students concentrating in radio-television.
311. **Telecommunications Activities (1:0:3).** Opportunity is offered the student who wishes to participate extensively in radio-television activities to secure credit for this laboratory work. Limited to 4 semester hours for speech majors and minors, 2 semester hours for others.
331. **Fundamentals of Telecommunications Broadcasting (3:3:0).** The basic principles and techniques for the operation of a radio or television control room, performance on radio and television. For students concentrating in radio and television.
332. **Radio Program Production (3:2:3).** Prerequisite: TELE 331, or approval of instructor. A concentrated and practical course covering the multiple problems faced by the radio station manager. Opportunity to acquire professional facility and techniques in direction and production of radio programs on the campus station KTXF-FM.
333. **Television Program Production (3:2:3).** Prerequisite: TELE 331, or approval of instructor. A concentrated and practical course on the theory and application of the principles of television production.

431. **Senior Projects in Telecommunications (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 telecommunications. Students required, in advance of registration, to consult with the instructor and secure the department chairman's approval of the specific project to be pursued. May be repeated once for credit.
432. **Telecommunications Program Planning and Management (3:3:0).** Prerequisite: TELE 331 or 337, or approval of instructor. Objectives and methods in planning commercial and educational programs for radio and television. Station staff organization and administration emphasized. Case studies and individual projects.
433. **Television Program Direction (3:2:3).** Prerequisite: TELE 333. The preparation and directing of television programs, including television dramas, variety shows, documentaries, and educational programs, for use in commercial stations.
- FOR GRADUATES**
531. **Studies and Problems in Telecommunications (3:3:0).** May be repeated for credit.
532. **Educational Television (3:3:0).** Graduate classification. The history, social impact, and effect that educational broadcasting has had upon the American way of life. Evaluation of in-school and general educational programs; the use of television in the classroom; the presentation of educational material on television.
533. **Contemporary Issues in Telecommunications (3:3:0).** A definitive study of the current issues and problems which affect telecommunications with special investigations into related influences from government, mass media, education, and society.

## Courses in Theatre Arts.

### FOR UNDERGRADUATES

131. **Voice for the Actor (3:2:3).** Prerequisite: G SP 133. A course intended specifically for training the beginning actor in the use of voice and vocal techniques for the stage. Work on dialects and voice included.
211. **Stage Makeup (1:0:3).**
232. **Principles of Acting (3:2:3).** Study and application of the theories and techniques of the art of acting.
- \*233. **Introduction to Theatre and Cinema I (3:3:0).** A study of the modern theatre and cinema art forms, with attention to the historical background and social and aesthetic values. Emphasis is placed on theatre. Attendance at representative plays and motion pictures.
- \*234. **Introduction to Theatre and Cinema II (3:2:2).** Continuation of TH A 233, with emphasis on cinema. One lecture, one hour of discussion and a two-hour viewing session each week.
311. **Theatre Activities (1:0:3).** Opportunity is offered the student who wishes to participate extensively in theatre activities to secure credit for this laboratory work. Limited to 4 semester hours for departmental majors and minors, 2 semester hours for others.
- \*331. **History of Theatre (3:3:0).** Prerequisite: TH A 233 or consent of instructor. A study of the origin and development of the theatre as a social and aesthetic force.
332. **Advanced Acting (3:2:3).** Prerequisite: TH A 131, 232. Continuation of the study and application of the theories and techniques of the art of acting, with emphasis upon characterization, analysis of roles, and techniques and types of performance.
333. **Principles of Theatrical Scenery (3:2:3).** Prerequisite: TH A 233 or equivalent. The study of technical problems of play production. Design, construction, and painting of scenery and properties and special effects.
334. **Principles of Theatrical Lighting (3:2:3).** Prerequisite: TH A 233 or equivalent. Study of the theory and practice of theatrical stage lighting. Elementary electricity, lighting control and instruments, lighting design.
335. **Principles of Theatrical Costuming (3:2:3).** Prerequisite: TH A 233 or equivalent. Study and application of the theories and techniques of theatrical costuming. Survey of historical dress. Design for the stage. Construction of theatrical clothing.
- 336, 337. **Practicum in Repertory Theatre I, II (3:0:9 each).** Prerequisite: TH A 131, 232, 233, or equivalent. Practical work in the organization, mounting, and presentation of plays in a repertory situation. May be repeated for credit.
431. **Senior Projects in Theatre Arts (3).** Prerequisite: Senior classification and 9 hours in theatre arts. Individual study, under guidance of a member of the faculty, of a specific problem of student's choice. Students required, in advance of registration, to consult with the instructor and secure the department chairman's approval of the specific project to be pursued. May be repeated once for credit.
432. **Stage Directing Methods (3:2:3).** Prerequisite: Junior classification, TH A 232, 233, 333, 334, and 335.
433. **Theory and Practice of Playwriting (3:3:0).** Study of the techniques of dramaturgy. Practical work in the writing of drama. May be repeated for credit.
434. **Creative Dramatics (3:3:0).** Studies in the principles and methods of developing original dramatizations with children.
435. **Children's Theatre (3:2:3).** Study of special problems of producing plays for children. Survey of the literature of the field and consideration of special techniques of acting, directing, and design.
436. **Directing School Theatre Activities (3:2:3).** Methods and principles involved in directing the school theatre program, with special attention to production of contest plays. Laboratory work with high school students in a workshop situation.

### FOR GRADUATES

531. **Studies and Problems in Theatre Arts (3:3:0).** May be repeated for credit.
532. **Studies in Modern Theatre (3:3:0).** The principal developments in the European and American theatre from 1870 to the present.
533. **Studies in the Production of Pre-Modern Drama (3:3:0).** A study of the problems of producing classical, Elizabethan, French neo-classic, Restoration, and eighteenth-century drama for present-day audiences.
534. **Theory and Practice of Scene Design (3:2:3).**

\* May be applied toward fulfillment of fine arts requirement for the B.A. degree.

535. **Theatre Costume Design (3:2:3).**
536. **Theory and Practice of Stage Lighting (3:2:3).**
- 537, 538. **Advanced Practicum in Repertory Theatre I, II (3:0:9 each).** Prerequisite: An undergraduate major in theatre arts, or consent of instructor. Practical work in supervision of the organization, mounting, and presentation of plays in a repertory situation. May be repeated for credit.
539. **Seminar in Theatre History (3:3:0).** Prerequisite: An undergraduate major in theatre arts or consent of the instructor. Consideration of the theatre of a specific historical epoch, or the comparative study of the theatre of several periods. May be repeated for credit.
5311. **Advanced Directing (3:2:3).** Study of procedures and techniques of directing, culminating in the direction of a laboratory production.
5312. **Theatre Management (3:2:3).** Study of university, community, and professional theatre management with special attention to policy making, audience building, play selection, staff organization, budget preparation, and relationships with governmental and private agencies and foundations.
5313. **Dramatic Criticism (3:3:0).** Principles of dramatic criticism from Aristotle to the present day.
5314. **Advanced Studies in Children's Theatre (3:2:3).** Study of advanced problems in producing plays for child audiences.
631. **Master's Thesis (3).** Enrollment required at least twice.

## Reserve Officers Training Corps

The Departments of the Army and Air Force maintain senior division Reserve Officer Training Corps units under the administration of the College of Arts and Sciences for the purpose of developing and producing officers. All physically fit male freshman and sophomore students, except veterans, are required to elect either band, physical education, aerospace studies, or military science.

**Four-Year Program.** The four-year program is composed of two years of basic course studies and two years of advanced course studies, including a summer training encampment at an Army post or Air Force base.

**Basic Course.** To enroll in the four-year ROTC program the student must be physically qualified as prescribed by the Department of the Army or Air Force, be accepted by the University as a regularly enrolled student, and agree to complete the basic course once enrolled, unless released by mutual agreement between the student's academic dean and the Professor of Aerospace Studies or Professor of Military Science. AFROTC students must be at least 14 years of age at the time of enrollment. Upon completion of one semester of the ROTC program, the student so desiring may be deferred from selective service for as long as he remains in the program, although his obligation with his local draft board remains unchanged. Midyear enrollees are accepted in the ROTC programs. Veterans and students with previous ROTC training may receive credit for all or part of the basic course, depending on their length of service or training; credit for high school ROTC may be granted for one year of the Army or Air Force basic course. Upon completion of the basic course, a student may continue in the advanced course provided he meets the requirements listed below.

**Advanced Course.** To enroll in the advanced ROTC program a student must have successfully completed the basic course, be a citizen of the United States, be not less than 17 years old, and be able to complete all requirements for appointment as a regular or reserve officer by the time he is 28 years old (for the Air Force, by the time he is 26 years and 6 months old, if he is programmed for flying training; 30 years old, if he is programmed for other than flying training). He must also 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, have at least a 2.00 grade-point average, and be selected by the Professor of Military Science or Professor of Aerospace Studies to continue in the program. Upon admission to the advanced course program, the student must agree in writing, with the consent of his parent or guardian if he is a minor, to complete the advanced course of instruction and accept a commission as second lieutenant. This agreement is automatically terminated when the student receives his commission or is disenrolled from the ROTC for any reason other than willful evasion of his contract. All advanced course students are enlisted in the Reserves and are deferred from the draft.



**Summer Camp.** Members of advanced ROTC are required to attend one summer camp, normally between their junior and senior years. Army ROTC summer camp begins early in June each year and lasts six weeks. Air Force ROTC conducts a number of four-week summer camps, with early and late starting dates to accommodate university schedules.

**Two-Year Program.** The two-year program is designed specifically to fill the needs of two-year college graduates and students of four-year colleges who have not taken ROTC during the first two years. Entry requirements into the two-year program are the same as entry into the four-year program except for the additional requirement of a six-week basic training camp conducted during the summer prior to enrollment in the program. The Army ROTC camp begins in early June. Air Force ROTC students may attend either the first preenrollment camp beginning in early June, or the second camp, beginning in mid-July. Military training at all camps will consist of academic, practical, and theoretical instruction.

**Scholarships.** The Departments of the Army and Air Force offer ROTC scholarships to selected students on a competitive basis. The Army offers two types: four-year scholarships are awarded by each of the five continental U.S. Armies, and one-, two-, and three-year scholarships are awarded to outstanding cadets selected by the Professor of Military Science and a board of Army and University officials. The Air Force offers four-year scholarships to high school seniors. In addition, eligible freshman, sophomore, and junior AFROTC cadets may apply for the three-, two-, or one-year scholarship, respectively, once in the program. ROTC scholarships pay tuition and regular classroom expense, such as laboratory fees and textbooks, as well as the \$50 per month subsistence allowance.

**Uniforms and Equipment.** Each ROTC student is furnished an officer-type uniform, including overcoat or raincoat and shoes, without cost to the student. Each student is required to maintain his uniform by cleaning and proper care and to return it to the ROTC military property custodian in the event he leaves school or becomes separated from the ROTC for other reasons. Uniforms and other equipment remain the property of the federal government or the University. All advanced ROTC students who receive a commission will also receive a \$300 uniform allowance when they are called to active duty. The federal government provides the necessary textbooks and equipment to carry out the ROTC program at no cost to the student.

**Flight Training.** During their final year, selected advanced course students of Army ROTC and pilot candidates in Air Force ROTC will 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 36½ hours of flight instruction, both given on an extracurricular basis. Students completing the course are given the opportunity to qualify for a Federal Aviation Agency private pilot's certificate.

**Commissioning.** Upon receiving a commission, the Army ROTC student agrees to serve 2 years on active duty and 4 years in the Reserve (nonscholarship cadets), or 4 years on active duty and 2 years in the Reserve (scholarship cadets). The Air Force cadet agrees to serve 4 years on active duty in a nonflying capacity, or 6 years on active duty if given flight training.

## Department of Aerospace Studies

The Air Force Reserve Officers Training Corps curriculum is designed to educate university men for careers as Air Force officers and to develop quality graduates with a sense of dedication. The ability to think and communicate effectively in their preparation for and acceptance of officer responsibilities is of utmost importance in the Department of Aerospace Studies.

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 specialty areas required by the U.S. Air Force; (b) to develop in cadets by example, discussion, and participation the 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; and (d) to provide military education which will give cadets a general background and sound foundation on which to build an officer career.

All courses in the program are taught by U.S.A.F. officers.

**General Military Course.** This course, consisting of the first two years, examines the role of U.S. military forces in the contemporary world with particular attention to the U.S. Air Force—its organization and mission. The functions of strategic offensive and defensive forces, general purpose and aerospace support forces are covered in the first year. The role of these forces as they are related to national defense policy is studied in the second year, with respect to general and limited war, alliances, and strategies and policies of the U.S. An introduction to U.S. defense organization and decision making processes and their contribution to national objectives is also covered.

**Professional Officer Course.** This course introduces the cadet in the first year to the growth and development of aerospace power in the U.S., aerospace power today, astronautics and space operations, and probable future developments in manned aircraft and space operations. Study in the last year includes Air Force leadership at the junior officer level including its theoretical, professional, and legal aspects, and a study of military management functions, principles, and techniques. Within this program, attention is devoted to developing communicative skills, preparing staff work, and providing leadership experiences in officer-type activities.

Entrance to the professional officer course is limited to those who are regularly enrolled in the University, who have completed the necessary screening, testing, and physical examination, and who have completed the general military course or the preenrollment six-week basic training camp for two-year applicants, or who receive credit for prior military service.

Cadets who complete the professional officer course are tendered appointments as second lieutenants, Reserve of the Air Force, upon graduation. Except for those authorized an educational delay for graduate study, all AFROTC graduates will be ordered to active duty soon after graduation and commissioning.

**Awards and Recognition.** A number of awards, trophies, and decorations are presented each year to outstanding AFROTC cadets during a suitable military ceremony by military and civilian leaders. The awards, presented to recognize achievement and to encourage competition, are given to recipients chosen by the Professor of Aerospace Studies, his staff, and the Cadet Wing. The President's Award is presented annually by the President of the University to the outstanding professional officer course cadet who has achieved a high academic standing and materially contributed to student life during his university career. The Professor of Aerospace Leadership Award goes each regular semester to the senior cadet who has demonstrated outstanding leadership within the Cadet Wing. Cadets showing outstanding qualities of leadership, high moral character, and definite aptitude for military service and who are in the upper half of their class and the upper third of the ROTC program are eligible for the Distinguished Air Force Reserve Officers Training Corps Cadet Badge. Distinguished cadets who maintain their high standards of performance until graduation are designated Distinguished Air Force Reserve Officer Training Corps Graduates.

**Sabre Flight.** The Sabre Flight is an organization of AFROTC students composed primarily of freshmen and sophomores. It is an integral part of the program and its basic mission is to promote interest in the AFROTC. Members of the flight participate regularly in honor guard formations and precision drill team activities.

**Arnold Air Society.** This professional honorary service organization of selected AFROTC cadets participates in a variety of service functions for the University and the community. Its objective is to create a closer and more efficient relationship with the AFROTC and to promote interest in the Air Force.

**Angel Flight.** The Angel Flight is an organization of University women sponsored by the Arnold Air Society. Its mission is to promote interest in the AFROTC program. A noted feature of the Angel Flight is its precision drill team. Membership selection is based on poise, beauty, personality, scholastic standing, and marching ability.

## Curriculum in Air Force Aerospace Studies.

### FIRST YEAR

115. **World Military Systems (1:1:1).** A survey course designed to acquaint the student with the political and ideological context in which contemporary military forces operate.

116. **World Military Systems (1:1:1).** A survey course designed to acquaint the student with the political and ideological context in which contemporary military forces operate.

## SECOND YEAR

223. **World Military Systems (2:2:1).** Prerequisite: AERS 115 and 116. A comparative study of world military forces to include free world land and naval forces, free world air forces, communist military systems, and a continuing look into current prospects and trends in the search for world peace.
224. **World Military Systems (2:2:1).** Prerequisite: AERS 115 and 116. A comparative study of world military forces to include free world land and naval forces, free world air forces, communist military systems, and trends in the development and employment of military power.

## THIRD YEAR

335. **Growth and Development of Aerospace Power (3:3:1).** Prerequisite: Junior standing. 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 (3:3:1).** Prerequisite: Junior standing. Astronautics and space operations, and the future development of aerospace power. Includes the United States space programs, vehicles, systems, and problems in space exploration.

## FOURTH YEAR

433. **The Professional Officer (3:3:1).** Prerequisite: AERS 335 and 336. A study in the meaning of professionalism, responsibilities of the professional officer, foundations of the military profession and the military justice system.
434. **The Professional Officer (3:3:1).** Prerequisite: AERS 335 and 336. A study of leadership theory, functions, and practices, management principles and functions, problem solving, and management tools, practices, and controls.

## Department of Military Science

The Army ROTC program consists of two parts:

**Basic Course.** A two-year course consisting of 1 hour of classroom instruction and 1½ hours of drill per week during the freshman year, and 2 hours of classroom instruction and 1½ hours of drill per week during one semester of the sophomore year. During the other semester, and in addition to 1½ hours of drill per week, History of Military Affairs (HIST 3317), is substituted for one semester of military science academics.

**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 be offered commissions as second lieutenants in the Regular Army.

**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 commissioning.

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 (a) an understanding of human behavior, together with proven methods for motivating others; (b) indoctrination in the techniques of leadership—tested practices and devices which tend to make him an effective leader; and (c) opportunity to apply the principles of leadership to everyday problems.

**Awards and Recognition.** The various individual awards presented by the Department of Military Science during the school year are the President's Award, Gerald Brown Memorial Award, Distinguished Military Student Badge, Superior Cadet Award, Military Excellence Ribbon, Good Conduct Award, Academic Achievement Ribbon, and Student Pilots Badge. In addition, Army cadets are eligible for the following awards presented by outside agencies: the Army and Navy Legion of Valor of the United States of America, National Defense Transportation Association Medal, Texas Sons

of the American Revolution Award, National Defense Supply Association Award, Dr. Ralph Mushon Memorial Award, American Legion Marksmanship Award, American Ordnance Association Award, Association of the United States Army Award, Armed Forces Communication and Electronics Award, and the Reserve Officers Association Medal.

**Army CorpsDettes.** The Army CorpsDettes is an organization of University women who have qualified for membership by personal appearance and charm, motivation, and scholastic achievement. Membership is limited to 45, and members must maintain a 2.50 grade-point average. This auxiliary to the Corps of Cadets has four main objectives: (a) to stimulate interest in the Army Reserve Officers Training Corps; (b) to augment the educational experiences of CorpsDettes members; (c) to participate in extracurricular activities which contribute to the welfare of Texas Tech and of the Army ROTC Cadet Corps; (d) to act as an auxiliary drill team to the Cadet Corps.

**Mackenzie Drum and Bugle Corps.** This organization forms an integral part of the Army ROTC Cadet Brigade. Military Science students having prior musical experience with the drum or trumpet may be assigned to this unit and will practice and play during normal drill periods. All instruments are furnished by the government.

**Counter guerrilla Unit.** Members of the unit are afforded the opportunity to apply classroom leadership and tactics instruction to a realistic field situation. In addition to weapons and tactics instruction, participation in the unit develops confidence in members' leadership ability, teamwork, and spirit. Membership is open to all Army, Air Force, and Marine Corps students who meet unit and University standards.

**Double T Rifle Team.** The Rifle Team is sponsored by the Military Science Department and is open to any undergraduate in good standing at the University. Members participate in Southwest Rifle Association collegiate matches and invitational shoulder-to-shoulder matches.

**Tyrian Rifles.** Precision drill and honor guard activities are carried out by this men's drill team. The Tyrian Rifles represent Texas Tech at various competitive meets throughout the nation.

**Scabbard and Blade.** This organization is a national military honor society for advanced course military science cadets having 2.00 grade-point averages and showing outstanding leadership qualities.

## Curriculum in Army Military Science.

### FIRST YEAR

111. **Organization of the Army and Individual Weapons Training (1:1:1½).** Prerequisite: 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 United States Army and National Security (1:1:1½).** Prerequisite: Same as for MILS 111. National defense policy; missions, capabilities, and role of the Army in conceivable types of warfare.

### SECOND YEAR

211. **Leadership Laboratory (1:0:1½).** Prerequisite: MILS 111, 112 or equivalent. School of the soldier and exercise of command.
222. **Map and Aerial Photography and Introduction to Operations and Basic Tactics (2:2:1½).** Prerequisite: MILS 111, 112, or equivalent. Reading and employment of maps and aerial photographs; principles of offensive and defensive combat.
- HIST 3317. **History of Military Affairs (3:3:0).** Prerequisite: MILS 111, 112 or equivalent.

### THIRD YEAR

331. **Leadership, Military Teaching, and Branches of the Army (3:3:1½).** Prerequisite: MILS 211, 222, HIST 3317 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 technical branches of the U.S. Army.
332. **Small Unit Tactics and Communications (2:2:1½).** Prerequisite: Same as for MILS 331. 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.

### FOURTH YEAR

431. **Military Operations, Logistics, and Administration (3:3:1½).** Prerequisite: MILS 322, 331. 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 United States in World Affairs, and Service Orientation (2:2:1½).** Prerequisite: Same as for MILS 431. 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.



## College of Business Administration

The College of Business Administration, organized in 1942, offers undergraduate work leading to the degrees of Bachelor of Business Administration and Bachelor of Science. The college has a normal enrollment of over 4,500 undergraduate and 300 graduate students. In addition, it makes its courses available to students in other colleges of the University in order that they may include business administration subjects in their programs.

The College 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.

The objectives of the College of Business Administration may be classified under three headings—education, research, and service. A primary objective of education in the College of Business Administration is to afford every student a broad base of business knowledge which will foster continuing intellectual development, provide the business knowledge necessary for satisfying and successful leadership in the business environment and provide an overview of business through an understanding of the functional area of business. Emphasis is upon developing the ability to accumulate and use data, solve problems, reach sound decisions, communicate effectively, and recognize and promote the social responsibilities of business.

The faculty of the College 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 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 college. 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 solving specific problems.

The College of Business Administration is divided into six instructional departments which offer course work and supervise the degree programs. The student should note carefully any particular requirements indicated by a department in which he plans to major. Curricula have been designed for each program, and specific required courses for each program are divided into groups. Group I (nonprofessional courses) and Group II (basic professional courses) are common to all programs and are given below in the section entitled General Curricula Requirements. Groups III, IV, and in some cases V, appear under the appropriate departmental heading.

The courses taught in the College of Business Administration are listed on the following pages under the department offering them.

**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. Another attractive field for women is business education.

**Load.** The normal study load for regular students in the college is 15 or 16 semester hours each semester. The student who shows promise of com-

piling only a mediocre grade record may have further load restrictions imposed. No student is permitted to enroll for a program of more than 18 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.

**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 freshman course, Business Enterprise (B AD 120) 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 possible interest to him. Aptitude tests are available to give students additional help in deciding upon their majors.

Upon accumulating 24 semester hours, each student must have selected, and have had approved by a major adviser from that particular field, a major field of study from one of the programs 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 an application for the degree in the office of the Dean of the College of Business Administration.

**Graduate Study.** The College of Business Administration offers study leading to the degree of Doctor of Business Administration. All of the departments participate as first-field and second-field concentrations for the Doctor of Business Administration degree.

The college also offers programs with majors in each of its departments leading to the degree of Master of Business Administration, in the Department of Accounting leading to the Master of Science in Accounting, in the Department of Economics leading to the Master of Arts, and in the Department of Business Education and Secretarial Administration leading to the Master of Education.

The professional M.B.A. degree program is offered especially for candidates with backgrounds in engineering, agriculture, the arts, sciences, law, or other nonbusiness areas. A 56-hour program covers introductory and advanced study areas to give the student a broad preparation for successful professional career activity as entrepreneurs or executives in business and industry. The 56 hours may be reduced by any equivalent business study already completed to a minimum of 31 hours.

Details of the graduate programs of the College of Business Administration will be found in the *Catalog of the Graduate School*.

**Honors Studies.** The Honors Plan of the College 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. Qualified stu-

dents are admitted to the program at the beginning of their freshman year. Admission is based upon the scores of the Scholastic Aptitude Test, standing in senior class, and recommendation of high school or college instructors. Some outstanding students may be admitted to the program in the middle of the freshman year or at the beginning of the sophomore year.

The program consists of special classes in business and nonbusiness subjects that are required for the bachelor's degree in the College of Business Administration. Through this plan a student may pursue any one of the majors within the College of Business Administration. The student who graduates under this program will have the best possible preparation for graduate and professional work in business administration and will be awarded a special display certificate designating him an Honors Plan graduate.

**Prelaw Studies.** Schools of law do not normally prescribe specific courses as part of their admission requirements. Students interested in attending law school after graduation may pursue any of the regular degree programs offered by the College of Business Administration. For specific information relating to law school preparation, interested students should inquire at the office of the Dean of the College of Business Administration.

**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 for majors in accounting, business education, economics, finance, general business, management, or marketing.
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 the College of Business Administration at least one year in advance of the proposed graduation date.

**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 for majors in economics or general business.
- 2, 3, 4, 5. Same as for the degree of Bachelor of Business Administration.

#### **General Curricula Requirements.**

##### **I. Nonprofessional courses (48 semester hours):**

ECO 133—The Development of American Business and Economic Institutions I

Special sections are available for Honors Plan students.

ECO 231, 232—Principles of Economics I and II

Special sections are available for Honors Plan students.

ENG 131, 132—College Rhetoric

Honors Plan students should register for 133H, 134H.

ENG 231 or 232—Masterpieces of Literature

Special sections are available for Honors Plan students.

GOVT 231—American Government, Organization

GOVT 232—American Government, Functions

MATH 137, 138—Mathematical Analysis

Special sections are available for Honors Plan students.

Physical Education, Band, or Basic ROTC—four semesters, but hours not counted for degree

Science—6 semester hours

Business Education students must take biology, chemistry, geology, or physics.

G SP 338—Business and Professional Speech

American History—6 semester hours

Humanities—3 semester hours as approved by the major adviser from one of the following fields (list of approved courses is available from adviser or office of the dean):

Art

Anthropology  
 English  
 Foreign Language  
 Music Literature  
 Philosophy  
 Psychology  
 Sociology

II. Basic professional courses (31 semester hours):

ACCT 232—Electronic Data Processing I

ACCT 234, 235—Elementary Accounting I and II

Special sections are available for Honors Plan students.

BLAW 338, 339—Business Law I and II

Honors Plan students should register for BLAW 339H only.

FIN 331—Corporation Finance

Special sections are available for Honors Plan students.

MGT 331—Industrial Management

Special sections are available for Honors Plan students.

MKT 246—Introduction to Business Statistics

Special sections are available for Honors Plan students.

MKT 332—Principles of Marketing

Special sections are available for Honors Plan students.

SECT 333—Business Correspondence

Special sections are available for Honors Plan students.

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 college 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 college assumes no obligation for substitutions claimed by the student unless he can present when needed his copy of the substitution form.

IV. Electives.

Honors Plan students are expected to complete B AD 441H—Seminar in Business Administration and B AD 422H—Business Policy Research and Report. 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. ECO 133, 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.

**Bachelor of Business Administration or Bachelor of Science—General Business Major.** The curriculum in general business recognizes the growing complexity of business, which requires coordination and integration with many fields of study taught outside the College of Business Administration. The program is offered to provide opportunity to a student who can satisfy the demand for qualified personnel with a background in business **plus** an area of concentration other than in the College of Business Administration. The area of concentration may be selected from any recognized department in the University.

I. Nonprofessional courses (48 semester hours).

II. Basic professional courses (31 semester hours).

III. General business major (30 semester hours minimum).

This major requires a nonbusiness area of concentration of not less than 18 semester hours and a minimum of 12 semester hours of approved business electives. Students interested in this program should confer with the Associate Dean of the College of Business Administration.

IV. Electives to complete a total of 126 semester hours, exclusive of freshman and sophomore physical education, band, or basic ROTC. Not less than 40 percent of the total hours required for graduation must be business and economics. The student may need to use part of the Group IV electives to assure the required amount of business work.

# Suggested Programs for Business Administration Curricula, 1970-1971

(Refer to Appropriate Statements of Degree Requirements)

YEAR	ACCOUNTING		BUSINESS EDUCATION		ECONOMICS		GENERAL BUSINESS	
	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
FIRST	ACCT 232 ENG 131 HIST 231 MATH 137 P.E. Science	ECO 133 ENG 132 HIST 232 MATH 138 P.E. Science	ECO 133 ENG 131 HIST 231 MATH 137 SECT 122 P.E.	ACCT 232 ENG 132 HIST 232 MATH 138 SECT 131 SECT 123	ECO 133 ENG 131 HIST 231 MATH 137 P.E. Science	ACCT 232 ENG 132 HIST 232 MATH 138 P.E. Science	ACCT 232 ENG 131 HIST 231 MATH 137 P.E. Science	ECO 133 ENG 132 HIST 232 MATH 138 P.E. Science
SECOND	ACCT 234 ECO 231 ENG 231 GOVT or 232 GOVT 231 Humanities P.E.	ACCT 235 ECO 232 GOVT 232 G SP 338 P.E.	ACCT 234 ECO 231 ENG 231 Science SECT 231 P.E.	ACCT 235 ECO 232 ENG 232 GOVT 231 MKT 246 P.E.	ACCT 234 ECO 231 ENG 231 GOVT or 232 GOVT 231 G SP 338 P.E.	ACCT 235 ECO 232 GOVT 232 Humanities P.E. NBAC* 3 hrs.	ACCT 234 ECO 231 ENG 231 GOVT or 232 GOVT 231 P.E. NBAC* 3 hrs.	ACCT 235 ECO 232 GOVT 232 G SP 338 P.E. NBAC* 3 hrs.
THIRD	ACCT 334 ACCT 336 BLAW 338 MKT 332 SECT 333	ACCT 335 BLAW 339 FIN 331 MKT 246 Acct. Elect.	BLAW 338 S ED 330 ED 332 GOVT 232 MKT 332 SECT 321	BLAW 339 S ED 334 Science SECT 322 SECT 327 P.E.	BLAW 338 ECO 331 FIN 331 MKT 332 Elective	BLAW 339 ECO 331 MGT 331 MKT 246 Elective	MKT 332 SECT 333 MGT 331 NBAC* 3 hrs. ABE** 3 hrs.	FIN 331 Humanities MKT 246 NBAC* 3 hrs. ABE** 3 hrs.
FOURTH	ACCT 430 ACCT 437 Electives	MGT 331 Acct. Elect. Electives	B ED 432 B ED 433 MGT 331 SECT 333 G SP 338 Noncertificated program and Plan I certificated program substitutions by advisement.	S ED 436 S ED 462 FIN 331	ECO 430 SECT 333 Approved Electives	ECO 431 ECO 431 Approved Electives	BLAW 338 NBAC* 3 hrs. ABE** 3 hrs. Electives * Non business area of concentration **Approved business elective	BLAW 339 NBAC* 3 hrs. ABE** 3 hrs. Electives



## Suggested Programs for Business Administration Curricula, 1970-1971

(Refer to Appropriate Statements of Degree Requirements)

(Continued)

YEAR	FINANCE		MANAGEMENT		MARKETING	
	FALL	SPRING	FALL	SPRING	FALL	SPRING
FIRST	ECO 133 ENG 131 HIST 231 MATH 137 P.E. Science	ACCT 232 ENG 132 HIST 232 MATH 138 P.E. Science	ECO 133 ENG 131 MATH 137 P.E. HIST 231 Science	ACCT 232 ENG 132 MATH 138 P.E. HIST 232 Science	ECO 133 ENG 131 Science P.E. MATH 137 Elective	ENG 132 ACCT 232 MATH 138 Humanities Science P.E.
	ACCT 234 ECO 231 ENG 231 GOVT or 232 P.E. Elective	ACCT 235 ECO 232 GOVT 232 Humanities G SP 338 P.E.	ACCT 234 ECO 231 ENG 231 GOVT or 232 P.E.	ACCT 235 ECO 232 GOVT 232 MGT 232 or 332 Humanities P.E.	ACCT 234 ECO 231 ENG 231 GOVT or 231 HIST 231 P.E.	ACCT 235 ECO 232 GOVT 232 HIST 232 MKT 246 P.E.
THIRD	BLAW 338 FIN 331 FIN 333 MKT 246 MKT 332	ACCT 334 BLAW 339 MGT 331 FIN 433 Fin. Elect.	BLAW 338 MGT 331 SECT 333 G SP 338 Mgt. Elect.	BLAW 339 MKT 332 FIN 331 MGT 336 Elective	MKT 332 MKT 334 BLAW 338 FIN 331 Elective	MKT 335 BLAW 339 MGT 331 SECT 333 Mkt. Elect.
	FIN 434 SECT 333 Elective Fin. Elect.	FIN 431 Electives Fin. Elect.	Electives Mgt. Elect.	MGT 432 Electives Mgt. Elect.	MKT 436 Electives Mkt. Elect.	MKT 433 G SP 338 Electives

## Department of Accounting

This department supervises the following degree programs: ACCOUNTING, Bachelor of Business Administration, Master of Business Administration, Master of Science in Accounting. The department cooperates in the program leading to the Doctor of Business Administration degree.

The undergraduate degree requirements are listed in the table below.

### Bachelor of Business Administration—Accounting Major.

- I. Nonprofessional courses (48 semester hours).
- II. Basic professional courses (31 semester hours).
- III. Major professional courses (21 semester hours):  
 ACCT 334, 335—Intermediate Accounting I and II  
 ACCT 336—Principles of Cost Accounting  
 ACCT 430—Income Tax Accounting  
 ACCT 437—Principles of Auditing  
 Accounting electives—6 semester hours from 400-level courses.
- IV. Electives to complete a total of 120 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 48 academic hours of course work outside the College of Business Administration. No more than 3 semester hours of the Group IV electives may be in accounting.

### Courses in Accounting.

#### FOR UNDERGRADUATES

121. **Elementary Mechanical Coding (2:2:2).** Students achieve proficiency with the keypunch, verifier, alpha-numeric keyboards, drills, program cards, card format, and coding.
231. **Industrial Accounting for Engineers (3:3:0).** A basic accounting course combining a managerial approach to financial accounting with a highly condensed presentation of the principles and procedures of accounting.
232. **Electronic Data Processing I (3:3:0).** A study of general purpose, digital, electronic computers and applications adaptable to automation; computer fundamentals, flowcharts, programming, basic COBOL and FORTRAN-IV, systems, control, and data cards.
233. **Electronic Data Processing II (3:3:0).** Prerequisite: ACCT 232. An advanced study of large, tape-controlled, general purpose, digital computers and suitable applications; programming in COBOL and FORTRAN-IV beyond the basic subset.
234. **Elementary Accounting I (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. **Unit Record Data Processing I (4:3:3).** Punched card methods; card format and coding; organization and operation of tabulating machines departments; applications. Wire panel boards; operate the printing punch, verifier, sorter, tabulator.
247. **Unit Record Data Processing II (4:3:3).** Wire panel boards, operate the keypunch, interpreter, reproducer, and collator. Study unit record accounting applications and systems for payroll, inventory, billing, sales, management, accounts payable and receivable, supervisor responsibility, and procedure development.
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.
323. **Introduction to Income Taxation for Individuals (2:2:0).** For nonaccounting majors only. A study of origin and development of basic concepts. Involves preparation of individual tax returns.
331. **Managerial Accounting (3:3:0).** Prerequisite: ACCT 235 and nonaccounting major. Accounting information as an aid to management decision making; emphasizes the use of budgets, standard costs, and relevant costs by management.
332. **Analysis of Financial Statements (3:3:0).** Prerequisite: ACCT 235 and nonaccounting major. The theoretical foundation of the balance sheet and the income statement, and a survey of the techniques available for analyzing these two statements.
334. **Intermediate Accounting 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).** Principles and techniques of cost accounting for product costing, control, and decision making. Consideration of prime costs, factory overhead, budgeting, and transfer pricing.
421. **Accounting Reports (2:2:0).**
430. **Income Tax Accounting (3:3:0).** Prerequisite: ACCT 234. A study in detail of certain provisions of the Internal Revenue Code, combined with elementary tax planning in business and individual transactions.
431. **Advanced Income Tax Accounting (3:3:0).** Prerequisite: ACCT 430. Methodology in income tax research and planning. Case studies used for corporate and individual problem solutions.
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 oil, with emphasis upon production.

434. **Advanced Accounting I (3:3:0)**. Prerequisite: ACCT 334, 335. Partnerships, ventures, installment sales, consignments, bankruptcies and receiverships, estates and trusts, actuarial science.
435. **Advanced Accounting II (3:3:0)**. Home office and branch accounting, consolidations, governmental units, insurance.
436. **Accounting Systems (3:3:0)**. Prerequisite: ACCT 235. The theories, procedures, and techniques of designing information systems for organizations that maintain financial records.
437. **Principles of Auditing (3:3:0)**. Prerequisite: ACCT 335. A study of system based independent audits including auditing objectives, procedures, internal control, working papers and reporting on the fairness of financial statements.
438. **Advanced Auditing (3:3:0)**. Prerequisite: ACCT 437. Readings in auditing. Review of auditing standards; case studies in auditing procedures and reporting.
439. **Budgeting (3:3:0)**. Prerequisite: ACCT 235, MKT 246. The use of accounting in the profit-planning process. The operating and financial budgets; flexible expense budgets; reports; and supplementary budgetary statistics.
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.

## FOR GRADUATES

531. **Controllership (3:3:0)**. Role of the controller in business.
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.
535. **Seminar in Accounting (3:3:0)**. Comprehensive study of some phase of accounting, such as internal auditing, accounting for the federal government, auditing of specific enterprises, accounting for fiduciaries and estates, advanced cost problems, and advanced machine accounting.
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.
538. **Advanced Corporation Accounting (3:3:0)**. Prerequisite: 12 hours of advanced accounting or consent of instructor. Problems and theory: corporate equities, capital adjustments, reorganizations, dissolutions, business combinations, financial reporting.
539. **Seminar in Federal Taxes (3:3:0)**. Investigation into organization and operation of the Internal Revenue Service. Tax research and planning in areas of federal income, gift, and estate taxation.
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.
5315. **Estate, Trust, and Gift Taxation (3:3:0)**. Intensive study of federal income taxation of the estate and trust entities and the transfer of property rights through gifts.
5316. **Oil and Gas Taxation (3:3:0)**. Analysis of oil and gas transactions under provisions of federal income tax laws. Studies of current practices in planning petroleum transactions.
5317. **Contemporary Approaches to the Development of Accounting Theory (3:3:0)**. Recent contributions in the development of accounting theory and hypotheses including scientific methods, measurement theory, communication theory, operationalism and other disciplines.
5318. **Income Tax Research and Planning (3:3:0)**. Fundamental procedures in research of income tax subject areas, as: depreciation, inventories, etc. Principles involved in necessary planning of actions for a desired tax result.
5319. **Advanced Auditing for Graduate Students (3:3:0)**. Readings in auditing. Review of auditing standards; case studies in auditing procedures and reporting.
5320. **Industrial Cost Control (3:3:0)**. Emphasis is on the use of operating data by management for control purposes.
5321. **Federal Income Tax Law for Partnerships (3:3:0)**. Withdrawals by partners; sale of partnership interests; adjustments to basis upon withdrawal of partner; transfers of unrealized receivables and appreciated inventories.
5322. **Federal Income Taxation of Corporations and Shareholders (3:3:0)**. Study of corporate tax problem areas, including liquidations, formation and reorganization, collapsibility, dividends, and "Subchapter S" treatments.
5341. **Managerial Accounting I (3:3:0)**. Prerequisite: ACCT 235 or 5531 and limited to non-accounting majors. Uses of accounting to business as well as the interpretation of financial statements and accounting reports.
5351. **Advanced Accounting Theory and Practice (3:3:0)**. Development of accounting theory and practice. Objectives and limitations of accounting and survey of accounting areas as they relate to the business environment.
5531. **Principles of Accounting (5:5:0)**. Survey of accounting procedures, accumulation of information regarding the accounting entity and interpretation for control purposes and managerial decisions.
5541. **Managerial Accounting II (5:5:0)**. A detailed analysis of financial statements and corporate accounts. Accumulation of cost information and interpretation of the results as an aid to managerial decisions.
731. **Research (3)**.

**Business Administration****Courses in Business Administration.\***

## FOR UNDERGRADUATES

120. **Business Enterprise (2:2:0)**. The study of business as a profession, a function, and an institution.
- 422H. **Business Policy Research and Report (3)**. Prerequisite: BAD 441H. Individual student investigation of some specific business problem under the personal direction of a scholar in the specialized field. Written report required.

\* Participation by all departments in the College of Business Administration.

**441H. Seminar in Business Administration (4:4:0).** Prerequisite: Permission of Honors Plan Director. Integrating course in policy formulation and administration. Student will draw on his knowledge of all the areas of business in solving organization problems.

#### FOR GRADUATES

- 5341. Research Methods in Business (3:3:0).** Prerequisite: Graduate standing; consent of instructor. A study of the scientific research methods in business.
- 5342. Business Policy (3:3:0).** Prerequisite: Graduate standing; consent of adviser. A course in policy formulation and policy implementation that integrates for the student the separate areas of business study.
- 5351. Business and Its Environment (3:3:0).** Prerequisite: Graduate standing. A consideration of the position of today's business in the light of those concepts which are the foundations of our society.
- 5352. Research Methods and Management (3:3:0).** Prerequisite: Graduate standing; permission of instructor. A study of scientific research methods, and the administrative and environmental aspects of the management of research personnel.
- 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.

## Department of Business Education and Secretarial Administration

This department supervises the following degree programs: **BUSINESS EDUCATION, Bachelor of Business Administration, Master of Business Administration, Master of Education.** The department also participates in the **BILINGUAL SECRETARIAL** program leading to a *Bachelor of Arts* degree and the program leading to the *Doctor of Business Administration* degree.

A certificate to teach business subjects in the state of Texas is earned by the completion of the business education certificated program. The noncertificated program prepares students for office administrative positions.

The undergraduate degree requirements are listed below.

### Bachelor of Business Administration—Business Education Major.

- I. Nonprofessional courses\* (48 semester hours).
- II. Basic professional courses (31 semester hours).
- III. Major professional courses (40 semester hours):
  - \*B ED 432—Teaching Business Subjects I
  - \*B ED 433—Teaching Business Subjects II\*\*
  - \*S ED 330—Principles of Secondary Education
  - \*ED 332—Educational Psychology
  - \*S ED 334—Curriculum Development in Secondary Education
  - \*S ED 436—Teaching in Secondary Schools
  - \*S ED 462—Student Teaching
  - SECT 122—Typewriting for Business I
  - SECT 123—Typewriting for Business II\*\*
  - SECT 131—Shorthand Theory\*\*
  - SECT 231—Dictation and Transcription\*\*
  - SECT 321—Office Machines I
  - SECT 322—Office Machines II\*\*
  - SECT 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 College of Business Administration.
- V. \*Evidence of at least eight weeks of continuous, full-time business experience.

### Courses in Business Education.

#### FOR UNDERGRADUATES

- 432. Methods of Teaching Business Subjects I (3:3:0).** Prerequisite: ACCT 235, BLAW 339, ECO 232. Business education as a profession. Methods, content, and materials to teach basic business subjects, bookkeeping, and office machines.
- 433. Methods of Teaching Business Subjects II (3:3:0).** Prerequisite: At least a C grade in both SECT 122 and 231 or equivalents. Methods, content, and materials to teach typewriting, shorthand, transcription, and secretarial procedures.

#### FOR GRADUATES

- 530. Foundations of Business Education (3:3:0).** A historical study of business education principles.
- 535. Seminar in Business Education (3:3:0).** Analysis of business education areas including curriculum, guidance, administration, supervision, evaluation, and economic education.

\* Approved substitutions will be made for noncertificated program.

\*\* Approved substitutions will be made for the Plan I certificated program.

536. **Research and Improvement of Instruction in Bookkeeping (3:3:0).** Prerequisite: B ED 432. Study of content, methods, and research to improve the instruction of bookkeeping.
537. **Research and Improvement of Instruction in Office Procedures (3:3:0).** Prerequisite: B ED 432 and MGT 331 or 339. Study of content, methods, and research to improve the instruction and performances in office procedures.
538. **Research and Improvement of Instruction in Shorthand (3:3:0).** Prerequisite: B ED 433. Study of content, methods, and research to improve the instruction of shorthand theory, dictation, and transcription.
539. **Research and Improvement of Instruction in Typewriting (3:3:0).** Prerequisite: B ED 433. Study of content, methods, and research to improve the instruction of typewriting.
5311. **Organization and Administration of Vocational Education (3:3:0).** Prerequisite: Graduate standing. The objectives, principles, and procedures for organizing and administering vocational education programs in high school, junior college, and adult education programs.
5312. **Cooperative Vocational Education Programs (3:3:0).** Prerequisite: Graduate standing. The objectives, principles, and procedures for establishing, coordinating, and teaching cooperative work-study programs in high school, junior college, and adult education programs.
5331. **Problems in Business Education (3:3:0).** Identification and analysis of contemporary business education problems. May be repeated for credit.
5351. **Collegiate Education for Business (3:3:0).** Prerequisite: Graduate standing. To assist prospective teachers in collegiate schools of business and management personnel in business and industry to develop a personal philosophy of education for business and to develop their teaching abilities.
630. **Master's Report (3).**
731. **Research (3).**

### Courses in Secretarial Administration.

#### FOR UNDERGRADUATES

121. **Beginning Typewriting (2:2:3).** Basic course in touch typewriting, with skill development and application emphasis on the preparation of typewritten business letters and manuscripts. No credit for those with one year of previous typewriting instruction.
122. **Typewriting for Business I (2:2:2).** Prerequisite: At least a C grade in SECT 121 or equivalent. Display of business data for effective administrative communication through typewritten letters, memos, reports, forms, etc. Selection and maintenance of typewriting equipment and supplies. Electric typewriting.
123. **Typewriting for Business II (2:2:2).** Prerequisite: At least a C grade in SECT 122 or equivalent. Technical aspects and problems in facilitating preparation, interpretation, comprehension, and processing of typewritten communications. Preparation of masters appropriate to various reproduction processes.
131. **Shorthand Theory (3:3:2).** Corequisite: SECT 122. Theory of Gregg system. Development of basic shorthand vocabulary. Recording and transcribing timed dictation of business communications.
231. **Dictation and Transcription (3:3:2).** Prerequisite: At least a C grade in both SECT 122 and 131. Expansion and automatization of shorthand vocabulary. Building of speed and accuracy in note taking. Typewritten transcripts.
232. **Advanced Dictation and Transcription (3:3:2).** Prerequisite: At least a grade of C in SECT 231 or equivalent. Development of ability to transcribe mailable business communications. Introduction of office-style dictation. Specialized business vocabulary.
321. **Office Machines I (2:2:2).** Prerequisite: ACCT 235. Numerical data processing machines and systems to decrease office expenses. Operation of calculating and accounting machines.
322. **Office Machines II (2:2:2).** Prerequisite: SECT 122. Communication and duplication machine processes and systems. Operation of dictating, transcribing, and duplicating machines.
327. **Report Writing (2:2:0).** Prerequisite: Junior standing. Composing effective business reports. Emphasis on business reporting procedures and solving internal business reporting problems.
331. **Secretarial Practice (3:3:0).** Prerequisite: SECT 232. Analysis of interpersonal relations in the office. Business ethics and office behavior.
332. **Secretarial Procedures (3:3:0).** Prerequisite: SECT 122. Scope of the secretarial profession. Supervision of office personnel. Records management; responsibilities in financial, legal, and other office administration matters.
333. **Business Correspondence (3:3:0).** Prerequisite: Junior standing. Composing psychologically sound business letters in correct and forceful English. Emphasis on solving business problems encountered in writing effective business letters.
431. **Internship (3:1:5).** Prerequisite: Senior classification and approval of instructor. Supervised business experience for minimum of 90 hours. Internship coordinated with lectures. Analysis and improvement of work operations.

### Department of Economics

This department supervises the following degree programs: *Economics, Bachelor of Business Administration, Bachelor of Science, Bachelor of Arts, Master of Arts, Master of Business Administration*. The department also participates in the program leading to the degree of *Doctor of Business Administration*. The requirements for the Bachelor of Arts degree are given in the Arts and Sciences section of this catalog. A minimum of 30 semester hours in economics courses approved by the chairman is required for a major in economics. The requirements for the other undergraduate degrees are given below.

#### **Bachelor of Business Administration or Bachelor of Science—Economics Major.**

- I. Nonprofessional courses (48 semester hours).
- II. Basic professional courses (31 semester hours).



- III. Major professional courses (33 semester hours):  
 ECO 3311—National Income Analysis  
 ECO 3314—Intermediate Economic Theory  
 ECO 430—Development of Economic Doctrines  
 ECO 431—Contemporary Economics Doctrines  
 ECO 4311—Advanced Economic Theory  
 Approved economics electives—9 semester hours  
 Approved noneconomics electives—9 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 College of Business Administration.

## Courses in Economics.

### FOR UNDERGRADUATES

133. **The Development of American Business and Economic Institutions I (3:3:0).** An analysis of how the contemporary American economy has evolved. Emphasis on the use of scientific tools to dissect problems; and comparisons of the characteristics of business institutions and the economic process in different eras.
134. **The Development of American Business and Economic Institutions II (3:3:0).** Prerequisite: ECO 133. A continuation of ECO 133, with primary 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).** An introduction to modern economic society and theories of production and exchange. Emphasis upon monetary and fiscal policy and macroeconomics. Credit will not be given for both 231 and 235.
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.
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 232, with emphasis upon monetary and fiscal policy. Credit will not be given for both 231 and 235.
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 232. The application of economic theory to problems of business enterprise.
334. **Taxation and Public Expenditures (3:3:0).** Prerequisite: ECO 232. Analysis of economic aspects of government finance; principles and problems of taxation, public expenditures, budgetary controls, and debt management.
336. **The Economics of Regulated Enterprise (3:3:0).** Prerequisite: ECO 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.
337. **Economic Systems (3:3:0).** Prerequisite: ECO 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 232. Principles of international trade, balance of payments, trade policies, and agreements.
339. **Latin America and the United States (3:3:0).** Prerequisite: ECO 232. The economics of Latin American countries and their economic relations with the United States.
3311. **National Income Analysis (3:3:0).** Prerequisite: ECO 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 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 Economics Analysis (3:3:0).** Prerequisite: ECO 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 232. Intermediate price theory and introduction to welfare theory. Includes theory of demand, theory of the firm, and welfare theory.
3315. **Development of the European Economy (3:3:0).** An analysis of technological, institutional, and other historico-economic forces and influences which have contributed to the emergence and development of the European economy.
3316. **Development of the American Economy (3:3:0).** An analysis of the European origins and the American development of the technological, institutional, and other historico-economic forces and influences which have created the economy of the United States.
430. **Development of Economic Doctrines (3:3:0).** Prerequisite: ECO 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.
432. **Economics of Growth and Development (3:3:0).** Prerequisite: ECO 232. A survey of the theories of economic growth and development including an evaluation of policies intended to achieve growth as well as maintain a high rate of growth.

433. **International Economic Relations (3:3:0)**. Prerequisite: 12 hours in economics. A critical evaluation of selected international economic problems.
435. **The Economics of Transportation (3:3:0)**. Prerequisite: ECO 232. 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 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: ECO 3314. Contemporary economic principles and thought concerning the production and distribution of goods and services.
4312. **Macrodynamic Economics (3:3:0)**. Prerequisite: ECO 3311. Historical survey of growth and development theory emphasizing cyclical, static macroeconomic models, formal macrodynamic economic models of growth and development.
4321. **Soviet Economics (3:3:0)**. Prerequisite: ECO 232. An examination and analysis of the operation of the economic system of the U.S.S.R. with special reference to planning.
4322. **Regional Economics (3:3:0)**. Prerequisite: ECO 232. A study on the techniques of economic analysis as applied to economic regions, with emphasis on special problems such as location of industry and regional development.
4323. **Monetary Theory (3:3:0)**. Prerequisite: ECO 3314 or 331 and FIN 333 or consent of instructor. An analysis of conceptual and theoretical consideration of the various doctrines of money, interest, and capital.
4324. **Manpower Problems and Policies (3:3:0)**. Prerequisite: ECO 3311 and 3314 or consent of instructor. A critical study of contemporary manpower problems and the policies that are being applied to solve these problems. Emphasis will be placed on the development of new directions for manpower policy.

## 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.
535. **Seminar in Economic Policy (3:3:0)**. Prerequisite: ECO 430. An analysis of major economic goals and policies of government and industry.
536. **Advanced International Economics (3:3:0)**. Prerequisite: ECO 338 or consent of instructor. An analysis of basic principles, problems and policies in international economics. Special attention is given to theories and alternative policies for economic development.
537. **Seminar in Public Finance (3:3:0)**. Prerequisite: ECO 3314, 3311 or 534, or consent of instructor. Analysis of economic effects of taxation, governmental expenditures, debt management, and budgetary planning and administration.
538. **The Nature, Method, and Scope of Economics (3:3:0)**. An analysis of the subject matter of economics and the different approaches in acquiring knowledge in the field. Attention is paid to the relationship between the positive and normative aspects of economics.
539. **Classical Economic Thought (3:3:0)**. Prerequisite: ECO 430. A critical analysis of the contributions of the Mercantilists, Monetary Economists, physiocrats and other pre-classical writers of economic thought. An intensive investigation of the body of classical and neo-classical thought as developed by Smith, Malthus, Ricardo, Say, Mill, Marshall and others.
5242. **Managerial Economics (2:2:0)**. Prerequisite: ECO 5341 or equivalent. An advanced course in the application of economic theory and analysis to the problems of the firm. Emphasis on mathematical tools of analysis.
5311. **Philosophy and Historiography of Economic History (3:3:0)**. An analytical study of the philosophy and historiography of economic history, with emphasis on the interpretation of economic history and the use of the historical method of analyzing economic forces and influences.
5312. **Seminar in Economic History (3:3:0)**. An analysis of selected topics from the economic history of the Western World. Each student is required to plan and to execute a research project related to the topic of the seminar.
5313. **Survey of Theories of Economic Growth and Development (3:3:0)**. Prerequisite: ECO 4312 or equivalent. A survey of the theories of growth and development.
5314. **Seminar in Economic Growth and Development (3:3:0)**. Prerequisite: ECO 5313. Intensive research into and analysis of selected economic growth and development topics.
5321. **Seminar in Mathematical Economics (3:3:0)**. Prerequisite: ECO 3313 or equivalent, or consent of instructor. A study of modern mathematical techniques used in the development and verification of economic theory.
5331. **Individual Study in Economics (3:3:0)**. Prerequisite: Graduate standing and permission of instructor. Directed reading and research concerning a specific problem or subject field in economics.
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.
5341. **Price and Income Theory (3:3:0)**. Prerequisite: ECO 5531 or 232. Designed for graduate students who need intensive study of intermediate economic price and income theory.
5351. **Advanced Micro-Economic Analysis (3:3:0)**. Prerequisite: ECO 3314 or 5341. Economic factors involved in the theory of the firm and determination of price. Special emphasis on the cases of monopoly, monopolistic competition and oligopoly.
5352. **Advanced Macro-Economic Analysis (3:3:0)**. Prerequisite: ECO 3311 or 5341. The aggregate approach to the economy and the tools of analysis used for the solving of aggregate problems.
5531. **The Economic Environment (5:5:0)**. Prerequisite: Graduate standing. A rigorous study of microeconomic and macroeconomic theory with applications to the major problems of the economy.
630. **Master's Report (3)**.
631. **Master's Thesis (3)**. Enrollment required at least twice.
731. **Research (3)**.

## Department of Finance

This department supervises the following degree programs: *FINANCE, Bachelor of Business Administration, Master of Business Administration*. The

department participates in the program leading to the degree of *Doctor of Business Administration*. Requirements for the bachelor's degree are listed below.

**Bachelor of Business Administration—Finance Major.**

**(Banking and Investments, Financial Administration, and Real Estate and Insurance)**

- I. Nonprofessional courses (48 semester hours).
- II. Basic professional courses (31 semester hours).
- III. Major professional courses (30 semester hours):  
 FIN 333—Principles of Money, Banking, and Credit  
 FIN 433—Corporate Financial Problems and Cases  
 FIN 434—Investments  
 Additional Finance courses approved by adviser—12 semester hours  
 ACCT 334—Intermediate Accounting I  
 Additional courses, taught outside the Finance Department, approved by adviser—6 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 College of Business Administration.

**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 financial problems.
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: 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. A survey of the entire field of private insurance and a foundation for more specialized courses.
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 annuity contracts. Group insurance, industrial insurance, disability protection, insurance company investments, and the taxation of policy proceeds.
3315. **Quantitative Analysis for Financial Decisions (3:3:0).** Prerequisite: FIN 331, MKT 246, and at least junior standing. The adaptation and application of various analytical and quantitative techniques to financial decision problems.
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. Study of fire insurance, marine insurance, and allied lines.
437. **Casualty Insurance (3:3:0).** Prerequisite: FIN 335 and 435. Various casualty lines of insurance, such as public liability, 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 principles 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.
4311. **Security Analysis (3:3:0).** Prerequisite: FIN 434. Comprehensive studies of the various methods of security selection and portfolio management are included. Intensive emphasis is placed upon valuation procedure of the various security types, particularly common stock.
4312. **International Finance (3:3:0).** Prerequisite: FIN 333 or consent of instructor. A study of the international monetary system in its theoretical and institutional setting. The flows of financial claims between countries both on current and capital account, and the function

of the foreign exchange market in arbitrage and hedging. The position of an individual business firm in conducting international trade, the procedures and practices in financing international transactions.

## FOR GRADUATES

531. **Current Financial Problems (3:3:0).** Solution and presentation of approved problems involving individual research in the field of finance.
533. **Seminar in Investment Analysis (3:3:0).** Prerequisite: FIN 434 or equivalent. Security analysis and selected problems in individual and institutional portfolio analysis.
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 used as a basis for analysis and decision.
536. **The Money and Capital Markets (3:3:0).** Prerequisite: FIN 431 and 433 or equivalent. A theoretical and empirical examination of saving and investment, financing and financial intermediaries, asset and portfolio structures, and interrelationship of financial and real variables of the economy.
537. **Risk Administration (3:3:0).** Prerequisite: FIN 335 or equivalent. A consideration of various methods of risk treatment including retention, prevention, reduction and transfer.
538. **Seminar in Contemporary Financial Theory (3:3:0).** An analysis of selected topics from various fields of finance. Each student is required to plan and to execute a research project related to the topic of the seminar. Course may be repeated for up to nine hours credit, providing there is no duplication of topics.
539. **History of Financial Thought (3:3:0).** A study of the evolution of thought concerning the finance function.
5331. **Business Finance (3:3:0).** Prerequisite: ACCT 5531 and ECO 5331 or equivalent. An introductory course in finance for graduate students designed to cover concepts in business finance and investment.
5341. **Current Business Financial Practices (3:3:0).** Prerequisite: FIN 331 or 5331. The general theory of financial administration with application to practical problems in business finance.
5351. **Financial Policies of Business (3:3:0).** Prerequisite: FIN 433 or 5341. The financial policy of business organization with emphasis on the organization of the financial function, evaluation of the financial performances and determination of the financial requirements.
731. **Research (3).**

**Courses in Business Law.**

## 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 fire, life, and accident policies; taxation affecting insurance policies; insurance and community property rights.
3313. **Oil and Gas Law (3:3:0).** General contracts, oil and leases and their interpretation, titles, royalty, proration and conservation of oil and gas, regulations governing drilling operations, government lands, cases on oil and gas.
4311. **CPA Law Review (3:3:0).** Review of business law, with emphasis on subject matter appearing frequently in the CPA law examinations.

## FOR GRADUATES

5331. **Legal Environment of Business (3:3:0).** Prerequisite: Graduate standing. The meaning, nature and sources of the law, the factors which shape it, and substantive fields of law which affect business organizations.

**Department of Management**

This department supervises the following degree programs: *MANAGEMENT, Bachelor of Business Administration, Master of Business Administration.* The department participates in the program leading to the degree of *Doctor of Business Administration.*

The undergraduate degree requirements are flexible to permit the student, with counsel, to tailor his own program related to the various aspects of management. Beyond the core in the major, the student can obtain a program emphasis through choice of electives in Manpower and Personnel, Administration, Operations and Industrial Management, or Management and Computer Science. Grades below C in management courses numbered 300 or above will not be acceptable for major requirements. The undergraduate requirements are given below.

**Bachelor of Business Administration—Management Major.**

- I. Nonprofessional courses (48 semester hours).
- II. Basic professional courses (31 semester hours).
- III. Major professional courses (30 semester hours).
  - MGT 232—Quantitative Analysis for Management Decisions I
  - or MGT 332—Quantitative Analysis for Management Decisions II
  - MGT 336—Behavioral Science in Business and Industry
  - MGT 432—Administrative Policy

Approved electives in Management—12 semester hours

Electives—9 semester hours

- IV. Electives to complete a total of 120 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 48 academic hours of course work outside the College of Business Administration.

## Courses in Management.

### FOR UNDERGRADUATES

232. **Quantitative Analysis for Management Decisions I (3:3:0).** Prerequisite: Consent of instructor. Development and understanding of business decision tools and models to be applied to the managerial decision process.
330. **Organization and Management (3:3:0).** The management function; basic principles, concepts, and practices in the operation of the organization.
331. **Industrial Management (3:3:0).** Principles and methods used in developing and operating industrial and business enterprises; principles of scientific management.
332. **Quantitative Analysis for Management Decisions II (3:3:0).** Prerequisite: ACCT 234, 235; ECO 231, 232; MGT 232; MKT 246. The applications of quantitative tools to business problems.
334. **Personnel Administration I (3:3:0).** Prerequisite: Consent of instructor. Principles and methodology in general personnel management and work force maintenance.
335. **Materials Management (3:3:0).** Prerequisite: MGT 331. The organization and function of the procurement and inventory activity.
336. **Behavioral Science in Business and Industry (3:3:0).** Prerequisite: Consent of the instructor. Theory, methods, and demonstrations of behavioral science applied to problems of business, industrial, and engineering settings.
339. **Office Management (3:3:0).** Standards of office practice, office methods, office planning techniques, and duties and responsibilities of the office manager.
3331. **Recent Labor Legislation (3:3:0).** Prerequisite: MGT 331. Study of permissive areas of activity in labor relations, with particular emphasis on major federal laws. General state labor legislation, with emphasis on Texas laws, is included.
3371. **Industrial Traffic Management (3:3:0).** Prerequisite: Consent of the instructor. The problems of commercial and industrial traffic management are studied, as well as logistics, functions.
3381. **The Theory of Transportation Ratemaking (3:3:0).** A study of the rules, rates, and charges governing the movement of goods in common carrier transportation.
430. **Management of Small Business Enterprise (3:3:0).** Prerequisite: Consent of the instructor. A problem course involving the application of principles of management to small-scale enterprise situations.
431. **Job Evaluation and Wage Administration (3:3:0).** Prerequisite: Consent of instructor. Applications of wage theory to wage problems of the firm, investigation of financial incentives, and administration of the wage program.
432. **Administrative Policy (3:3:0).** Prerequisite: Consent of instructor. Application of the case method to complex problems of policy formulation in the administration of the firm.
434. **Personnel Administration II (3:3:0).** Prerequisite: MGT 334. Problems in personnel management examined through consideration of cases, experiences, and results of research in various fields of employer-employee relationships.
435. **Employee Supervision (3:3:0).** Prerequisite: MGT 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.
436. **Systems and Procedures (3:3:0).** Prerequisite: MGT 339 or consent of the instructor. Development and standardization of practices and procedures, work analysis and job simplification, and planning of administrative information systems and controls.
437. **Management and the Business Environment (3:3:0).** Study and cases in social responsibility, business ethics, and other problems in the external environment of the business organization.
438. **Production I (3:3:0).** Prerequisite: MGT 331, 332; MKT 246. Critical examination of management decision-making techniques, with major emphasis on the practical applications of scientific methods to analysis of production activities.
439. **Production II (3:3:0).** Prerequisite: MGT 438. An extension of Production I, with a rigorous application of schematic, statistical, and mathematical tools to problems of systems design and resource allocation within the firm.
442. **Industrial Management Problems (4:3:2).** Prerequisite: MGT 331 or equivalent background. A problem and field course involving study of organization, planning, and operation of industrial enterprises.
4331. **Collective Bargaining (3:3:0).** Prerequisite: MGT 331. A study of labor union development, organization, leadership, and operational techniques. Consideration of collective bargaining issues and procedures.
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 carriers.
4381. **Advanced Traffic Management (3:3:0).** Prerequisite: MGT 3371. Advanced study of the major problems faced by industry and by carriers in the movement of goods.

### FOR GRADUATES

511. **Individual Problems (1:1:0).**
530. **Individual Research in Management (3).**
531. **Current Problems in Management (3:3:0).**
533. **Quantitative Analysis for Business (3:3:0).** Prerequisite: Consent of instructor. Quantitative tools and the techniques employed in problem analysis utilizing computer aid for the more complex situations.
535. **Human Behavior in Business (3:3:0).** Prerequisite: Consent of instructor. The course examines theories of social and behavioral sciences and will emphasize research and the analysis of problems involving the role and contributions of people in the business environment.



536. **Management of Human Resources (3:3:0).** Prerequisite: Consent of instructor. Factors involved in the selection, development, adjustment, and motivation of individual employees with emphasis on independent investigations and preparations by students.
537. **Seminar in Personnel Administration (3:3:0).** Prerequisite: Consent of instructor. A reading and research seminar, involving individual research and reflective group discussion emphasizing evaluation of personnel policies and design of model personnel organizations.
538. **Advanced Production Management (3:3:0).** Prerequisite: Consent of instructor. Complex problems encountered in managing production operations. Use of modern analytical techniques such as those of management science, operations research, and simulation.
539. **Seminar in Operations Management (3:3:0).** Prerequisite: Consent of instructor. Readings, individual research and reports, and group studies of operations policy and production problems. Complex problems requiring programming to computers will be included.
5311. **International Business Management (3:3:0).** Prerequisite: Consent of instructor. Comparative analysis of domestic, international, and multi-national business operations, and the significance for organization and management.
5312. **Administrative Policy and Strategy (3:3:0).** Prerequisite: Consent of instructor. An integrative and problem-solving course in organizational administration, planning, and strategy. Simulations and cases are utilized in diagnostic and decision-making exercises.
5313. **Business and Management Systems (3:3:0).** Prerequisite: Consent of instructor. Analysis of a business or enterprise in terms of its major functions in order to build a framework for an information or control system.
5314. **Philosophy and Thought in Management (3:3:0).** Prerequisite: Consent of instructor. An investigation into the forces and institutions which control and influence the exercise of managerial activities. Emphasis on history, ethics, and current thought.
5315. **Mathematical Programming for Business (3:3:0).** Computer based linear programming; revised simplex method; special problem forms and methods; parametric programming; business applications.
5316. **Computer Models for Business, Industry, and Government (3:3:0).** Study, construction, and operation of computer simulations and other models as aids for management and administrative decisions.
5317. **Management Information Systems (3:3:0).** Advanced study of information systems: their design, implementation, and contribution to management planning, decision-making, and control.
5318. **Seminar in Labor and Collective Bargaining (3:3:0).** Study and analysis of collective bargaining theory as well as major labor relations problems and public labor policy dilemmas.
5331. **Organization and Human Behavior (3:3:0).** Prerequisite: Consent of instructor. An introduction to the decision-making process and the principles of organization and administration as basic social techniques.
5341. **Management Decision Making (3:3:0).** Prerequisite: Consent of instructor. Limited to other than management majors. A basic management theory course intended to provide students with an orientation to the decision-making function of the manager or administrator.
5342. **Production Management (3:3:0).** Prerequisite: Consent of instructor. Fundamentals of the production function and basic analytical methods of factor allocation.
5351. **Decision Theory and Management Science (3:3:0).** Prerequisite: Consent of instructor. An operative theory of decisions for business, including foundations in philosophy, logic, economics and management science.
5352. **Administrative Organization (3:3:0).** Prerequisite: Consent of instructor. Development of organization theory and applications in the analysis of organization design and the measurement of its effectiveness.
5353. **Advanced Organization Theory (3:3:0).** Prerequisite: consent of instructor. Advanced study of organization theory and models as they relate to management and administration.
731. **Research (3).**

## Department of Marketing

This department supervises the following degree programs: *MARKETING, Bachelor of Business Administration, Master of Business Administration*. The department also participates in the program leading to the degree of *Doctor of Business Administration*. The undergraduate degree requirements are given below.

### **Bachelor of Business Administration—Marketing Major.**

- I. Nonprofessional courses (48 semester hours).
- II. Basic professional courses (31 semester hours).
- III. Major professional courses (30 semester hours):
  - MKT 334—Principles of Advertising
  - MKT 335—Principles of Retailing
  - MKT 433—Marketing Problems
  - MKT 436—Marketing Research and Analysis
  - 9 additional semester hours of 400-level courses in marketing
  - 9 semester hours of nonmarketing courses selected from the following:
    - ACCT 331—Managerial Accounting
    - ACCT 332—Analysis of Financial Statements
    - ACCT 336—Principles of Cost Accounting
    - ANTH 232—Cultural Anthropology
    - ART 321—Problems in Visual Communications
    - ECO 331—Economics of Business Enterprise
    - JOUR 335—Advertising Media

MGT 232—Quantitative Analysis for Business Decisions I  
 MGT 336—Behavioral Science in Business and Industry  
 MGT 432—Administrative Policy  
 PHIL 231—Introduction to Logic  
 PSY 230—General Psychology I  
 SOC 230—Introduction to Sociology

- 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 College of Business Administration.

## Courses in Marketing.

### FOR UNDERGRADUATES

246. **Introduction to Business Statistics (4:3:2).** Prerequisite: MATH 137 and 138. Techniques of analysis of numerical data including averages, dispersion, statistical inference, linear correlation, and time series.
331. **Public Relations (3:3:0).** Policies and procedures of creating and maintaining public good will in business. The course examines the many functional aspects of public relations.
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).** An overview of the broad field of advertising. Acquaints students with the role of advertising in the American economy.
335. **Principles of Retailing (3:3:0).** Prerequisite: MKT 332. Comprehensive introduction to and evaluation of retailing with emphasis on profit elements, pricing and merchandising policies, inventory and merchandise control.
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.
426. **Index Numbers (2:2:0).** Prerequisite: MKT 246. An intensive study of the construction and interpretation of index numbers. Practical problems in measurement of business status through use of index numbers.
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 and senior standing. Actual marketing cases and problems. Marketing costs, brand policy, channels of distribution, sales promotion, sales policies, price policies, and operating control.
434. **Wholesaling (3:3:0).** Prerequisite: MKT 332. Processes and institutions of wholesale marketing from manufacturer to retailer through merchant and functional middleman with special emphasis upon modern channels of distribution.
435. **Business Cycles and Forecasts (3:3:0).** Prerequisite: MKT 246. Theories of cycles. Causes and proposed remedies. Examination of forecasting services and techniques employed by them. Problems in specific commodities and securities.
436. **Marketing Research and Analysis (3:3:0).** Prerequisite: MKT 246 and 332. Scientific marketing research methods; emphasis on collection, analysis, and interpretation of data as applied to the solution of marketing problems.
437. **Advanced Business Statistics (3:3:0).** Prerequisite: MKT 246. A more extended study of some phases of business statistics, including multiple and partial correlation, analysis of variance, and chi-square tests.
439. **Sales Management (3:3:0).** Prerequisite: MKT 332. Problems and methods of organization and administration of sales departments, sales operations, sales control, sales promotion, and sales policies.
4311. **Advertising Practices (3:2:3).** Prerequisite: MKT 334 or approval of instructor. Analysis of the creative aspects of advertising: copy, layout, typography, and production. Provides practical application for the different types of media advertising.
4312. **Advertising Campaigns (3:1:4).** Prerequisite: MKT 4311 or approval of instructor. A specialized, skill-development course with emphasis on advertising campaigns. Includes planning, preparing, and presenting of campaigns.
4313. **International Advertising (3:3:0).** Prerequisite: Senior standing and permission of professor. A study of the practices and procedures of advertising on the international market.
4315. **Retail Buying (3:3:0).** Prerequisite: MKT 335. Analysis of the functions of the retail buyer. Evaluation and direction of buying techniques. Qualitative and quantitative considerations in buying.
4316. **Advertising Administration (3:3:0).** Prerequisite: MKT 4311. Use of the problem-solving approach to management problems in advertising through cases, research projects, special reports, and readings.
4319. **Analysis of Retail Operations (3:1:4).** Prerequisite: Approval of instructor. Study of the functional operations processes in a retailing institution. Student follows a schedule of observation, analysis and application. Minimum of 75 clock hours.

### FOR GRADUATES

531. **Advanced Marketing Problems (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Contemporary marketing problems and resultant opportunities. Heavy emphasis on reading from current journals and other related publications.
532. **Advanced Marketing Research (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Experimental design of research projects dealing with marketing problems.
533. **Marketing Theory (3:3:0).** Prerequisite: MKT 332 or 5331, graduate standing, and consent of instructor. Principles, theories, and problems in marketing from the social and the firm's point of view.
- 536, 537. **Individual Study in Marketing I, II (3:3:0 each).** Prerequisite: Graduate standing. Directed individual study of advanced marketing problems varying with the needs of the particular student.

538. **Trade Regulations (3:3:0).** Prerequisite: Graduate standing. Governmental controls intended to promote the free enterprise system. Federal, state, and local laws and their interpretation by the courts.
5331. **Marketing Foundations (3:3:0).** Prerequisite: Graduate standing. Marketing functions and the institutions which perform them; choice of criteria for marketing strategy decisions; marketing structural relationships; and the role of marketing.
5332. **Statistical Methods in Business (3:3:0).** Prerequisite: Graduate standing. Topics covered include averages, dispersion, estimation, testing hypotheses, correlation, regression, analysis of time series, and applications of these techniques to decision making.
5334. **Advertising in a Contemporary Society (3:3:0).** Prerequisite: Graduate standing and approval of instructor. A broad perspective and penetrating study of advertising—its functions, its role, its challenges, and its opportunities for business and society.
5341. **Marketing Administration (3:3:0).** Prerequisite: Graduate standing. Marketing planning, strategy, and tactics. Organization, execution, and control of the marketing effort. Enrollment limited to nonmarketing majors.
5342. **Advanced Statistical Methods (3:3:0).** Prerequisite: MKT 5332 or 246 and graduate standing. A continuation of MKT 5332. Emphasis on evaluation and use of analytical and interpretive statistical methods.
5343. **Seminar in Industrial Marketing (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Marketing research, channels of distribution, promotional efforts, pricing, and control of marketing operations in industrial markets.
5351. **Marketing Thought (3:3:0).** Prerequisite: MKT 332 or 5331, graduate standing, and consent of instructor. The contribution of marketing scholars to marketing thought. Development of problems, theory, and principles.
5352. **Statistical Decision Making (3:3:0).** Prerequisite: MKT 246 or 5332. Bayesian decision analysis, involving probability theory incorporated in scientific business decisions.
5353. **Marketing Strategy I (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Product development decisions and channel distribution analysis evaluated in detail and related to management decisions.
5354. **Marketing Strategy II (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Promotional policies and pricing policies evaluated in detail and related to necessary management decisions.
5355. **Seminar in Current Marketing Problems (3:3:0).** Prerequisite: Graduate standing and consent of instructor. A critical analysis of selected current problems in the field of marketing.
5362. **Advanced Experimental Statistics (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Business statistical problems involving experimental design and combining the methodology involved in experimentation.
5372. **Advanced Inference Problems (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Business statistical problems involving inference, including inferences concerning proportions, variances, regression, correlation, and covariance.
5382. **Advanced Multivariate Analysis (3:3:0).** Prerequisite: Graduate standing and consent of instructor. Business statistical problems involving advanced multivariate techniques including correlation, factor analysis, discriminant analysis, activity analysis, and input-output analysis.
731. **Research (3).**

## College of Education

The College of Education, established in 1967, is accredited by the Texas Education Agency, the Southern Association of Secondary Schools and Colleges, and the National Council for Accreditation of Teacher Education. Through this latter accreditation, Texas Tech University holds membership in the American Association of Colleges for Teacher Education. This membership signifies that the teaching certificate earned at Texas Tech is accepted in a majority of the states in the nation through reciprocity with other members of the association.

The primary function of the College of Education is to provide degree and teacher certification programs for both undergraduate and graduate students who plan a career in teaching in the elementary and secondary schools. In addition the graduate program qualifies persons to serve as general educational administrators, elementary and secondary school principals, supervisors, guidance and counseling specialists, school business specialists, curriculum directors, special education teachers and administrators, and educational research and field services specialists.

Professional preparation is offered for persons intending to occupy or occupying positions in universities, senior colleges, and community junior colleges. Instruction related to administration, curriculum, teaching, counseling, educational planning, public relations and other aspects of higher education is available.

The College of Education is divided into instructional departments which offer course work leading to degrees and to teacher certification. Specific curricula are designed for each degree program and are shown in tables on the following pages, together with a descriptive list of courses offered in each department. Any deviation from the approved curriculum for a particular degree must have prior approval from the chairman of the department supervising the program and the office of the Dean of the College of Education.

**Advisory Program.** The advisory program in the College of Education is designed to provide aid to each student in planning and carrying out the appropriate degree and teaching certification program. Each student, including transfers, who enrolls in the College of Education is assigned to a faculty adviser. Each student is expected to have at least one individual interview each semester with the adviser during which the current semester's work will be evaluated and the next semester's plan will be developed.

The faculty adviser is responsible for (1) assisting the student in planning his program and in selecting courses to be taken each semester prior to registration, (2) advising the student in planning a balanced class schedule, (3) helping the student in selecting the proper areas of specialization and/or teaching fields, (4) advising the student in meeting admission and retention standards of teacher education and student teaching, and (5) serving as a counselor on personal problems upon request. Either adviser or advisee may file a request in the office of the Dean of the College of Education for a change in assignment.

**Degree and Teaching Certification Programs.** The College of Education offers work at the undergraduate level leading to the degree of Bachelor of Science in Education with a major in elementary education or secondary education. These programs are designed especially for those who plan a career in teaching in the elementary and secondary schools in any area of specialization and/or teaching fields. 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 grade level and in the desired teaching fields. Since the Bachelor of Science in Education degree

includes the requirements for certification to teach, these must be completed before the degree can be awarded.

Students previously enrolled in a program leading to a Bachelor of Science in Education degree (elementary or secondary) in the College of Arts and Sciences may complete the program as specified in the catalog under which they entered.

All persons recommended for or applying for the Provisional Teaching Certificate will be required to take the National Teacher Examinations during the last semester of their college program. Evidence of having taken the National Teacher Examinations must be submitted prior to the issuance of the certificate.

The College of Education offers work at the graduate level leading to the Master of Education degree, Doctor of Education degree, and the Professional Teaching Certificate. These programs are described in the *Catalog of the Graduate School*.

**Academic Foundations.** During the freshman and sophomore years the student completes the academic foundations for both the Bachelor of Science in Education degree and the requirements for a teaching certificate. The work in professional education and the advanced courses in the teaching specialization for elementary and the two teaching fields or broad fields major for secondary are taken in the junior and senior years.

The academic foundations program in the elementary education curriculum is shown in the freshman and sophomore years in the accompanying table. Students preparing to teach in the elementary school are advised to follow the sequence shown. The academic foundations program in the secondary education curriculum is shown in the freshman and sophomore years in the secondary education table. Students preparing to teach in the secondary school are advised to follow the sequence shown. Students who postpone taking the required freshman courses until the senior year will take such subjects, but credit will not be allowed towards the degree.

**Academic Specialization (Elementary Level) and Teaching Fields (Secondary Level).** The student pursuing the Bachelor of Science in Education degree with a major in elementary education may begin his academic specialization in the freshman year. The student seeking the Bachelor of Science in Education degree in the secondary curriculum may begin work in the teaching field(s) during the freshman year. A majority of the work in the academic specialization (elementary) and the teaching fields (secondary) must be completed prior to admission into student teaching. Therefore, the student is advised to follow the specialization sequence shown in the table for the appropriate degree.

**Professional Education.** The professional education sequence for both the elementary and secondary curricula begins the first semester of the junior year. The standards for admission to a program leading to teacher certification are presented in the section of the catalog under Teacher Education. Since the student must complete 12 semester hours in professional education before admission into student teaching in the elementary curriculum and 9 semester hours in the secondary curriculum, it is essential that the exact sequence for professional education shown in the appropriate degree table be followed. Failure to do so may preclude completion of the degree and certification program in four years. No student will be permitted to enroll in more than 9 semester hours of professional education in one semester.

**Student Load.** The normal load for a student in the College of Education is 16 semester hours. No student will be permitted to enroll in more than 18 semester hours, including work taken by correspondence, without written approval from the Dean of the College of Education. During the semester in which student teaching is taken the maximum load is 16 semester hours.

**Length of Degree Program.** The Bachelor of Science degree in both elementary and secondary education can be completed within normal load limits in eight semesters. A student may, however, be required to attend either one summer term or a ninth semester due to failure to meet the admission standards into teacher education and student teaching, poor planning or scheduling, or for other reasons. During the first semester of the junior year the student, with the aid of the faculty adviser, should plan the remaining degree requirements to determine his graduation date. An appli-



cation for the degree should be filed in the office of the Dean of the College of Education before his last semester.

**Bachelor of Science in Education—Elementary Major.** The curriculum established for elementary education is designed to provide (1) a broad base in academic foundations essential to teaching effectively in the elementary schools; (2) a specialization in one subject field; (3) an emphasis in art, health and physical education, and music; (4) an intensive preparation in professional education, including student teaching, and in elementary content courses; (5) electives chosen under advisement to round out the personal and professional development of the individual. A major in elementary education may also elect to pursue a concurrent program leading to certification to teach the mentally retarded or the physically handicapped. The latter program also endorses one to teach children who are minimally brain injured (MBI) and who manifest learning disabilities. A detailed curriculum table is given with the Department of Elementary Education. The general requirements are listed below.

Sem. Hrs.

1. English .....	12
2. Mathematics .....	3
3. Government .....	6
4. American History .....	6
5. Laboratory Science .....	16
Including biology and two semesters of physical science.	
6. Anthropology, Economics, Philosophy, Speech, Sociology .....	15
7. Music, Health and Physical Education .....	12-18
8. Academic Specialization (Plan I, Plan II) .....	18-24
May duplicate courses in 1-7 above. Plan I must include 9 hours of advanced work and Plan II must include 12 hours of advanced work.	
9. Professional education and elementary content .....	30
Both the requirements for the degree and the certificate must be completed at the time of graduation.	
10. Physical Education, Band, or Basic ROTC .....	4-6
11. Electives sufficient with the above to total a minimum of 128 semester hours.	

**Bachelor of Science in Education—Secondary Major.** The curriculum established for secondary education is designed to provide (1) a broad base in academic foundations believed to be essential for effective teaching in the secondary schools in any subject or field; (2) a specialization in two teaching fields, or in a broad teaching field; (3) an intensive preparation in professional education including student teaching; (4) electives to round out the personal and professional development of the individual. A major in secondary education may also elect to pursue a concurrent program leading to certification to teach physically handicapped children and minimally brain injured children (MBI) and who manifest learning disabilities.

In this program the student may begin work in one of the major teaching fields in the freshman year. This work will be done in departments outside the College of Education offering the teaching fields listed in the section of this catalog entitled Teacher Education. A detailed curriculum table is presented with the Department of Secondary Education. The general requirements are listed below:

Sem. Hrs.

1. English .....	12
2. Mathematics or Foreign Language .....	6-8
3. Government .....	6
4. American History .....	6
5. Laboratory Science .....	8
6. Philosophy, Sociology, Speech .....	9
7. General Psychology, Physical Education, or fine arts .....	3
8. Adolescent Psychology .....	3
9. Teaching field No. 1 .....	24
May duplicate courses in 1-7 above.	
10. Teaching field No. 2 .....	24
May duplicate courses in 1-7 above.	
11. Professional education .....	24
Only 18 hours required for certificate; for degree purposes 6 hours of electives from professional education must be chosen under advisement. Both the requirements for the degree and certificate must be completed at the time of graduation.	

12. Physical Education, Band, or Basic ROTC .....4-6  
 13. Electives sufficient with the above to total a minimum of  
 128 semester hours.

**Bachelor of Science in Education—Special Education Major.** A major in special education is offered in the programs of deaf education or speech therapy. These highly specialized programs do not require a base in elementary or secondary education, but concurrent preparation leading toward certification in elementary or secondary education and one of these special fields is possible.

## Department of Education

### Courses in Education.

#### FOR UNDERGRADUATES

432. **Educational Psychology (3:3:0).** Prerequisite: Junior classification. Eligibility for or admission to the Teacher Education Program. Educational and psychological principles as basic knowledge in professional education and in teaching.
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 of 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: 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. \$3 service fee. Lab one hour per week required.
4331. **Foundations of Educational Sociology (3:3:0).** Prerequisite: Senior classification and 9 hours of education. Principles of education sociology essential to an understanding of the social, economic, civic, and cultural functions of education.

#### FOR GRADUATES

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.
531. **History of Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology. A study of the development of Western education with emphasis on pedagogical leaders and reformers.
532. **Philosophy of Education (3:3:0).** Prerequisite: 18 hours of 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 of education, including 3 hours of educational sociology. Sociological principles as basic knowledge in professional education.
535. **Behavioral Sciences and Education (3:3:0).** Prerequisite: 10 hours of education and educational psychology. A study of the human and animal sciences as foundations for educational practice and innovation.
536. **Elementary School Administration (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Elementary school organization, personnel, curriculum, details of modern administration and supervision.
537. **Secondary School Administration (3:3:0).** Prerequisite: 18 hours of 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 of education, including ED 4315 or 5311 or equivalent. State, regional, and local audio-visual programs; budgeting, selection, procurement, accounting, distribution, and care of audio-visual materials, preparation of personnel for audio-visual centers.
539. **Administration of School Business Services (3:3:0).** Prerequisite: 18 hours of education and educational psychology, including ED 533. Internal business management of schools, including activity funds, teacher welfare, special services, lunchroom, transportation, and purchasing and accounting.
5139. **Advanced Education Workshops in Teaching and Administration (1).** Prerequisite: 18 hours of education and educational psychology, and experience as a teacher or administrator.
5180. **Advanced Workshop in Guidance and Counseling (1:1:0).** Prerequisite: Graduate standing in guidance and counseling and permission of instructor. Workshop and field experience assignments in guidance related activities through schools and service agencies or in on-campus workshop groups.
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 ED 4315. \$3 service fee.
5512. **Supervision in the Elementary School (3:3:0).** Prerequisite: 18 hours of education and educational psychology including ED 5371. Supervision in the elementary school with emphasis on problems and procedures.
5313. **Supervision in the Secondary School (3:3:0).** Prerequisite: 18 hours of education and educational psychology including ED 5371. Problems and procedures of supervision in the secondary school.
5314. **Curriculum and Instruction in the Junior College (3:3:0).** Prerequisite: 18 hours of education and educational psychology and approval of instructor. The study of preparation for teaching in the junior college. The unique characteristics of junior colleges and junior college students. Development and trends in junior college curricula.

5316. **The Junior College (3:3:0).** Prerequisite: 18 hours of education and educational psychology and approval of instructor. The junior college in terms of terminal education and senior college preparation. Development of junior college programs.
5318. **Selection and Evaluation of Audio-Visual Materials (3:3:0).** Prerequisite: 18 hours in education, including ED 4315 or 5311 or equivalent. Commercially prepared audio-visual materials. Special emphasis given to selection, classification of film and filmstrip, preparation of study guides.
5319. **Audio-Visual Production (3:3:0).** Prerequisite: 18 hours of education, including ED 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 in education and educational psychology. 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 of education and educational psychology. Methods of educational research; methods of obtaining, processing, interpreting, and utilizing significant educational data.
5323. **Advanced Educational Statistics (3:3:0).** Prerequisite: 3 hours of educational statistics. Application of statistical analysis to educational data.
5325. **Legal Bases of Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology, and ED 533. Legal structure of education in America, with emphasis on school laws in Texas.
5331. **Human Development in Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Biological, social, and psychological interrelationships and implications for classroom teaching and learning.
5346. **Advanced Curriculum Development (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Fundamental bases for curriculum development.
5347. **Systems of Analyzing Processes in the Classroom (3:3:0).** Prerequisite: ED 5346. An intensive study of and practice in using current systems for analyzing classroom behavior and interaction for improving the effectiveness of teaching.
5348. **Teaching the Educationally Deprived (3:3:0).** Prerequisite: ED 5346. An intensive study of the educationally deprived and effective ways of enabling them to learn.
5349. **Organizing and Administering the Instructional Improvement Program (3:3:0).** Prerequisite: 18 hours of education and educational psychology, and ED 5346, or equivalent. Principles and procedures of organizing programs of system-wide curriculum and instructional improvement.
5350. **Curriculum Problems: Overcoming Student Learning Difficulties (3:3:0).** Prerequisite: ED 5346. An intensive study of analyzing and correcting or eliminating pupil learning difficulties of all students in school.
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 field of professional education. Required on the advanced graduate program in education.
5352. **Seminar in Philosophy of Education (3:3:0).** Prerequisite: 24 hours of education, including ED 532. Synthesis and analysis of philosophical theories, concepts, and studies related to the field of education.
5353. **Comparative Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Educational systems of the major countries.
5354. **Seminar in Education Sociology (3:3:0).** Prerequisite: 24 hours of education and educational psychology. Educational sociology; current sociological problems as related to the field of professional education.
5357. **The Administration of the Junior College (3:3:0).** Prerequisite: 18 hours of 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 of education, including ED 5312 and 5313. Principles and current practices in the field of supervision.
5363. **Problems in Audio-Visual Education (3:3:0).** Prerequisite: 24 hours of education, including ED 4315 and two advanced courses in audio-visual education. Problems in planning audio-visual education programs for 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. Research analysis, and synthesis in the field of educational psychology.
5366. **The Administration of School Staff Personnel (3:3:0).** Prerequisite: 18 hours of education, including ED 533. Principles and procedures in selection, organization, and administration of school personnel.
5367. **School Finance (3:3:0).** Prerequisite: 18 hours of education and educational psychology, including ED 533, 539, or equivalent. Basic theories, principles, and problems in school finance.
5368. **School Housing (3:3:0).** Prerequisite: Limited to majors in educational administration. completion of 15 hours of advanced education, including ED 533, 536, and 537. School building needs; educational and architectural services; evaluation of school facilities; 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 ED 533. Cooperative development of school-community relationship and mutual understanding of the school's purposes, functions, achievements, and needs.
5371. **General Supervision (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Principles, planning, organizations, and processes of supervision in both elementary and secondary schools.
5372. **Organization and Administration of Guidance and Personnel Services (3:3:0).** Prerequisite: 12 hours of 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.
5373. **Educational Evaluation (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Bases and techniques of appraisal, tests, polls, measurement, data treatment, and interpretation.

5381. **Introduction to Guidance and Personnel Services (3:3:0).** Prerequisite: Graduate standing in education. Objectives, principles, and practices in guidance and personnel services in educational settings; the role and scope of activities within the personnel services.
5382. **Guidance and the Classroom Teacher (3:3:0).** Prerequisite: Graduate standing and 18 hours of education. Philosophy and principles of guidance emphasizing the role of the teacher.
5383. **Information Services in Guidance (3:3:0).** Prerequisite: ED 5372 or 5382 or equivalent. Development of informational materials, organization of informational services, and application of educational, personal-social, and vocational information to individual and group activities.
5384. **Group Techniques in Guidance (3:3:0).** Prerequisite: ED 5372 or 5382 or equivalent. A study of group techniques applicable to guidance and personnel services for teachers, supervisors, and administrators, as well as guidance workers.
5385. **Guidance and Counseling in the Elementary School (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Philosophy, principles, and practice of guidance services in elementary schools.
5386. **Guidance Services for Exceptional Children and Youth (3:3:0).** Prerequisite: Graduate standing in education. Provision of guidance and counseling services for students in school and agency programs for exceptional children. Identification and placement procedures.
5387. **Individual Appraisal in Guidance and Counseling Services (3:3:0).** Prerequisite: 9 hours of graduate guidance and counseling courses. Analysis and techniques of individual appraisal in guidance and counseling services.
5388. **Techniques in School Guidance Services (3:3:0).** Prerequisite: 6 semester hours credit in guidance and counseling courses. Theory, simulation, and practice in techniques used in guidance programs with emphasis on educational, vocational, and developmental processes in working with students, teachers, parents, and agencies.
5389. **Student Personnel Services in Higher Education (3:3:0).** Prerequisite: Graduate standing. An overview of student personnel programs and services in junior colleges, colleges, and universities. A study of the philosophy, role, problems, trends, organization, and administration of student personnel services in higher education.
5390. **Practicum in Guidance (3:3:0).**
5391. **The Administration of Higher Education (3:3:0).** Prerequisite: 12 semester hours in graduate level administration courses or by special approval. Overview of administrative problems in senior colleges and universities. Techniques of administering personnel, program, budgetary aspects, public relations, auxiliary enterprises, etc.
5392. **Seminar in Higher Education (3:3:0).** Prerequisite: 18 hours of graduate work in education including 3 to 6 hours in higher education courses. Depth study of major issues, trends, and problems in higher education today.
5393. **Seminar in Guidance and Counseling (3:3:0).**
5394. **Comparative Higher Education (3:3:0).** Prerequisite: 18 graduate hours in education or by special approval. Contributions of past and contemporary educational thought to systems of higher education throughout the world. Special application to higher education in the United States.
5395. **Higher Education in the United States (3:3:0).** Prerequisite: 18 semester hours at graduate level in education or by special approval. History, philosophy, issues and trends, and current problems in higher education in the United States. Includes comprehensive survey of developmental and current literature.
5396. **Long Range Planning in Higher Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology and approval of instructor. Philosophy and purposes; the educational program; views of learning. Function, form, and cost in educational structures. Financial planning. Systems approach and systems analysis in planning.
5397. **Development Work in Higher Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology and approval of instructor. Ideas and program development. Organization and staff for development work with various constituencies. Aspects of fund raising; public relations; public information.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
- 635, 636. **Internship in Education (3 each).**
- 731, 732. **Research (3 each).**
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Elementary Education

### Elementary Education Curriculum.

Students preparing to teach in the elementary school are advised to follow the four-year sequence outlined below.

Fall		FIRST YEAR		Spring	
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3		
BIOL 141, Botany or		BIOL 141, Botany or			
BIOL 142, Zoology	4	BIOL 142, Zoology	4		
MATH 1310, Struct. of Math for		HIST 232, Hist. of U.S. since 1877	3		
El. Tchrs. or		MATH 1310, Struct. of Math for			
SOC 230, Intro. to Soc.	3	El. Tchrs. or			
HIST 231, Hist. of U.S. to 1877	3	SOC 230, Intro. to Soc.	3		
*Academic specialization or		*Academic specialization or			
P E 233, P.E. for El. Schl. Tchrs.	3	P E 233, P.E. for El. Schl. Tchrs.	3		
P.E., Band, or Basic ROTC	1	P.E., Band, or Basic ROTC	1		

## SECOND YEAR

Fall	
ENG 231, Mast. of Lit.	3
GOVT 231, Amer. Govt., Org.	3
CHEM 141, Gen. Chem. or	
GEOL 143, Physical Geol. or	
PHYS 141, Gen. Phys.	4
**M ED 231, Mus. for	
Class. Tchrs. and/or	3
*Academic specialization or	
G SP 239, Spch. for Pers. Devel.	3
P.E., Band, or Basic ROTC	1-2

17-18

Spring	
ENG 232, Mast. of Lit.	3
GOVT 232, Amer. Govt., Funct.	3
CHEM 142, Gen. Chem. or	
GEOL 144, Physical Geol. or	
PHYS 142, Gen. Phys.	4
**M ED 232, El. Mus. Prac.	
Prin. and/or	3
*Academic specialization or	
G SP 239, Spch. for Pers. Devel.	3
P.E., Band, or Basic ROTC	1-2

17-18

## THIRD YEAR

Fall	
ED 332, Ed. Psych.	3
E ED 3331, Child Dev. &	
El. Schl. Curric.	3
*Academic specialization or	
ANTH 232, Cult. Anthropology	3
P E 230, P.E. for El. & Sec. Schls.	3
ART 3317, Art in El. Education	3

15

Spring	
E ED 3344, Lang. Arts in	
El. Schl. Curric.	3
E ED 3345, Soc. Stud. in	
El. Schl. Curric.	3
*Academic specialization or	
ANTH 232, Cult. Anthropology	3
**ART 3318, Crafts in El. Ed. and/or	3
*Academic specialization	3

15

## FOURTH YEAR

Fall	
E ED 461, Stud. Tchg. in El.	
Schl. (fall or spring)	6
E ED 4342, Tchg. Reading in El. Schl.	3
*Academic specialization	3
ECO 237, Eco. Geography or	
PHIL 230, Intro. to Phil.	3

15

Spring	
E ED 4344, Children's Lit.	3
E ED 4341, Tchg. Arth. in El. Schl.	3
E ED 4343, Tchg. Sci. in El. Schl.	3
*Academic specialization	3
PHIL 230, Intro. to Phil. or	
ECO 237, Eco. Geography	3

15

Students are required to take the National Teachers' Examination in order to qualify for a teaching certificate.

\* See areas of academic specialization.

\*\* Depends upon which plan of academic specialization is followed.

## Courses in Elementary Education.

## FOR UNDERGRADUATES

211. **Projects in Elementary Education (1).** Exploratory experiences in educational programs through the elementary school level. May be repeated for credit.
3331. **Child Development and the Elementary School Curriculum (3:3:0).** Prerequisite: Junior standing. Eligibility for or admission to the Teacher Education Program. Principles of child development as they apply to the elementary school curriculum. Observation required.
3332. **Kindergarten Education (3:3:0).** Prerequisite: Junior standing; enrollment in or completion of E ED 3331 or equivalent. Bases for programs, methods, and materials for the five-year-old.
3344. **Language Arts in the Elementary School Curriculum (3:3:0).** Prerequisite: Junior standing; enrollment in or completion of E ED 3331, or equivalent. Bases for programs, methods, and materials.
3345. **Social Studies in the Elementary Curriculum (3:3:0).** Prerequisite: Junior standing; enrollment in or completion of E ED 3331, or equivalent. Bases for programs, methods, and materials.
431. **Student Observation and Teaching in the Elementary School (3).** Prerequisite: Attainment of admission standards to student teaching; completion of 90 hours of work, ED 332, E ED 3331, 3345, plus 24 hours in content.
433. **Student Observation and Teaching in the Kindergarten (3).** Prerequisite: Admission to student teaching and completion of approximately 90 hours of work. Classroom observation and teaching of children in the kindergarten.
461. **Student Teaching in the Elementary School (6).** Prerequisite: Attainment of admission standards to student teaching; completion of approximately 90 hours of work, ED 332, E ED 3331, 3344, 3345, plus 24 hours in the academic specialization courses.
4332. **Concept and Verbal Development of the Kindergarten Child (3:3:0).** Prerequisite: ED 322, C D 330, E ED 3332. Role of the kindergarten in concept building and in development of adequacy in verbal communication. Special emphasis on methods and materials for educationally disadvantaged and non-English speaking children.
4341. **Teaching Arithmetic in the Elementary School (3:3:0).** Prerequisite: ED 332 and E ED 3331, or equivalents. Bases for programs, methods, and materials.
4342. **Teaching Reading in the Elementary School (3:3:0).** Prerequisite: Senior standing; ED 332 and E ED 3331, or equivalents; enrollment in, or completion of, E ED 461. Bases for programs, methods, and materials.
4343. **Teaching Science in the Elementary School (3:3:0).** Prerequisite: ED 332 and E ED 3331, or equivalents. Bases for programs, methods, and materials.
4344. **Children's Literature (3:3:0).** Prose and poetry for children under 12, including standards for judging and criteria for selecting children's books.

## FOR GRADUATES

5138. **Advanced Education Workshops in Elementary Education (1:1:0).** Prerequisite: 18 hours of education and educational psychology and experience as a teacher.
5321. **Individual Study (3:3:0).** Prerequisite: Advanced graduate classification in education and educational psychology. Individual study on special aspects of professional education. May be repeated for credit.



5326. **Reading Development in the Elementary School (3:3:0).** Prerequisite: Graduate standing in education. Nature of the reading process; methods and materials for developing this process.
5332. **Study of the Kindergarten Child (3:3:0).** Prerequisite: Graduate standing and certification to teach in the elementary school. Study of the influence of environmental factors on the physical, emotional, social, and intellectual growth of young children. Observation required.
5333. **Developing Kindergarten Programs (3:3:0).** Prerequisite: Graduate standing; elementary teaching certificate. Research study and laboratory observations to determine nature and need of school experiences for kindergarten age children.
5334. **Facilities, Materials, and Methods for Kindergarten (3:3:0).** Prerequisite: Graduate standing; elementary school certification. Scientific study of facilities, equipment, materials, and methods designed for maximum development of the individual child of kindergarten age.
5337. **Problems in Kindergarten Education (3:3:0).** Prerequisite: EED 5332 and consent of instructor. Seminar on central issues and problems in early childhood education emphasizing identification and interpretation of salient research; investigation and discussion of readiness for systematic learning; concept development in the arts, mathematics, science, and language; and physical, emotional and social growth of the kindergarten-age child.
5341. **Developing Arithmetic Programs in Elementary Education. (3:3:0).** Prerequisite: 18 hours of education and educational psychology. The development of arithmetic and its educative function in the elementary school curriculum.
5342. **Developing Reading Programs in Elementary Education (3:3:0).** Prerequisite: 18 hours of education and educational psychology 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).** Prerequisite: 18 hours of education and 6 hours of science. Methods and materials for helping children develop an understanding of their natural and physical environment.
5344. **Developing Language Arts Programs in Elementary Education (3:3:0).** Prerequisite: 12 hours of English and 18 hours of education. Applications of research findings and modern theory to teaching and organizing the language arts in the elementary school.
5345. **Developing Social Studies Programs in Elementary Education (3:3:0).** Prerequisite: 18 hours of education. Objective, patterns, and principles of organization of social studies in the elementary schools.
5348. **Children's Literature for Elementary School Teachers and Librarians (3:3:0).** Prerequisite: 18 hours of education and educational psychology. Literature for children in the elementary school; selection, use, and organization.
5352. **Determining Reading Achievement and Planning for Continuous Growth (3:3:0).** Prerequisite: Graduate standing, at least one year of elementary classroom teaching, and one course in the teaching of reading. A comprehensive approach to the diagnosis of reading development and difficulties, and an evaluation of teaching techniques based on diagnosis.
5354. **Modern Linguistics in the Elementary School (3:3:0).** Prerequisite: 18 hours of professional education and educational psychology. Methods and materials for helping children understand better and use more effectively the system of the English language.
5355. **Seminar in Elementary Education (3:3:0).** Prerequisite: Graduate standing, 24 hours of education and educational psychology, and consent of advisory committee. Trends in modern elementary education.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
- 731, 732. **Research (3 each).**
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Secondary Education

### Secondary Education Curriculum.

A typical program in secondary education is shown below. The student in secondary education should consult with an advisor in the Secondary Education Department who will assist him regarding sequence of courses and choices of alternate courses.

#### FIRST YEAR

Fall		Spring	
*ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
MATH 135, Fund. of Math. I or (if 500 or below on SAT quantitative) Math 133, Coll. Alg. or Foreign Language	3-4	HIST 232, Hist. of U.S. since 1877 or GOVT 232, Amer. Govt., Funct.	3
HIST 231, Hist. of U.S. to 1877 or GOVT 231, Amer. Govt., Org.	3	MATH 131, Trig. or MATH 136, Fund. of Math. II or Foreign Language	3-4
Teaching Field or elective	3-4	Teaching field or elective	3-4
PSY 230, Gen. Psych. or *Fine Arts	3	SOC 230, Intro. to Soc.	3
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	16-19		16-19

## SECOND YEAR

Fall		Spring	
ENG 231, Mast. of Lit.	3	ENG 232, Mast. of Lit.	3
***G SP 239, Spch. Devel. or		Science—Biol., Chem., Geol., or	
***PHIL 230 or 231 or 238	3	Physics	4
Science—Biol., Chem., Geol., or		HIST 232, Hist. of U.S. since 1865 or	
Physics	4	GOVT 232, Amer. Govt., Func.	3
HIST 231, Hist. of U.S. to 1877 or		Teaching field	3
GOVT 231, Amer. Govt., Org.	3	***PHIL 230, 231, 238 or	
Teaching field	3	***G SP 239, Spch. Devel.	3
P.E., Band, or Basic ROTC	1-2	P.E., Band, or Basic ROTC	1-2
	17-18		17-18

## THIRD YEAR

Fall		Spring	
S ED 330, Found. of Sec. Ed.	3	PSY 335, Adol. Psych.	3
ED 332, Ed. Psych.	3	S ED 334, Curric. Devel. in Sec. Ed.	3
Teaching field	6	Teaching field	6
Teaching field	3-6	Teaching field	3-6
	15-18		15-18

## FOURTH YEAR

Fall		Spring	
S ED 436, Tchg. in Sec. Schls.	3	Teaching field	3-6
S ED 462, Stud. Tchg. in Sec.		Ed. electives—ED 430, 438, 4331,	
Schl. (fall or spring)	6	4315, 4332, 4333, 4334, 4335,	
Teaching field	3	4336, or 4337	6
Teaching field	3	Free electives	6
	15		15-18

Students are required to take the National Teachers' Examination in order to qualify for a teaching certificate.

\* Consult catalog under "Advanced Placement" and "Honors Program."

\*\* Fine Arts: Choose one of the following. ART 130, 131, (Hist. of Art); M LT 238, 239 (Heritage of Music); P E 3313 (Hist. of Dance), for P.E. majors only; TH A 233 (Intro. to Theatre & Cinema).

\*\*\* Students should take G SP 239 one semester of sophomore year and philosophy the other.

## Courses in Secondary Education.

## FOR UNDERGRADUATES

212. Projects in Secondary Education (1).
330. Foundations of Secondary Education (3:3:0). Prerequisite: Junior classification. Eligibility for or admission to the Teacher Education Program. Introduction to secondary education; basic principles underlying the secondary school program.
334. Curriculum Development in Secondary Education (3:3:0). Prerequisite: Junior classification, ED 332 and S ED 330 or equivalent. Foundations of curriculum development, patterns of organization, curriculum resource units, and issues in curriculum development. Observation required.
432. Student Observation and Teaching in the Secondary School (3). Prerequisite: Attainment of admission standards to student teaching; completion of 90 hours of work, 15 hours of education, including ED 332, and S ED 334, plus a major portion of the course work in the teaching field.
436. Teaching in Secondary Schools (3:3:0). Prerequisite: Senior classification; ED 332, S ED 330, 334, or equivalents. Foundations of teaching, methods and techniques, evaluation, management problems related to teaching.
462. Student Teaching in the Secondary School (6). Prerequisite: Attainment of admission standards to student teaching; completion of 90 hours of work, 9 hours of education, including ED 332, S ED 330, 334, plus 18 hours of the course work in each of the teaching fields, or 30-36 hours on the 48-hour program. Completion of or enrollment in S ED 436.
4332. Developmental and Advanced Reading (3:3:0). Prerequisite: S ED 330 and ED 332 or a course in reading. Study of reading ability expectancies for grade and age levels; plans for regular and advanced students; study skills, critical reading, motivation, and appreciations.
4333. Remedial and Corrective Reading (3:3:0). Prerequisite: S ED 330 and ED 332 or a course in reading. Diagnosis of reading difficulties; organization of reading laboratory; problems of grouping, and evaluation. Selection of equipment, resources, and media.
4334. Youth Literature for Secondary School Teachers and Librarians (3:3:0). Prerequisite: 6 hours of education. Selection of materials, media, resources, and equipment for various students in the secondary school.
4335. Teaching Grammar, Composition, Spelling, and Listening (3:3:0). Prerequisite: 6 hours of education. Preparation for teaching grammar, usage, punctuation, composition, spelling, critical thinking, and listening in junior and senior high schools.
4336. Teaching English to the Culturally Disadvantaged (3:3:0). Prerequisite: 6 hours of education. Presenting the English language and literature to culturally disadvantaged students; methods, materials, curriculum.
4337. Teaching English Language and Literature to the Bi-Lingual Adolescent (3:3:0). Prerequisite: 6 hours of education. Problems in teaching English and literature to bi-lingual adolescents. Analysis of language differences as a basis for instruction.

## FOR GRADUATES

5137. Advanced Education Workshops in Secondary Education (1:1:0). Prerequisite: 18 hours of education and educational psychology and experience as a teacher or administrator.

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.
5321. **Individual Study (3:3:0).** Individual study on special aspects of professional education. May be repeated once for credit. Prerequisite: Advanced graduate classification in education and educational psychology.
5332. **Studies in Curriculum of English and Social Studies in Secondary Schools (3:3:0).** Prerequisite: Graduate standing. Scope and sequence of curricula in the fields of social studies and English. Surveys of recent trends; selection of activities, resources, materials, and media.
5334. **Teaching Reading in the Secondary School (3:3:0).** Prerequisite: 12 hours of education and educational psychology. Emphasis on developing reading skills in content fields, establishing a comprehensive reading program.
5335. **Studies in Youth Literature for Secondary School Teachers (3:3:0).** Study of techniques for developing maturity in reading, selection of materials, media, and resources for secondary students. Prerequisite: 6 hours of secondary education.
5356. **Seminar in Secondary Education (3:3:0).** Prerequisite: 24 hours of education and educational psychology. Trends in modern secondary education.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
- 731, 732. **Research (3 each).**
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Special Education

### Courses in Special Education.

#### FOR UNDERGRADUATES

210. **Introductory Experiences With Handicapped Children (1:1:0).** Prerequisite: Sophomore standing. Supervised experiences in community installations serving handicapped children.
213. **Projects in Special Education (1).** Exploratory experiences in programs of special education.
4212. **The Language of Signs and Fingerspelling (2:2:0).** Prerequisite: SPED 4356. Communication through the language of signs, expressed by the position and motion of arms and hands, and fingerspelling, using manual alphabet.
4338. **The Education of Exceptional Children (3:3:0).** Prerequisite: ED 332. Characteristics of major categories of exceptional children and educational implications.
4339. **Teaching the Educable Mentally Retarded (3:3:0).** Prerequisite: SPED 4338, 4354. Curriculum, methods, and materials in teaching educable level mentally retarded children.
4351. **The Physically Handicapped Child: His Nature and Needs (3:3:0).** Prerequisite: SPED 4338. Physical, psychological, sociological, and educational implications of crippling conditions and chronic health problems in children.
4352. **Teaching the Child with Minimal Brain Dysfunction (3:3:0).** Prerequisite: SPED 4338. The characteristics, psychology, and education of children with brain damage, including the minimally brain injured.
4353. **Teaching the Physically Handicapped Child (3:3:0).** Prerequisite: SPED 4338. The characteristics, psychology, and education of children with orthopedic impairment or chronic health problems.
4354. **Education of the Mentally Retarded Child (3:3:0).** Prerequisite: SPED 4338. Physical, sociological, psychological, and educational implications of mental retardation.
4355. **Teaching the Gifted Child (3:3:0).** Prerequisite: SPED 4338. Characteristics of and educational programming for gifted children.
4356. **Education of the Deaf (3:3:0).** Prerequisite: SPED 4338. The deaf in historical perspective; psychological, sociological, educational implications of severe hearing loss.
4357. **Teaching Elementary School Subjects to the Deaf (3:3:0).** Prerequisite: 9 hours of content courses for the elementary school and SPED 4338 and 4356. Principles and methods of teaching reading, arithmetic, social studies, and science to deaf children.
4358. **Teaching School Subjects to the Deaf II (3:3:0).** Prerequisite: SPED 4357. The second course in the required sequence for certification in deaf education.
4360. **Teaching the Trainable Mentally Retarded (3:3:0).** Prerequisite: SPED 4338 or 4354. Curriculum, methods, and materials in teaching the trainable level mentally retarded.
4361. **The Child with Minimal Brain Dysfunction: His Nature and Needs (3:3:0).** Prerequisite: SPED 4338. Introduction to the child with minimal brain dysfunction and learning difficulties; definition, identification, diagnosis, and implications for educational programming.
4362. **Public School Speech Therapy (3:3:0).** Expediting relationships with other education personnel, scheduling of children for therapy, and selecting and using appropriate techniques, materials and equipment.
4658. **Practicum in Special Education (6:6:0).** Prerequisite: Completion of sequence of courses in the particular area of exceptionality. Observation and supervised teaching with the deaf, emotionally disturbed, mentally retarded, physically handicapped, or children with minimal brain dysfunction.
4659. **Internship in Speech Pathology (6:6:0).** Prerequisite: Completion of required courses in speech pathology prerequisite to clinical practice and those required in Professional Development in Education.

#### FOR GRADUATES

5136. **Advanced Education Workshops in Special Education (1:1:0).** Prerequisite: 18 hours of education and educational psychology and experience as a teacher or administrator.
5310. **Exceptional Children and Youth (3:3:0).** Prerequisite: Graduate standing. Major categories of exceptional children and youth, psychological, sociological, and educational implications of exceptionality.
5311. **Educational Appraisal of Exceptional Children (3:3:0).** Prerequisite: SPED 4338 or SPED 5310. Appraisal instruments and techniques employed by relevant disciplines in determining appropriate educational placement and programming for exceptional children.
5312. **Use of Consultative Techniques with Parents of Exceptional Children (3:3:0).** Prerequisite: SPED 4338 or SPED 5310 or consent of instructor. The roles of professional personnel in bringing about parental understanding of their exceptional children and acceptance of Special Education placement.

5313. **Administration and Supervision of Special Education (3:3:0).** Prerequisite: SPED 5310 or consent of instructor. Philosophy, concepts, and problems in the administration and supervision of Special Education programs.
5314. **Seminar in Special Education (3:3:0).** Prerequisite: Consent of instructor. Recent research practices and problems areas in Special Education.
5320. **Mentally Retarded Children and Youth (3:3:0).** Prerequisite: SPED 4338 or SPED 5310. Psychological, sociological, genetic, medical aspects of retardation to include 30 hours of observation and participation in classes for handicapped children or in an institutional setting.
5321. **Individual Study (3:3:0).** Prerequisite: Graduate standing and consent of instructor. May be repeated for credit.
5322. **Curriculum and Methods for the Educable Mentally Retarded (3:3:0).** Prerequisite: SPED 4338 or SPED 5310. Curriculum, methods, and materials in teaching educable level mentally retarded children.
5323. **Curriculum and Methods for the Trainable Mentally Retarded (3:3:0).** Prerequisite: SPED 4338 or SPED 5310 and SPED 4354 or SPED 5320. Curriculum, methods, and materials in teaching the trainable level mentally retarded.
5324. **Reading for the Mentally Retarded (3:3:0).** Prerequisite: SPED 4339 or consent of instructor. The relationship of the learning characteristics of retarded children to acquisition of reading skills; research in reading for these children; evaluation of existing materials and technology.
5325. **Advanced Curriculum Development for the Mentally Retarded (3:3:0).** Prerequisite: SPED 4339 or consent of instructor. Examination of curricular theory, curricular approaches to subject matter, and development of an appropriate curriculum for retarded children at all levels.
5326. **Vocational Adjustment of Mentally Retarded Youth (3:3:0).** Prerequisite: SPED 4338, 4354, or consent of instructor. The programming for high school age retarded to expedite social and occupational adequacy. Contributions of Special Education and Vocational Rehabilitation services.
5327. **The Mentally Retarded in Society (3:3:0).** Prerequisite: SPED 4338, SPED 5310, graduate standing or permission of instructor. A study of all levels of adult retardates functioning in society. Emphasis is placed on community aspects of caring for retardates.
5328. **Problems in Mental Retardation (3:3:0).** Prerequisite: SPED 4338, 4354, 4339, or consent of instructor. General problems and problem areas in mental retardation.
5330. **Physically Handicapped Children and Youth (3:3:0).** Prerequisite: SPED 5338 or SPED 5310. Crippling Conditions and other health problems. Medical, psychological, educational, and rehabilitation manifestations.
5331. **Education of Physically Handicapped Children and Youth (3:3:0).** Prerequisite: SPED 4338 or SPED 5310 and SPED 4351 or SPED 5330. Modifications of physical facilities, equipment, schedules, and procedures in educating physically disabled individuals.
5340. **Minimal Brain Dysfunction in Children and Youth (3:3:0).** Prerequisite: SPED 4338 or SPED 5310. Psychological, sociological, and educational implications of minimal brain dysfunction.
5341. **Education of Children with Minimal Brain Dysfunction (3:3:0).** Prerequisite: SPED 5340 or consent of instructor. Adaptive curriculum, methods, and materials in minimal brain dysfunction.
5342. **Advanced Methods and Materials for the Education of Children with Minimal Brain Damage (3:3:0).** Prerequisite: SPED 4338 or 5310, SPED 4361, 4352, or equivalent courses.
5343. **Perceptual-Motor Development of Children with Minimal Brain Dysfunction (3:3:0).** Prerequisite: SPED 4352, 4361, 5340, 5341, or consent of instructor. Techniques and programming designed to expedite the perceptual-motor functioning of these children.
5350. **Deaf Children and Youth (3:3:0).** Prerequisite: SPED 4338 or 5310. The deaf in historical perspective; psychological, sociological, educational implications of severe hearing loss.
5351. **Education of Deaf Children and Youth (3:3:0).** Prerequisite: 9 hours of content courses for the elementary school and SPED 4338 or SPED 5310 and SPED 5350 or SPED 4356.
5352. **Signs and Fingerspelling for the Deaf (3:3:0).** Prerequisite: SPED 4338 or SPED 5310. Languages of signs and fingerspelling.
5360. **Emotionally Disturbed Children and Youth (3:3:0).** Prerequisite: SPED 4338, 5310 or consent of instructor. The characteristics, psychology, and education of emotionally disturbed children.
5361. **Education of Emotionally Disturbed Children and Youth (3:3:0).** Prerequisite: SPED 4338, 5310, 5360, or consent of instructor. Adaptations of curriculum and methods, as well as educational settings in the education of emotionally disturbed children.
5370. **Visually Handicapped Children and Youth (3:3:0).** Prerequisite: SPED 4338 or 5310 or consent of instructor. Psychological, sociological, and educational implications of severe visual limitation and blindness.
5380. **Children and Youth with Multiple Disabilities (3:3:0).** Prerequisite: SPED 4338, 5310, or consent of instructor. Psychological, sociological, and educational implications of multiple disability in children and youth.
5382. **Gifted Children and Youth (3:3:0).** Prerequisite: SPED 4338 or 5310 or consent of instructor. Psychological, sociological, and educational implications of higher level intelligence and intellectual ability.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice
- 635, 636. **Internship in Special Education (3 each).**
- 731, 732. **Research (3 each).**
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## College of Engineering

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 aim of the College of Engineering is to impart a basic 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 training which is not readily obtainable after graduation. As an aid to the development of scientific attitude, the importance of the qualities of honesty, loyalty, thoroughness, and industry is emphasized. A desire for learning and for knowledge of the ethics of the profession is also 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. From 60 to 70 percent of graduates in engineering have attained executive positions. Engineering training is recognized as desirable preparation for a commercial career. Indeed, surveys of employment 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 descriptions of degree programs. 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.

**Undergraduate Degrees.** The College of Engineering offers the following four-year curricula, each leading to the degree of Bachelor of Science in the respective field of engineering: agricultural, 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, two five-year curricula are offered leading to the degrees of Bachelor of Architecture with a design option or construction option.

The College of Engineering is divided into instructional departments which offer course work and supervise the degree programs. Specific curricula are designed by the departments for each of the degree programs and are presented in special tables on the following pages along with a descriptive list of the courses offered by each department.

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. Before registration for each semester, a student 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.

**General Requirements of the College of Engineering.** The requirements for an engineering degree include many courses that are common to all



engineering degree plans. Most of these courses are given at the freshman and sophomore level, and though the beginning student is required to select a major, the absolute choice is not of vital concern until the latter part of the sophomore year. Specific curricula have been established for each degree program and are given in detail on the following pages.

General regulations that apply to all degrees:

1. A student planning to complete one of the Bachelor of Science in Engineering degrees must have adequate preparation in mathematics as evidenced by placement tests and high school credits, or he must earn credit in college courses in algebra and/or trigonometry. An alternate freshman curriculum is provided for those students with inadequate preparation in mathematics.

2. A student in the College of Engineering is expected to earn credit in the particular courses listed in one of the curricula and to follow the sequence of courses therein recommended.

3. Any substitution or deviation in subject matter specified in a curriculum requires the written approval of the Dean of the College of Engineering and the chairman of the student's major department. Electives require the written approval of the department chairman.

4. Courses transferred from another institution will be evaluated by the office of the Dean of the College of Engineering for substitutions in a given curriculum.

5. With the approval of a student's major department chairman, 3 hours of the advanced ROTC credits may be counted for nontechnical elective courses.

6. General University regulations allow a maximum of 18 semester hours of work toward an undergraduate degree to be completed by correspondence. Of this general total of 18 hours, however, the College of Engineering specifies that no more than 9 hours of credit may be obtained in this way in courses in engineering, science, and/or mathematics. All correspondence work taken for degree credit requires written approval of the Dean of the College of Engineering.

7. A student who expects to receive a degree during a particular year must file an "Application for Degree" with the office of the Dean of the College of Engineering during the spring semester of the preceding year. Prior to his fall registration he will receive a list of courses and be apprised of the number of grade points which he lacks.

In making this application, the student must indicate the year's catalog under which he plans to graduate, since he must meet all of the requirements of a specific year's catalog. This must be a year during which he registered as a student in the College 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. Also see Uniform Degree Requirements of the University.

8. A student who has completed the requirements for his first bachelor's degree from the College of Engineering may acquire a second by completing the curriculum prescribed for it, together with a minimum of 27 additional hours of required work, the precise number of additional hours being determined by the particular specialization in which the degree is sought.

9. A candidate for a degree in the College of Engineering should file a Personnel Data Form with the Placement Service.

**Freshman Programs.** Recommended qualifications for admission to the College of Engineering are given in the Admissions 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 1315, Introductory College Mathematics; or MATH 133, College Algebra; and/or 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 who are unable to take advantage of the summer school, should schedule the following:

### Alternate Freshman Year for Engineering Students.

Fall		Spring	
MATH 131, Trigonometry	3	MATH 151, Anal. Geom. & Calc. I	5
MATH 133, Coll. Alg.	3	ENG 132, Coll. Rhet.	3
EGR 136, Engr. Graphics I	3	EA&D 135, Engr. Anal. I	3
ENG 131, Coll. Rhet.	3	CHEM 142, Gen. Chem.	4
CHEM 141, Gen. Chem.	4	P.E., Band, or Basic ROTC	
P.E., Band, or Basic ROTC			
16*		15*	

### SUMMER SESSION

MATH 152, Anal. Geom. & Calc. II	5
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\* 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, and in 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.

**Advanced Degrees in Engineering.** Programs are available through the College of Engineering leading to Master of Science and Doctor of Philosophy degrees in the fields of chemical, civil, electrical, industrial, and mechanical engineering, and to a Doctor of Philosophy degree with interdisciplinary combinations of the engineering fields and/or the physical and biological sciences and mathematics. In addition to these programs, the College of Engineering offers a Master of Engineering degree designed especially for the practicing engineer desiring to continue his professional education. Currently off-campus programs are operating in Amarillo, Borger, Pampa and the Midland-Odessa area. It is expected that this program will soon become available in all cities served by closed-circuit television under an association of colleges and universities forming the Western Information Network.

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 *Catalog of the Graduate School*.

## Department of Agricultural Engineering

The Department of Agricultural Engineering administers the following degree programs: AGRICULTURAL ENGINEERING, *Bachelor of Science in Agricultural Engineering* and *Master of Science in Agricultural Engineering*, and MECHANIZED AGRICULTURE, *Bachelor of Science*. This department is under the joint supervision of the College of Engineering and the College of Agricultural Sciences. Agricultural engineering is the application of engineering principles to the agricultural industry. See the section on the College of Agricultural Sciences for a description of the department and its course offerings. The curriculum for the B.S. degree program in Agricultural Engineering is given in the accompanying table.

### Agricultural Engineering Curriculum.

Fall		Spring	
AGED 111, The Ag. Industry	1	AGE 122, Constr. Matls. & Fabri.	2
AGRO 131, Ag. Plant Science	3	ECO 235, Fund. of Eco.	3
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Analysis I	3	EGR 136, Engr. Graphics I	3
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

## SECOND YEAR

Fall		Spring	
AG E 232, Plane & Topo. Surv.	3	AG E 233, Engr. Instr. & Contr.	3
ANSC 339, Envir. Physio. & Anim. Beh.	3	C E 233, Statics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
MATH 235, Anal. Geom. & Calc. III	3	MATH 335, Math. for Engr. & Scits. I	3
PHYS 143, Prin. of Physics I	4	PHYS 241, Prin. of Phys. II	4
P.E., Band of Basic ROTC		P.E., Band of Basic ROTC	

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## THIRD YEAR

Fall		Spring	
AG E 336, Prin. Ag. Mach. Des.	3	E E 234, Electronic Instr.	3
AGRO 241, Soils	4	C E 3311, Mech. of Solids	3
C E 332, Dynamics	3	C E 3351, Mech. of Fluids	3
E E 233, Elec. Systems Anal.	3	GOVT 231, Amer. Govt., Org.	3
M E 3314, Mechanisms	3	M E 3321, Engr. Thermo. I	3
Elective	2	Elective (Humanity)	3

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## FOURTH YEAR

Fall		Spring	
AG E 411, Seminar	1	AG E 433, Elem. of Tractor Des.	3
AG E 436, Ag. Proc. Systems	3	AG E 434, Farm Elec. Sys.	3
AG E 438, Funct. Des. of Ag. Struct.	3	AG E 437, Des. of Irrig. Sys.	3
AG E 442, Engr. Soil & Water Conser.	4	AG E 439, Struct. Des. Farm Bldg.	3
GOVT 232, Amer. Govt., Funct.	3	HIST 232, Hist. of U.S. since 1877	3
HIST 231, Hist. of U.S. to 1877	3	Elective	3

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Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—136.

\* See Alternate Freshman Year in the College of Engineering.

\*\* Exclusive of P.E., Band, or Basic ROTC.

**Courses in Agricultural Engineering.** See course listings of Agricultural Engineering Department under the College of Agricultural Sciences section.

## Department of Architecture

This department supervises the following degree program: ARCHITECTURE, *Bachelor of Architecture*, with options in Construction or Design. The undergraduate degree requirements are given in the accompanying tables.

Programs in the Department of Architecture concentrate on the concept that architecture and design are embodiments of the attitudes and ideas of society; that man's needs and requirements are basic to the realization of form and functional expressions; that the requirements of man's changing environment are major factors in design determination.

A common core of design courses applies to both degree plans. Architecture majors are urged to spend summer months working in the offices of registered architects.

**Departmental Affiliations.** The Department of Architecture is affiliated with the Association of Collegiate Schools of Architecture, National Institute of Architectural Education, the American Federation of Art, the College Art Association, and Tau Sigma Delta (national honor society in Architectural and Allied Arts).

A growing emphasis is being placed on research, especially on aspects applied to the unique geographic problems of this locale. The faculty includes members qualified by the Office of Civil Defense for fallout shelter analysis and those trained in documentation and preservation of historic structures, in cooperation with the Historical American Building Survey.

Degrees in architecture are accredited by the National Architectural Accreditation Board. Most of the faculty are registered architects and hold individual memberships in the American Institute of Architects, American Institute of Planners, American Society of Planning Officials, and Association of Collegiate Schools of Architecture.

**General.** The department reserves the right to retain, exhibit, and reproduce work submitted by students. Work submitted for grade is the property of the department and remains such until it is returned to the student. The department maintains a reference library under the supervision of a trained librarian and receives research material pertinent to design problems in progress at all levels. Reference sources include valuable training aids provided by the Carnegie Foundation and an extensive collection of photographic plates and slides.

Many courses in architecture, especially those in city planning and history of architecture, history of landscape architecture, and freehand drawing, are available for electives to students majoring in other departments. Consent of the instructor may be secured in lieu of the professional prerequisites listed.

Majors in architecture may not register for work in the Advanced Undergraduate Program which starts with the junior year until certified to be eligible by the department. To qualify for certification a student must have completed the program for the first two years in its entirety with a minimum grade-point average of 2.00. A grade-point average of not less than 2.00 must be maintained in the professional course work.

Elective courses must be approved in advance by the chairman of the department. Students are strongly urged to take elective courses in the humanities or instructional disciplines other than architecture and art.

### Architecture Curriculum, Construction Option.

		FIRST YEAR			
Fall				Spring	
ARCH 121, Freehand Drawing	2			ARCH 122, Freehand Drawing II	2
ARCH 133, Intro. to Des. & Theory	3			ARCH 134, Arch. Graphics	3
MATH 151, Anal. Geom. & Calc. I	5			MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3			ENG 132, Coll. Rhet.	3
Elective	3			Elective	3
P.E., Band, or Basic ROTC				P.E., Band, or Basic ROTC	
		16*		16*	
		SECOND YEAR			
Fall				Spring	
ARCH 241, Arch. Des., Grade II	4			ARCH 242, Arch. Des., Grade II	4
ARCH 323, Hist. of Mod. Arch.	2			ARCH 330, Hist. of Arch.: Ancient/Medieval	3
ARCH 234, Matl. & Meth. of Constr.	3			PHYS 241, Prin. of Physics II	4
MATH 235, Anal. Geom. & Calc. III	3			C E 233, Statics	3
PHYS 143, Prin. of Physics I	4			ENG 231, Mast. of Lit.	3
ARCH 211, Arch. Esthetics	1			P.E., Band, or Basic ROTC	
P.E., Band, or Basic ROTC					
		17*		17*	
		THIRD YEAR			
Fall				Spring	
ARCH 351, Arch. Des., Grade III	5			ARCH 352, Arch. Des., Grade III	5
ARCH 432, Hist. of Ren. Arch.	3			ARCH 337, Prin. of City Planning	3
ARCH 335, Mech. Equip. of Bldgs.	3			ARCH 336, Mech. Equip. of Bldgs.	3
C E 3341, Struct. Anal. I	3			C E 3342, Struct. Anal. II	3
C E 3311, Mech. of Solids	3			G SP 338, Bus. & Prof. Speech	3
		17		17	
		FOURTH YEAR			
Fall				Spring	
ARCH 451, Arch., Des., Grade IV	5			ARCH 436, City Planning	3
ARCH 333, Arch. Structures	3			ARCH 452, Arch. Des., Grade IV	5
C E 4343, Reinf. Concr. Struct. I	3			ARCH 334, Arch. Structures	3
Elective	3			C E 4344, Reinf. Concr. Struct. II	3
C E 231, Plane Surveying	3			Elective	3
		17		17	
		FIFTH YEAR			
Fall				Spring	
ARCH 420, Prof. Practice	2			ARCH 435, Building Technology	3
C E 4341, Struct. Des. I	3			C E 4342, Struct. Design II	3
C E 3211, Mech. of Solids Lab.	2			C E 3201, Portland Cem. Concr. Tech.	2
HIST 231, Hist. of U.S. to 1877	3			C E 3321, Soil Engr. Science	3
GOVT 231, Amer. Govt., Org.	3			GOVT 232, Amer. Govt., Funct.	3
ARCH 410, Seminar	1			HIST 232, Hist. of U.S. since 1877	3
Elective	3			C E 3121, Soil Engr. Sci. Lab.	1
		17		18	
Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—169.					
* Exclusive of P.E., Band, or Basic ROTC.					

### Architecture Curriculum, Design Option.

		FIRST YEAR	
Fall		Spring	
ARCH 121, Freehand Drawing I	2	ARCH 122, Freehand Drawing II	2
ARCH 133, Intro. to Des. & Theory	3	ARCH 134, Arch. Graphics	3
Foreign Language	4	MATH 131, Trigonometry	3
MATH 133, Coll. Algebra	3	Foreign Language	4
ENG 131, Coll. Rhetoric	3	ENG 132, Coll. Rhetoric	3
P.E., Band, or Basic ROTC		Elective	3
15*		P.E., Band, or Basic ROTC	
		15*	

SECOND YEAR

Fall		Spring	
ARCH 241, Arch. Des., Grade II	4	ARCH 242, Arch. Des., Grade II	4
ARCH 323, Hist. of Modern Arch.	2	ARCH 330, Hist. of Arch.:	
ARCH 224, Freehand Drawing III	2	Ancient/Medieval	3
ARCH 234, Matl. & Meth. of Constr.	3	ARCH 225, Beg. Watercolor	2
PHYS 141, Gen. Physics	4	PHYS 142, Gen. Physics	4
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
P.E., Band, or Basic ROTC		ARCH 211, Arch. Esthetics	1
		P.E., Band, or Basic ROTC	

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THIRD YEAR

Fall		Spring	
ARCH 351, Arch. Des., Grade III	5	ARCH 352, Arch. Des., Grade III	5
ARCH 432, Hist. of Ren. Arch.	3	C E 338, Struct. Mech.	3
C E 337, Struct. Mech.	3	Elective	3
ENG 231, Mast. of Lit.	3	ARCH 336, Mech. Equip. of Bldgs.	3
ARCH 335, Mech. Equip. of Bldgs.	3	ARCH 337, Prin. of City Planning	3

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FOURTH YEAR

Fall		Spring	
ARCH 451, Arch., Des., Grade IV	5	ARCH 452, Arch. Des., Grade IV	5
ARCH 333, Arch. Structures	3	ARCH 436, City Planning	3
C E 436, Simple Th. Reinf. Concr.	3	ARCH 334, Arch. Structures	3
ARCH 420, Prof. Practice	2	Elective	3
ARCH 326, Anat. & Life Drawing	2	G SP 338, Bus. & Prof. Speech	3
Elective	3		

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FIFTH YEAR

Fall		Spring	
ARCH 440, Arch. Des. & City Planning, Grade V	4	ARCH 435, Building Technology	3
ARCH 422, Design Program	2	ARCH 461, Arch. Des. Grade V	6
ARCH 4316, Arch. Sculpture	3	ARCH 4317, Arch. Sculpture	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
ARCH 410, Seminar	1	ARCH 425, Arch. Des.: Thesis	2
Elective	3		

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Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—169.  
\* Exclusive of P.E., Band, or Basic ROTC.

Courses in Architecture.

FOR UNDERGRADUATES

- 121, 122. Freehand Drawing I, II (2:0:6 each). Representational drawing in charcoal emphasizing fundamental skills. Culminating work introducing color with pastels.
133. Introduction to Design and Theory (3:3:0). Study of man and his environment and the influences of environment on the design professions. Introduction to design principles.
134. Architectural Graphics (3:1:6). Study of descriptive geometry, architectural shades and shadows and perspective methods. Basic problems in projections.
211. Architectural Esthetics (1:1:0). Prerequisite: ENG 132. Architecture as a contemporary philosophical concept. Lectures and visual experiences to develop perceptive faculties in the esthetics of architecture.
224. Freehand Drawing III (2:0:6). Prerequisite: ARCH 121, 122. 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.
228. A History of Modern Cities (2:2:0). Prerequisite: Sophomore standing. A study of cities of the world since the Industrial Revolution, emphasizing the form, organization, and order of urban development and man's involvement with the forces that create human environment.
230. Survey of Architectural History of the Western World (3:3:0). Survey of architectural history of western world from ancient civilization to mid-twentieth century emphasizing relationship of climate, geography, culture, resources, and technical developments. Not available for credit to architecture majors.
234. Materials and Methods of Construction (3:3:0). Prerequisite: ARCH 133, 134. Introduction to properties, specifications, and uses of architectural materials and analysis of structural systems related to architecture.
235. Architecture of Mexico and the Spanish Southwest (3:3:0). Prerequisite: Sophomore standing. Critical evaluation of architecture and culture of the areas of Spanish conquest and colonization in South, Central, and North America with specific emphasis on Mexico and the Southwest U.S.A.
- 241, 242. Architectural Design, Grade II (4:0:12 each). Prerequisite: ARCH 133, 134. Application of the basic principles of design with emphasis on the three-dimensional problems leading to 6-hour to 48-hour projects under individual criticism dealing with elements of plan and evaluation. Introduction to project-completion method of study. 9-hour problems emphasizing composition and presentation.
321. Design Workshop (2:0:6). Prerequisite: ARCH 242 or equivalent. Project development in architectural design. May be repeated for credit.
323. History of Architecture: 19th and 20th Centuries (2:2:0). Prerequisite: For architecture majors, ARCH 133, 134; for others, none. Cultural and social influences as they determine the development of the 19th and 20th century architecture in Europe and the Americas. Illustrated lectures.



326. **Anatomy and Life Drawing (2:0:6).** Prerequisite: ARCH 224. Study of anatomical structure. Drawing from life.
330. **History of Architecture: Ancient/Medieval (3:3:0).** Prerequisite: For architectural majors, ARCH 323; for others, none. Architectural contributions of ancient, classic, and medieval civilizations and their relation to cultural heritage and development of the western world. Illustrated lectures.
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.
332. **History of Landscape Architecture (3:3:0).** Prerequisite: Junior classification. Historical survey of landscape design, with applications to the present time. Illustrated lectures.
- 333, 334. **Architectural Structures (3:2:3 each).** Prerequisite: ARCH 352, 336. Application of structural theory to specific building requirements, code restrictions, and fabrication limitations. Preparation of details and visits to projects under construction.
- 335, 336. **Mechanical Equipment of Buildings (3:3:0 each).** Prerequisite: ARCH 234 and 242. Heating and air-conditioning requirements and systems for buildings. Basic theory and problems in illumination and acoustics.
337. **Principles of City Planning (3:3:0).** Prerequisite: ARCH 242 or junior standing. Comprehensive background in planning principles which will contribute to the total understanding of architecture as students and as professionals in an urban society and environment.
338. **History of Architecture and Landscape Design: Baroque/Modern (3:3:0).** Historical survey of architecture and landscape design from the Baroque period to the present.
339. **Fall-out Shelter Analysis (3:3:0).** Prerequisite: Architecture major, ARCH 451 and CE 435; engineering majors, senior classification. Analysis of effects of nuclear weapons, nuclear shielding calculation methodologies, environmental factors in shelter design and application of basic principles of design to shelter systems and their utilization. Those successfully completing course will be awarded Department of Defense Certificate of Proficiency upon graduation.
- 351, 352. **Architectural Design, Grade III (5:2:9 each).** Prerequisite: ARCH 241, 242. 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.
410. **Seminar (1:1:0).** Prerequisite: Fifth year standing in architecture. Papers on subjects relating to architecture presented for discussion. For candidates for degree of Bachelor of Architecture only.
420. **Professional Practice (2:2:0).** Prerequisite: Senior standing. Office organization, ethics, professional relations for architects.
422. **Design Program (2:1:3).** Prerequisite: ARCH 440 or concurrent enrollment in ARCH 440. Preliminary study, research, and conferences to develop complete program for terminal problem in ARCH 461 and 425.
425. **Architectural Design: Thesis (2:0:6).** Prerequisite: ARCH 461 or concurrent registration in ARCH 461. Coordination of research and preparation of written thesis supporting project completed in ARCH 461.
430. **History of Early American Architecture (3:3:0).** Prerequisite: ARCH 432 and consent of instructor. The American architectural heritage. Pre-Columbian, Southwestern Colonial, regional styles of the eastern seaboard, Western Reserve, and Greek Revival. Illustrated lectures.
431. **Urban Land Use and Planning Cost Analyses (3:3:0).** Prerequisite: Arch 337 or senior standing. A study of general and specific economic factors involved in analyzing costs of planning and architectural projects with justification and advantages of project expenditures.
432. **History of Renaissance Architecture (3:3:0).** Prerequisite: ARCH 330. 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.
435. **Building Technology (3:1:6).** Prerequisite: ARCH 334 and 336. Synthesis of mechanical, electrical, and acoustical problems relative to design and structural considerations. Preparation of calculations, working drawings, and architectural 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.
440. **Architectural Design and City Planning, Grade V (4:0:12).** Prerequisite: ARCH 451, 452. 24-hour to 72-hour problems under individual criticism dealing with large compositions involving groups of buildings, site planning, and transportation and circulation.
- 451, 452. **Architectural Design, Grade IV (5:2:9 each).** Prerequisite: ARCH 351, 352. 15-hour 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 ability and expression in a limited amount of time.
461. **Architectural Design, Grade V (6:0:18).** Prerequisite: ARCH 440 and 422. Development and design of terminal thesis problem programmed in ARCH 422.
- 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.
4321. **History of Architecture and Art in the Arid Lands of the World (3:3:0).** Prerequisite: Junior standing. An investigative study of the architecture and art of arid lands, ancient and modern, and the geographic and climatic conditions influencing them.
4331. **Special Problems in Architecture and City Planning (3:3:0).** Prerequisite: Advanced standing and approval of the department chairman. Individual studies in advanced architecture and city planning of special interest to students. May be repeated for credit.

## FOR GRADUATES

5331. **Special Problems in City Planning (3:2:3).** Individual studies in advanced architecture and city planning of special interest to student. May be repeated for credit.

## Department of Chemical Engineering

This department supervises the following degree programs: *CHEMICAL ENGINEERING, Bachelor of Science in Chemical Engineering, Master of Science in Chemical Engineering, Doctor of Philosophy*. In addition to the Engineering 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. The undergraduate degree requirements appear in the accompanying curriculum table.

### Chemical Engineering Curriculum.

FIRST YEAR*			
Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Anal. I	3	EGR 136, Engr. Graphics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
15**		15**	
SECOND YEAR			
Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	PHYS 241, Prin. of Physics	4
PHYS 143, Prin. of Physics I	4	EE 234, Electronic Instr.	3
EE 233, Elect. Sys. Anal.	3	MATH 335, Higher Math. for Engr. & Scits. I	3
CHEM 335, Organic Chem.	3	CHEM 336, Organic Chem.	3
CHEM 315, Organ. Chem., Lab.	1	CHEM 316, Organic Chem. Lab.	1
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
17**		17**	
SUMMER SESSION			
First Term		Second Term	
CHE 3111, Chem. Engr. Lab	1	CHE 3312, Chem. Engr. II	3
CHE 3311, Chem. Engr. I	3	CE 3311, Mech. of Solids	3
CE 233, Statics	3		
7		6	
THIRD YEAR			
Fall		Spring	
CHEM 347, Physical Chem.	4	CHEM 348, Physical Chem.	4
CHE 4311, Chem. Eng. III	3	CHE 4312, Chem. Eng. IV	3
CHE 330, Engr. Matls. Science	3	CHE 3351, Anal. Instr.	3
Elective (Humanity)	3	HIST 231, Hist. of U.S. since 1877	3
Elective	3	Elective (Humanity)	3
16		16	
FOURTH YEAR			
Fall		Spring	
CHE 4321, Chem. Engr. Thermo.	3	CHE 4322, Chem. Engr. Thermo.	3
CHE 4241, Unit Oper. Lab.	2	CHE 4242, Unit Oper. Lab.	2
CHE 4353, Process Instr.	3	CHE 4354, Chem. Engr. Plant Des.	3
CHE 4352, Process Design	3	HIST 232, Hist. of U.S. since 1877	3
Elective (Technical)	3	Elective (Technical)	3
14		14	

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—137.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

### Courses in Chemical Engineering.

#### FOR UNDERGRADUATES

330. **Engineering Materials Science (3:3:0).** Prerequisite: CHEM 142, PHYS 143. Fundamental properties of engineering materials. Inter-atomic and intermolecular binding forces and energies; thermal energies; crystal structure; amorphous solids; aggregates and imperfections. Physical basis for common electrical, magnetic, and thermal properties.
3111. **Chemical Engineering Laboratory (1:0:3).** Prerequisite: CHEM 142. Elementary engineering measurement of the chemical and physical properties of materials of commercial importance.
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: CHE 3311. Basic principles of the unit operations, including the fundamentals of heat, mass, and momentum transport.
3351. **Analytical Instrumentation (3:2:3).** Corequisite: CHEM 335. Analytical tools used for instrumental analysis and control of process plants.
4121. **Chemical Engineering Seminar (1:1:0).** Prerequisite: Advanced standing and approval of the department chairman. 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 4311. 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 such selected unit operations of chemical engineering 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 department chairman. 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 department chairman. 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.
4342. **Polymer Science and Technology (3:3:0)**. Prerequisite: CHEM 335. Theory of macromolecular structures and the relation of properties to structure. The manufacture and application of polymeric materials.
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.
4352. **Process Design (3:1:6)**. Prerequisite: CH E 4312. A problem course on the application of engineering and economic principles to the design of chemical processes.
4353. **Process 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.
4371. **Nuclear Engineering (3:3:0)**. Prerequisite: Thermodynamics. Basic principles applicable to engineering problems of the atomic energy field.

## FOR GRADUATES

5121. **Graduate Seminar (1:1:0)**. Required of all chemical engineering graduate students. May be repeated for credit.
5310. **Advanced Chemical Engineering Techniques (3:3:0)**.
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)**. 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.
5323. **Digital Computation for Chemical Engineers (3:3:0)**. The development and testing of mathematical models of industrial chemical systems using conventional digital simulation techniques.
5331. **Special Problems in Chemical Engineering (3:3:0)**. Prerequisite: Approval of department chairman. 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 chairman. 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.
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.
5361. **Biochemical Engineering (3:3:0)**.
5362. **Engineering Economics and Design For Pollution Abatement (3:2:3)**.
5365. **Instrumental Analysis of Air Pollutants (3:2:3)**.
- 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)**. Nuclear reactions, reactor fuel cycles, production of nuclear feed materials, properties of irradiated fuels, and separation processes.
630. **Master's Report (3)**.
- 731, 732. **Master's Thesis (3)**. Enrollment required at least twice.
- 731, 732. **Research (3 each)**.
831. **Doctor's Dissertation (3)**. Enrollment required at least four times.

## Department of Civil Engineering

This department supervises the following degree programs: *CIVIL ENGINEERING, Bachelor of Science in Civil Engineering, Master of Science in Civil*

*Engineering, Doctor of Philosophy.* The undergraduate degree requirements appear in the accompanying curriculum table.

### Civil Engineering Curriculum.

#### FIRST YEAR\*

Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Anal. I	3	E GR 136, Engr. Graphics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

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#### SECOND YEAR

Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	PHYS 241, Prin. of Physics II	4
PHYS 143, Prin. of Physics I	4	E E 234, Electronic Instr.	3
E E 233, Elec. Sys. Anal.	3	MATH 335, Higher Math. for Engrs. & Scits. I	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
Elective (Humanity)	3	C E 233, Statics	3
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

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#### THIRD YEAR

Fall		Spring	
MATH 336, Higher Math for Engrs. & Scits. II	3	GEOL 233, Geol. for Engrs.	3
C E 231, Plane Surveying	3	CH E 330, Engr. Matl. Sci.	3
C E 332, Dynamics	3	C E 3121, Soil Engr. Sci. Lab.	1
C E 3311, Mech. of Solids	3	C E 321, Soil Engr. Sci.	3
C E 3341, Struct. Anal. I	3	C E 3342, Struct. Anal. II	3
M E 3321, Thermodynamics	3	C E 3351, Mech. of Fluids	3
		C E 3211, Mech. of Solids Lab.	2

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#### FOURTH YEAR

Fall		Spring	
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt. Funct.	3
C E 4343, Reinf. Concr. Struct. I	3	C E 3371, Water & Waste Treat.	3
C E 4354, Surface Hydrology	3	C E 4331, Spec. Prob. in Civil Engr.	3
C E 4361, Highway Engr. I	3	Electives (Technical)	9
Elective	3		
C E 3201, Constr. Matls.	2		18
C E 3151, Mech. of fluid lab.	1		

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Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—134.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

### Courses in Civil Engineering.

#### FOR UNDERGRADUATES

231. **Plane Surveying (3:2:3).** Prerequisite: MATH 151. 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 152, PHYS 143. Equivalent force systems, equilibrium of force systems, friction, centroids, moments of inertia, introduction to structural mechanics.
332. **Dynamics (3:3:0).** Prerequisite: C E 233, MATH 335. Motion of particles and of rigid bodies.
337. **Structural Mechanics I (3:3:0).** Prerequisite: MATH 131. Statics for students of architecture, design option, and others who desire a condensed presentation of the material.
338. **Structural Mechanics II (3:3:0).** Prerequisite: C E 337. Mechanics of solids for students of architecture, design option, and others who desire a condensed presentation of the material.
3121. **Soil Engineering Science Laboratory (1:0:3).** 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).** Prerequisite: C E 3351.
3201. **Construction Materials (2:1:3).** Studies concerning the physical properties of construction materials.
3211. **Mechanics of Solids Laboratory (2:1:3).** Prerequisite: C E 3311. Analytical studies of stress and strain; strain measurements; interpretation of strain data.
3302. **Procedures of Problem Analysis (3:3:0).** Prerequisite: MATH 336; EA&D 135. Application of matrix theory and statistics to civil engineering.
3311. **Mechanics of Solids (3:3:0).** Prerequisite: C E 233. Introductory theory of determination of stress and strain in elastic and inelastic bodies subject to various conditions of loading.
3321. **Soil Engineering Science (3:3:0).** Prerequisite: C E 3311, concurrent registration in C E 3121. Physical properties of soils; theories of stress, settlement, and consolidation of soils.

3341. **Structural Analysis I (3:3:0)**. Corequisite: C E 3311. The analysis of stress functions in framed structures for fixed and moving load systems.
3342. **Structural Analysis II (3:3:0)**. Prerequisite: C E 3341. The theory of statically indeterminate structures.
3351. **Mechanics of Fluids (3:3:0)**. Prerequisite: C E 332. Hydrostatics; dynamics of viscous and nonviscous fluids; resistance to flow; flow in pipes and open channels.
3371. **Water and Waste Treatment (3:2:3)**. Corequisite: C E 4354. Quality and quantity of water and wastes in municipal and industrial engineering. Laboratory work in the chemistry of water and wastes.
435. **Structures (3:3:0)**. Prerequisite: C E 338. Structures in steel, reinforced concrete, and timber for students of architecture, design option.
4121. **Civil Engineering Seminar (1:1:0)**. Individual study of engineering problems of special interest and value to the student.
4261. **Traffic Engineering (2:1:3)**. Corequisite: C E 4361. Studies of speed, volume, accidents, time delay studies, and the statistical analysis of data.
4321. **Soil Engineering (3:3:0)**. 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)**. Individual studies in advanced engineering areas of special interest. May be repeated for credit.
4332. **Special Experimental Problems in Civil Engineering (3:0:9)**. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit.
4333. **Special Problems in Water Resources (3:3:0)**. Individual studies in water resources. May be repeated for credit.
4335. **The Relationship of Technology to Society (3:3:0)**. Prerequisite: Advanced standing. A survey of modern technology and its effect on man's society.
4337. **Cost Estimating (3:3:0)**. 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)**. Prerequisite: Senior standing in engineering or approval of department chairman. Professional and industrial problems, contracts, specifications, ethics of engineering.
4341. **Structural Design I (3:2:3)**. Prerequisite: C E 3342. Plastic and elastic design in homogenous materials, with special emphasis on steel and aluminum.
4342. **Structural Design II (3:2:3)**. Prerequisite: C E 4341. Advanced theory and design in homogenous materials for complex structures.
4343. **Reinforced Concrete Structures I (3:3:0)**. Corequisite: C E 3342. Design of reinforced concrete structures by elastic and ultimate strength theories.
4344. **Reinforced Concrete Structures II (3:3:0)**. Prerequisite: C E 4343. Analysis and design of prestressed concrete members including continuous beams, slabs, tension members, compression members, tanks.
4351. **Intermediate Hydromechanics (3:3:0)**. Prerequisite: C E 3351. Hydrokinematics, boundary-layer theory, resistance of immersed bodies, lift and drag.
4353. **Elements of Hydraulic Engineering (3:3:0)**. Prerequisite: C E 3351. Dams; channels and pressure conduits; hydraulic machinery; hydroelectric power.
4354. **Surface Hydrology (3:2:3)**. Prerequisite: C E 3351. The occurrence and distribution of water; precipitation, evapotranspiration, infiltration, runoff.
4355. **Ground Water Hydrology (3:3:0)**. Prerequisite: C E 4354. Infiltration; flow of underground water under water table and artesian conditions; development of ground water supplies; recharge of ground water reservoirs.
4361. **Highway Engineering I (3:3:0)**. Prerequisite: C E 3321. Route location, planning, traffic engineering, geometric design, drainage, and earthwork; bituminous materials.
4362. **Highway Engineering II (3:3:0)**. Prerequisite: C E 4361 and 4343. Design construction, and maintenance of pavements; soil-aggregate roads and soil stabilization.

## FOR GRADUATES

5121. **Advanced Soil Engineering Laboratory I (1:0:3)**. Laboratory determination and evaluation of the engineering properties of soils.
5122. **Advanced Soil Engineering Laboratory II. (1:0:3)**. Prerequisite: C E 5121. Laboratory determination of engineering properties of soils.
5237. **Construction Management (2:2:0)**. Management aspects of the construction industry.
5310. **Numerical Methods in Engineering (3:3:0)**. Prerequisite: MATH 336 or consent of instructor. Numerical techniques for the formulation and solution of discrete and continuous systems of equilibrium eigenvalue and propagation problems.
5311. **Advanced Mechanics of Solids (3:3:0)**. Stress and strain at a point; theories of failure; unsymmetrical bending; curved flexural members; beams on continuous support; energy methods.
5313. **Theory of Elastic Stability (3:3:0)**. Theory of the conditions governing the stability of structural members, determination of critical loads for various types of members.
5314. **Theory of Plates and Shells (3:3:0)**. 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)**. Several analyses of stress and strain in rectangular and polar coordinates; stress functions; energy methods; finite difference equations; membrane analogy for torsion.
5317. **Theory of Plasticity (3:3:0)**. Prerequisite: C E 5316. Stress and strain tensor; theories of yield (Von Mises, Tresca, Mohr, Coulomb); plane stress and plane strain problems; inelastic torsion; viscoelastic behavior of materials.
5321. **Advanced Soil Engineering I (3:3:0)**. Specialized topics in the theoretical and practical aspects of foundation and earthwork engineering.
5322. **Advanced Soil Engineering II (3:3:0)**. Prerequisite: C E 5321. Earth pressure; stability of deep cuts; stability of dams; settlement of structures; anchored bulkheads.
5331. **5332. Advanced Work in Specific Fields (3:3:0) (3:0:9)**. 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.
5333. **Advanced Work in Water Resources (3:3:0)**. Individual studies in advanced water resources. May be repeated for credit.
5342. **Advanced Plastic Design. (3:3:0)**. Study of the theory of plastic design of steel frames and multistory buildings.



5343. **Advanced Structural Analysis (3:3:0).** Application of modern design methods to building frames, arches, rigid bents, continuous trusses.
5344. **Advanced Reinforced Concrete Design (3:3:0).** Analysis and design of complex reinforced concrete structures.
5345. **Special Topics in Reinforced Concrete (3:3:0).** Yield-line theory for flat slab; plastic hinges; shear and diagonal tension; bond and other related topics in concrete.
5346. **Design of Structures for Dynamic Loads (3:3:0).** Nature of dynamic loading from earthquake and wind forces; nature of dynamic resistance of structural elements and complete structures; concepts of limit design.
5347. **Matrix Methods of Structural Analysis (3:3:0).** Matrix operations, force method, and stiffness method with applications.
5351. **Open Channel Hydraulics (3:3:0).** Channel geometry and parameters. Uniform and varied flow. Flood routing.
5352. **Hydrodynamics (3:3:0).** Prerequisite: CE 4351, MATH 336. Potential and stream functions; vortex dynamics; wave motions; conformal transformations.
5353. **Water Resources Engineering I (3:3:0).** Problems in water resources conservation and utilization with particular emphasis on river basin and interbasin studies involving multiple water uses.
5354. **Water Resources Engineering II—System Simulation and Analysis (3:3:0).** Prerequisite: CE 5353 or consent of instructor. Application of modern decision making tools to the design and operation of water resource systems.
5355. **Flow in Porous Media (3:3:0).** Single and multiple phase flow in confined and unconfined porous formations toward natural outlets or toward wells.
5356. **Earth Dams (3:3:0).** Selection of dam sites; principles of design of earth dams; flow nets and seepage; selected topics.
5357. **Water Resources Engineering III—Institutions (3:3:0).** Prerequisite: CE 5353. A study of the various institutions which play a prominent role in water resource development.
5372. **Advanced Water Treatment (3:3:0).** Prerequisite: CE 3371. Water chemistry and microbiology; advanced methods for water quality control; renovation of water for reuse.
5373. **Advanced Waste Treatment (3:3:0).** Prerequisite: CE 3371. Advanced methods of waste treatment including municipal and industrial liquid and solid wastes.
5374. **Water and Wastewater Analysis (3:1:6).** Prerequisite: CE 3371 or consent of instructor. Laboratory procedures for the examination of water and wastewater including determination of concentrations of specific mineral and biological contaminants.
5375. **Unit Processes Laboratory (3:0:9).** Prerequisite: CE 5372, CE 5373, CE 5374. Operation and evaluation of water and wastewater treatment units for water quality control.
5376. **Water Quality Networks (3:3:0).** Prerequisite: CE 5372, CE 5373, CE 5374, or concurrent enrollment. Effects of wastewater discharges on quality of water in streams, lakes, reservoirs, bays, and estuaries; methods of surface water quality control.
5377. **Special Studies in Sanitary Engineering (3:3:0).** Prerequisite: CE 5374. Advanced work in specific fields of water quality control.
5378. **Solid Waste Treatment (3:3:0).** Prerequisite: Consent of instructor. Treatment and disposal of municipal, industrial, and agricultural solid wastes.
5379. **Air Pollution Control (3:3:0).** Prerequisite: Consent of instructor. Measurement and control of atmospheric pollutant emissions.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
- 731, 732. **Research (3 each).** May be repeated for credit.
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Electrical Engineering

This department supervises the following degree programs: **ELECTRICAL ENGINEERING, Bachelor of Science in Electrical Engineering, Master of Science in Electrical Engineering, Doctor of Philosophy.**

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.

To be admitted to junior standing as an electrical engineering major, a student must submit a petition to the department prior to his registration for the third year; its acceptance depends upon the student's grade record. He is expected to have an overall grade-point average of 2.00, above average grades in mathematics courses, and C or better in both EE 231 and 232.

### Electrical Engineering Curriculum.

#### FIRST YEAR\*

Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Anal. I	3	EGR 136, Engr. Graphics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

## SECOND YEAR

Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	PHYS 241, Prin. of Physics II	4
MATH 335, Higher Math. for Engrs. & Scits. I	3	E E 232, Prin. of Elect. Engr. II	3
PHYS 143, Prin. of Physics I	4	MATH 336, Higher Math. for Engrs. & Scits. II	3
E E 231, Prin. of Elect. Engr. I	3	E E 3331, Measurements Lab.	3
GOVT 231, Amer. Govt., Org. P.E., Band, or Basic ROTC	3	E E 3361, Elect. & Mag. Prop. of Matl.	3
	16**	P.E., Band, or Basic ROTC	16**

## SUMMER SESSION

First Term		Second Term	
C E 233, Statics	3	C E 332, Dynamics or	
M E 3321, Engr. Thermo.	3	EA&D 4313, Var. Methods	3
	6	GOVT 232, Amer. Govt., Funct.	3
			6

## THIRD YEAR

Fall		Spring	
E E 3311, Electronics	3	E E 3312, Electronics II	3
E E 3321, Circuit Theory I	3	E E 3322, Circuit Theory II	3
E E 3323, Meth. of Circuit Anal.	3	E E 3332, Experimental Lab. I	3
E E 3341, Electromag. Theory I	3	E E 3342, Electromag. Theory II	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
	15		15

## FOURTH YEAR

Fall		Spring	
E E 4333, Experimental Lab. II	3	E E 4332, Spec. Experimental Prob.	3
E E 4351, Energy Conversion I	3	Electives (Technical)	6
Elective (Humanity)	3	Electives	6
Electives (Technical)***	6		15
	15		

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—134.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

\*\*\* At least one technical elective must be in the area of thermodynamics or dynamics.

## Courses in Electrical Engineering.

## FOR UNDERGRADUATES

- 231, 232. Principles of Electrical Engineering I, II (3:3:0 each). Corequisite: MATH 235 or approval of department chairman. Principles of electric and magnetic circuits. Induced and generated electromotive force. Forces on conductors. Fundamentals of alternating current circuits. Fundamentals of resistance, inductance, and capacitance.
233. Electrical Systems Analysis (3:2:2). Co-requisite: MATH 235. The language of signals and systems. Mathematical representation of signals and system components. Concept of the transfer function. Elements of analog simulation and computation.
234. Electronic Instrumentation (3:2:2). Prerequisite: E E 233. Circuit models, block diagrams, and signal-flow diagrams. Concept of the controlled source. Models for physical devices. Electronic amplifiers and feedback systems. Instrumentation systems.
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.
3322. Circuit Theory II (3:3:0). Prerequisite: E E 3321. Theory of nonlinear networks, and parameter formulations.
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. Fourier series, and integrals.
3331. Measurements Laboratory (3:0:9). Corequisite: E E 232. 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 3311, 3321, 3331. 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 fields from the vector viewpoint.
3342. Electromagnetic Theory II (3:3:0). Prerequisite: E E 3323, 3341. General solutions for Maxwell's equations. Traveling waves in scalar media. Boundary conditions and constraints imposed by bounding surfaces.
3361. Electric and Magnetic Properties of Materials (3:3:0). Prerequisite: MATH 235, E E 231. Structure of crystals. Application of diffraction techniques. Application to semiconducting materials. Electrical processes in dielectrics.

4121. **Electrical Engineering Seminar (1:1:0)**. Prerequisite: Advanced standing and approval of department chairman. 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.
4314. **Finite State Machines (3:3:0)**. Prerequisite: Senior or graduate standing or consent of the instructor. An introduction to the design and analysis of finite state machines. Transition tables. Minimal and linear machines.
4315. **Biomedical Instrumentation (3:3:0)**. Principles of transducers: mechanical effects, inductance, capacitance, photoelectricity, piezoelectricity, thermoelectricity. Chemical measurements: pH, pO<sub>2</sub>, pCO<sub>2</sub> electrodes, specific ion electrodes. External and implantable electrodes. Colorimetry and spectrophotometry. Respiration, blood flow and pressure cardiography, plethysmography, encephalography, muscular activity. Bioelectric phenomena.
4316. **Biomedical Instrumentation Laboratory (3:0:9)**. A laboratory course to accompany the lecture course in biomedical instrumentation. Properties of transducers. Application of electronics and measuring circuits to sphygmography, pneumography, cardiography, and plethysmography. Spectrophotometry circuits and measurements. Electrochemical measurements. Physiological signal recording and analysis.
4317. **Electronics III (3:3:0)**. Prerequisite: EE 3312. Advanced methods in the analysis and design of electronic circuits. Detailed study of specialized circuits and their integration into functional systems.
4318. **Physical Electronics (3:3:0)**. Prerequisite: EE 3312, 3342. Introductory study of the physical properties of electron devices; electron ballistics, thermionic emission, conduction through gases and solids.
4321. **Passive Network Synthesis (3:3:0)**. Prerequisite: EE 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.
4322. **Topological Network Analysis (3:3:0)**. Prerequisite: EE 3322. Fundamentals of linear graphs; topological formulation and theory of contacts; nets; linear programming techniques.
4331. **Special Problems in Electrical Engineering (3:3:0)**. Prerequisite: Advanced standing and approval of department chairman. 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: EE 4333. Individual experimental studies in current problems in advanced engineering technology of special interest.
4333. **Experimental Laboratory II (3:0:9)**. Prerequisite: EE 3312, 3332, 3341. 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: EE 3342. The wave equation and its solution in guiding systems. Discontinuities and impedances in waveguides. Microwave resonators.
4343. **Energy Transmission (3:3:0)**. Prerequisite: Senior standing in electrical engineering. Theory and application of transmission lines at power, signal, and high frequencies.
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.
4352. **Direct Energy Conversion (3:3:0)**. Prerequisite: EE 3361. Thermoelectric, photoelectric, and thermionic converters, magnetohydrodynamic and electrogasdynamic generators. Fuel cells. Nuclear energy conversion and reactor theory.
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: EE 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)**. Prerequisite: EE 3312, 3322. Transmission through linear networks; impulse response and convolution; modulation and modulation systems; noise and noise spectra; signal to noise considerations, matched filters; quantization techniques.
4381. **Integrated Circuits (3:3:0)**. Theory of fabrication of diodes, transistors, capacitors, resistors into functional arrays. Calculations of thin film capacitances and resistances. Distributed R-C networks. Operation of junction diodes and transistors, MOS transistors. Linear and digital functional blocks. Frequency selective networks.
4382. **Integrated Circuits Laboratory (3:0:9)**. A laboratory course to accompany the lecture course in integrated circuits. Design and fabrication of semiconductor devices and integrated circuits. Alloying, oxidations, diffusions, thin film techniques, and photolithography. Measurements of integrated circuit performance.

#### 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.
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 is 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.

- 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.
- 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.), distributed amplifiers, stagger-tuned amplifiers, synchronous-tuned amplifiers.
- 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.
- 5322, 5323. Advanced Network Theory I and II (3:3:0 each)** Prerequisite: Graduate standing in electrical engineering or consent of instructor. Theory of two-terminal and four-terminal networks, impedance transformation, Foster's theorem and extensions.
- 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.
- 5325. Information Theory (3:3:0).** Prerequisite: Graduate standing in electrical engineering. Probability 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 policy decisions are made.
- 5328. Statistical Theory of Communications (3:3:0).** Prerequisite: E E 5317 or consent of instructor. The Fourier methods. Wiener-Hopf criteria, prediction and prediction filters presented. Syntheses 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 Investigations in Engineering Applications (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 guiding electromagnetic waves. Reduction of wave-guide and obstacle problems to equivalent network problems.
- 5343. Radio Propagation (3:3:0).** Prerequisite: Graduate standing, E E 5342, or consent of instructor. Propagation in a stratified medium; ray theory; ionospheric sounding; transmission problems; cross-modulation and nonlinear effects.
- 5344. Antennas and Radiating Systems (3:3:0).** Prerequisite: 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 results of practical measurements of antenna radiation patterns 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.
- 5355, 5356. Plasma Theory I and II (3:3:0 each).** Prerequisite: E E 4318 and graduate standing. Vector mechanics of many particle systems. Kinetic gas theory. Orbit theory. Particle collisions, ionization phenomenon. Radiation, Boltzmann-Vlasov equation, oscillations. Plasma turbulence and instabilities. Applications and devices.
- 5357. Plasma Theory III (3:3:0).** Prerequisite: E E 5355. Plasma diagnostic methods, experimental techniques, fusion reactor design considerations.
- 5358. Optics, Radiation, and Noise in Quantum Electronics (3:3:0).** Prerequisite: Graduate standing. Radiation from dipoles and moving particles. Diffraction. Scattering. Incoherent and coherent sources. Reflections and transmission.
- 5359. Quantum Electronics (3:3:0).** Prerequisite: E E 4318, 5371 or the consent of the instructor. Introduction to quantum mechanics. Spectroscopy, transition rates and selection rules. Induced and spontaneous emission, noise, masers and lasers, solid-state devices.
- 5360. Physical Optics and Engineering Applications (3:3:0).** Prerequisite: E E 5359 or 5354 or consent of the instructor. Study of lasers, masers, magneto and electro-optic devices and optical data processing.
- 5361, 5362. Reliability of Electronic Systems I and II (3:3:0 each).** Prerequisite: Graduate standing. Concepts of systems effectiveness and maintainability. Data analysis techniques. System analysis techniques applied to electronic systems including probability, reliability, and functional analysis. Reliability management concepts.
- 5363. Systems Engineering I (3:3:0).** Prerequisite: E E 5361. The reliability of and system modelling of maintained and non-maintained systems. Allocation of redundancies.
- 5364. Applied Network Theory I (3:3:0)** Prerequisite: Graduate standing. The theory of linear graphs applied to physical problems. Applications to linear programming techniques, cybernetics, network and stochastic flows.
- 5371. Advanced Engineering Analysis I (3:3:0).** Prerequisite: Graduate standing or consent of instructor. Applications of Tensor analysis, variational techniques, finite difference techniques to electrical engineering problems. Orthogonal functions. Nonlinear oscillations.

5392. **Feedback Control System II (3:3:0).** The application of linear control system theory to a wide range of problems; including fluid dynamics, chemical processes, mechanical vibrations, and many types of electromechanical systems. A few nonlinear systems are treated.
5393. **Digital Computer Design (3:2:3).** The application of asynchronous switching circuits, number systems, codes, switching algebra, etc. to design digital computer subsystems. Lab experiments using integrated circuits provide the implementation of the theory.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
6311. **Solid State Electronics IV: Special Topics (3:3:0).** Specialized topics in solid state electronics such as superconductivity, magneto-optical effects, piezoelectricity, magneto and piezo theory of energy bands, electron tunneling, and compound semiconductors.
6312. **Solid State Electronics III (3:3:0).** Prerequisite: E E 5313. Diagnostic and laboratory techniques of preparation and purification of materials, crystal structure determination, mechanical and thermal property measurements, studies at high pressures, measurement of electrical and magnetic properties, measurements of optical and photoelectric properties.
6321. **Advanced Detection Theory (3:3:0).** Prerequisite: E E 5325 or consent of the instructor. Filtering and detection of signals from noise. Optimal filter theory. Error correcting codes.
6322. **Switching Circuit Theory II (3:3:0).** Prerequisite: Graduate standing. Binary and sequential filters. Sequential networks. Detection of coherent and incoherent trains. A posteriori and a priori probability.
6351. **Theory of Plasma Waves (3:3:0).** Prerequisite: E E 5355 or consent of the instructor. Waves in cold and finite temperature plasmas. Dispersion relations. Free and forced oscillations. Landau damping. Topology of wave normal surfaces.
6352. **Solid State Plasma Theory (3:3:0).** Prerequisite: E E 5313 and 5354. Plasma oscillations. Wave propagation. Pinch effect. Magnetoreflexions and absorption instabilities.
6371. **Advanced Engineering Analysis II (3:3:0).** Prerequisite: E E 5371 or equivalent. Application of ordinary and partial differential equations to electrical engineering problems. Sturm-Liouville problem. Series solutions. Green's functions.
- 731, 732. **Research (3 each).**
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## Department of Engineering Analysis and Design

The Department of Engineering Analysis and Design has as its prime mission the offering of courses for the education of excellent generalists for technological/management careers in industry and government, and as independent entrepreneurs. This program is centered on a systems approach to complex problem-solving, with even-handed emphasis on the human and physical facets of objects and means. Many of the offerings are of interest to both undergraduate and graduate students throughout the University.

In addition, beginning and advanced courses in computer programming and technology are available to students desiring minimum or intensive training in this field. Engineering students will find several courses designed to supplement their other skills for the solution of large-scale engineering systems problems.

All departments of the College of Engineering are joint sponsors of one or more of the courses in Engineering Analysis and Design.

## Courses in Engineering Analysis and Design.

### FOR UNDERGRADUATES

- 123, 124. **Engineering Design and Logic I, II (2:2:0 each).** The profession of engineering and its relation to energy, materials, resources, computers, communication, and control. Basic digital computer programming. Synthesis and analysis of typical engineering problems.
135. **Engineering Analysis I (3:3:0).** The profession of engineering and its relation to energy, materials, resources, computers, communication and control. Basic computer programming. Synthesis and analysis of typical engineering problems.
2351. **Introduction to Computer Science I (3:3:0).** An introductory course in computer programming for students in mathematically oriented fields. History of computers; organization and components; FORTRAN language and algorithmic processes; prepares the student for use of Computer Center facilities. Degree credit not given for both EA&D 135 and 2351.
2352. **Introduction to Computer Science II (3:3:0).** Similar to EA&D 2351 except that the course emphasizes the non-mathematical approach.
4313. **Variational Methods (3:3:0).** Prerequisite: MATH 335. Variational and optimal methods in selected engineering topics. Stability and steady-state criteria. Formulation and solution of physical problems by variational techniques including exact methods (Euler-Lagrange equations) and approximate methods (Rayleigh-Ritz method and dynamic programming).
4331. **Special Problems in Engineering Analysis and Design (3:3:0).** Prerequisite: Instructor's consent. Individual studies in engineering analysis and design. May be repeated.
4333. **Special Problems in Computer Science (3:3:0).** Prerequisite: MATH 335 and senior standing. Individual studies in computer technology in special areas. May be repeated.
- 4341, 4342. **Digital Computations I, II (3:3:0 each).** Prerequisite: EA&D 124, MATH 335. Application of numerical analysis to solution of linear and nonlinear engineering systems problems. The approximation problem applied to engineering systems. Matrix methods in engineering.
4343. **Analog Computations (3:2:3).** Prerequisite: MATH 335, EA&D 135. Analysis of selected engineering problems using the analog computer. Auxiliary devices used with analog computer.
4347. **Engineering Applications of Linear Programming (3:2:2).** Prerequisite: EA&D 4342. Elements of linear programming. Application to warehousing, transportation, network flow and other engineering problems.



4353. **Digital Programming Systems (3:3:0).** Prerequisite: EA&D 2351 or equivalent and consent of instructor. Computer software systems. Compilers, assemblers, and loaders. Definition of functions and the analysis of current approaches to satisfying functional needs.
4354. **Problem Oriented Computer Languages (3:3:0).** Prerequisite: EA&D 2351 or 2352. Language structure; introduction to COBOL, ALGOL, and other languages, such as PL/I. Stress placed upon the use of the computer as a problem-solving device.
4355. **Computer Applications to Numerical Methods (3:3:0).** Prerequisite: EA&D 4353. Computer programming applied to numerical error, significant digit arithmetic procedures, classes of error, expression evaluation; solution of non-linear expressions, interpolation, systems of equations; Newton's method, Euler's method, Runge-Kutta.

## FOR GRADUATES

5313. **Field Theory (3:3:0).** Prerequisite: MATH 335. Application of partial-differential equations and related methods to generalized field problems selected from the areas of electromagnetism, heat transfer, elasticity, fluid mechanics, and vibrations.
5314. **Analysis of Engineering Systems I (3:3:0).** Prerequisite: MATH 335 or its equivalent and consent of instructor. Analysis of linear and non-linear engineering systems through transform methods and series solutions.
5315. **Analysis of Engineering Systems II (3:3:0).** Prerequisite: EA&D 5314 or consent of instructor. Continuation of analysis of linear and non-linear engineering systems through partial differential equations. Matrix methods and finite differences.
5331. **Special Problems in Advanced Engineering Analysis and Design (3:3:0).** Prerequisite: Graduate standing. Individual studies in advanced applied engineering analysis and design. May be repeated.
5332. **Special Problems in System Engineering (3:3:0).** Prerequisite: Consent of instructor. Individual studies in the synthesis and analysis of engineering systems that require significant interdisciplinary knowledge.
5333. **Special Problems in Advanced Computer Science and Technology (3:3:0).** Prerequisite: Graduate standing. Individual studies in advanced computer science and technology. May be repeated.
5341. **Dynamic Programming (3:2:2).** Prerequisite: EA&D 4342. Basic concepts of dynamic programming and its applications to systems analysis; allocation and scheduling processes; Markovian decision processes.
5342. **Applications of Topological Methods (3:2:3).** Prerequisite: Graduate standing. Linear graphs for applied transportation and network flow problems. Minimal cost flow; multiterminal maximal flow. The application of topology in engineering problems.
5351. **Computer Logic Design and Switching Theory (3:3:0).** Prerequisite: EA&D 4353. Symbolic logic and Boolean algebra for the description and analysis of switching circuits; simplification of switching circuits through analysis; error detection and correction techniques, basic sequential circuits; digital systems design principles.
5352. **Computer Systems Organization and Programming I (3:3:0).** Prerequisite: Consent of instructor. A graduate level course in programming systems. The structure of languages and the relationships between software systems and languages. Monitors, compilers, assemblers, and loaders.
5353. **Computer Systems Organization and Programming II (3:3:0).** Prerequisite: EA&D 5352. Survey of hardware systems and components in relation to software systems. Optimization of systems for various types of job loadings. Simulation of computer configurations.
5354. **Simulation Techniques (3:3:0).** Prerequisite: EA&D 4353. Computer simulation utilizing logical, numerical, and Monte Carlo modeling to represent systems; system status representation and modification; collection and analysis of data; special languages such as GPSS III, SIMULA, SIMSCRIPT.
5355. **Heuristic Techniques (3:3:0).** Prerequisite: EA&D 5354. Distinction between heuristic and algorithmic methods; justification for heuristic approach; mathematical intuition; current research projects. Term project required.
5356. **Formal Computer Language (3:3:0).** Prerequisite: EA&D 5353. Mega languages; languages and grammars used as primitive models of material languages; properties of formal languages; syntactical analysis and compilation.
5357. **Information Retrieval I (3:3:0).** Prerequisite: EA&D 4353. Coding; storage; classification; automatic retrieval; error analysis and correction; Key variants; multikey files; searching strategy, indexing lattices; system performance measurement.
5358. **Introduction to Artificial Intelligence (3:3:0).** Prerequisite: EA&D 4353. Theories and techniques necessary to simulate and study goal oriented behavior of natural or artificial systems; induction process and hypothesis formulation; learning and adaptive systems; pattern recognition; generalized problem solving.
5359. **Statistical Computer Techniques (3:3:0).** Prerequisite: Consent of instructor. The development and use of statistical and mathematical algorithms; emphasis on application and problem-solving techniques.
5361. **Synthesis of Man/Machine Systems (3:2:3).** Prerequisite: Consent of instructor. Systems as products of intentional interdisciplinary innovation in complex problem areas. Interdisciplinary development of complex systems of men and machines. Structures, frameworks, and methodologies. Team projects in problem analysis and system synthesis.
5362. **Analysis of Man/Machine Systems (3:3:0).** Prerequisite: EA&D 5361. Concepts, methodologies, and tools for use in determining the functional capabilities of systems and their subsystems. Subsystem interactions. Quantitative and qualitative prediction and measurement of the performance of complex systems of man and machines. Sensitivity, failure mode, and marginal analysis.
5367. **Management of Technical Innovation (3:3:0).** Prerequisite: Consent of instructor. The goals, methodologies, and tools of intentional innovation. Disciplinary, multidisciplinary, and interdisciplinary research and development activities. Case studies drawn from diverse areas of industry and government.
5368. **Industrial Innovation (3:3:0).** Prerequisite: Consent of instructor. Industrial innovation as a product of the interaction of scientists, engineers, entrepreneurs, managers and financiers. History of the technical entrepreneur. Establishment and development of technically-based businesses. Case studies and term project.

## Engineering Physics

**Department of Physics, College of Arts and Sciences.** The curriculum 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 College of Arts and Sciences and by the College of Engineering. See the section on the College of Arts and Sciences for a description of the department and its course offerings.

## Engineering Physics Curriculum.

FIRST YEAR*			
Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	EGR 136, Engr. Graphics	3
EA&D 135, Engr. Anal. I	3	PHYS 143, Prin. of Phys. I	4
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
	15**		16**
SECOND YEAR			
Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	MATH 335, Higher Math. for Engrs. & Sci. I	3
ENG 132, Coll. Rhet.	3	PHYS 242, Prin. of Physics III	4
PHYS 241, Prin. of Physics II	4	EE 234, Electronics Instr.	3
EE 233, Elect. Sys. Anal.	3	CE 3311, Mech. of Solids	3
CE 233, Statics	3	Elective (Humanity)	3
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
	16**		16**
SUMMER SESSION			
First Term		Second Term	
PHYS 335, Elect. & Mag.	3	PHYS 336, Elect. & Mag.	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
	6		6
THIRD YEAR			
Fall		Spring	
MATH 336, Higher Math. for Engrs. & Sci. II	3	PHYS 341, Electronics	4
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
PHYS 434, Mechanics	3	PHYS 435, Mechanics	3
ME 3321, Engr. Thermo.	3	CH E 330, Engr. Matl. Sci.	3
Elective	3	Elective	3
	15		16
FOURTH YEAR			
Fall		Spring	
MATH 3318, Finite Math. Structures	3	PHYS 313, Nuclear Phys. Lab.	1
PHYS 437, Quantum Mech.	3	PHYS 338, Intro. to Nuc. Phys.	3
ME 4314, Fluid Dynamics	3	ME 4315, Heat & Mass Trans.	3
PHYS 434, Mechanics	3	EE 4353, Feedback Contr. Sys.	3
Elective	3	Elective (Mathematics)	3
	15	Elective (Technical)	3
			16

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—137.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

**Courses in Engineering Physics.** See course listings of Physics Department in College of Arts and Sciences.

## Department of Industrial Engineering

This department supervises the following degree programs: INDUSTRIAL ENGINEERING, Bachelor of Science in Industrial Engineering, Master of Science in Industrial Engineering, Doctor of Philosophy. The undergraduate degree requirements appear in the accompanying curriculum table. The curriculum is designed to equip the student for professional pursuits in the analysis and design of man-machine work systems. Industrial Engineering students must have a minimum grade-point average of 2.00 in all courses in their major field. Only one D grade will be accepted in a major course.

**Industrial Engineering Curriculum.****FIRST YEAR\***

Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhct.	3	ENG 132, Coll. Rhct.	3
EA&D 135, Engr. Anal. I	3	EGR 136, Engr. Graphics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

15\*\*

15\*\*

**SECOND YEAR**

Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	PHYS 241, Prin. of Physics II	4
PHYS 143, Prin. of Physics I	4	E E 234, Elect. Instr.	3
E E 233, Elec. Sys. Anal.	3	MATH 335, Higher Math. for	
ECO 235, Prin. of Eco.	3	Engrs. & Scits. I	3
CHE 330, Engr. Matl. Sci. or		I E 3311, Prin. of Indus. Engr. I	3
M E 3341, Matis. I	3	MATH 3318, Finite Math. Struct.	3
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

16\*\*

16\*\*

**THIRD YEAR**

Fall		Spring	
I E 3315, Engr. Statistics I	3	I E 3325, Engr. Statistics II	3
I E 417, Engr. Stat. Lab.	1	I E 417, Engr. Stat. Lab.	1
I E 3321, Oper. Research I	3	I E 3331, Work Analys. & Des.	3
C E 233, Statics	3	I E 3351, Manuf. Proc. I	3
M E 3321, Engr. Thermo.	3	C E 332, Dynamics or	
ACCT 231, Indus. Acct. for Engrs.	3	C E 3311, Mech. of Solids	3
		Elective (Humanity)	3

16

16

**SUMMER SESSION**

First Term		Second Term	
I E 3341, Work Syst. Control	3	I E 3334, Engr. Eco. Anal.	3
GOVT 231, Amer. Govt., Org.	3	GOVT. 232, Amer. Govt., Funct.	3

6

6

**FOURTH YEAR**

Fall		Spring	
HIST 231, Hist. of U.S. to 1877	3	I E 4361, Manag. Syst. Anal. & Dsgn.	3
Elective (Humanity)	3	HIST 232, Hist. of U.S. since 1877	3
Elective (Technical)***	9	Elective (Technical)***	6

15

12

Minimum hours required for graduation exclusive of P.E., Band, or Basic ROTC—133.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

\*\*\* At least 12 hours of technical electives from the following courses: I E 335, 4321, 4325, 4333, 4334, 4341, 4351.

**Courses in Industrial Engineering.****FOR UNDERGRADUATES**

311. **Computer Programming Techniques Laboratory (1:0:3).** Prerequisite: I E 321 or concurrent enrollment. Computer programming techniques and methods applied to programming exercises.
321. **Computer Programming Techniques (2:2:0).** Prerequisite: Instructor's consent. Programming techniques for digital and analog computers. Degree credit not given for both this course and EA&D 135.
332. **Industrial Organization and Management (3:3:0).** Prerequisite: Nonmajor student and instructor's consent. Modern manufacturing management. Forms of ownership, financial sources; organization charts; plant location and layout; design of manufacturing processes; use of work measurement in management field; principles of quality, production, and inventory control; wage and salary policies.
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; initiating production control; flow control; block and load control. Forms and communications systems. Value of production control. Linear programming applications to production control.
338. **Elements of Methods Analysis (3:2:3).** Prerequisite: Nonmajor student and instructor's consent. Science and work, the work system, work simplification, operation analysis, forms control and design. Methods improvement and principles of effective work. Survey of work measurement, work sampling, and inventory control. Applications to many areas, such as business concerns, the home, the farm, the hospital, etc.
3311. **Principles of Industrial Engineering (3:3:0).** Prerequisite: MATH 3318 or consent of instructor. Consideration of the organization through systems approach. Management objectives, decision theory, model formulation. Introduction to operation research techniques.
3315. **Engineering Statistics I (3:3:0).** Prerequisite: MATH 232. Descriptive statistics, probability theory, sampling, distributions, point estimation, interval estimation. Introduction to curve fitting.

- 3321. Operations Research I (3:3:0).** Introduction to operations research. Emphasis on linear programming and simulation.
- 3325. Engineering Statistics II (3:3:0).** Prerequisite: I E 3315 or equivalent. Statistical inference, hypothesis testing, elements of analysis of variance, regression analysis. Introduction to statistical decision theory.
- 3331. Work Analysis and Design (3:2:3).** Prerequisite: I E 3315. Principles and techniques of work measurement, methods engineering, work sampling, and predetermined time systems. Basic biotechnology including introduction to functional anatomy, kinesiology; physiological work measurement.
- 3334. Engineering Economic Analysis (3:3:0).** Prerequisite: Junior classification. Evaluation of engineering proposals and technical projects using time value of money. Selections between alternatives, depreciation, corporate income taxes, replacement studies.
- 3341. Work Systems Control (3:3:0).** Production control systems, production planning, forecasting, scheduling, materials and inventory control systems and models, learning curves, critical path methods of PERT and CPM.
- 3351. Manufacturing Processes I (3:2:3).** Prerequisite: C E 330 or M E 3341. Fundamentals of materials and processes for manufacturing including casting, welding, forming, and machining processes; fundamentals of metrology for manufacturing; economics of processing.
- 417. Engineering Statistics Problem Laboratory (1:0:3).** Prerequisite: Parallel registration in I E 3315, 3325. Experimental study of statistical techniques. Problem design and data analysis. May be repeated in different areas.
- 4121. Industrial Engineering Seminar (1:1:0).** Prerequisite: Advanced standing and departmental approval. Individual study of engineering problems of value to the student. May be repeated.
- 4321. Operations Research II (3:3:0).** Prerequisite: I E 3321 and consent of instructor. Queueing theory model development and applications. Mathematical programming techniques. Optimization of probabilistic models.
- 4325. Quality Control and Reliability (3:3:0).** Prerequisite: I E 3325. Control charts, acceptance sampling, rectifying inspection, standard sampling plans. Failure time distribution models, reliability estimation, hazard functions, probability of systems. Reliability, growth, and maintenance.
- 4331. Individual Studies in Industrial Engineering (3:3:0).** Prerequisite: Advanced standing and departmental approval. May be repeated.
- 4332. Special Experimental Problems in Industrial Engineering (3:0:9).** Prerequisite: Advanced standing and departmental approval. May be repeated.
- 4333. Man-Machine Systems (3:2:3).** Prerequisite: Consent of instructor. Human performance in man-machine systems. Includes human sensory, motor, and information processes; man-machine dynamics; and environmental effects on human performance.
- 4334. Facilities Planning and Design (3:3:0).** Prerequisite: Consent of instructor. Modern plant layout and materials handling practices, stressing the importance of interrelationships with management planning, product and process engineering, methods engineering and production control.
- 4341. Management Systems Control (3:3:0).** Prerequisite: Senior standing. Emphasis in application of the various management controls such as budgets, inventory control, material control, production control, manpower control, and cost control.
- 4351. Manufacturing Processes II (3:2:3).** Prerequisite: I-E 3351 and consent of instructor. Analysis of new processes such as electro-chemical machining, electric discharge machining, ultrasonic machining, and others; shape applications, material and cost considerations.
- 4361. Management Systems Analysis and Design (3:3:0).** Prerequisite: Graduating industrial engineering senior. Solving of case studies relating to production, management, and organization in several industries. Emphasis is on utilizing industrial engineering techniques covered in all previous course work.

## FOR GRADUATES

- 512, 513. Seminar (1:1:0 each).** Prerequisite: Graduate standing or instructor's consent. Discussion will concern present research conducted in industrial engineering. Other special topics will also be considered. May be repeated.
- 535. Engineering Controls for Industrial Safety (3:3:0).** Prerequisite: Graduate standing or instructor's consent. 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.
- 5111, 5212, 5213, 5214. Industrial Engineering Case Analysis (1:1:0, 2:2:0).** Prerequisite: Graduate standing or instructor's consent. Special studies and investigations in the application of various industrial engineering techniques.
- 5301. Biotechnology and Human Performance I (3:2:3).** Prerequisite: Graduate standing, consent of instructor. Functional anatomy and physiology of the musculo-skeletal system and its relationship to work design, kinesiology, work physiology, anthropometry applications of biotechnology industrial settings.
- 5302. Biotechnology and Human Performance II (3:2:3).** Prerequisite: Graduate standing or consent of instructor. The study of mechanical and physical environments and their effects on man as well as his performance. These environments include thermal, noise, vibration, and light.
- 5303. Physiological Systems Analysis (3:2:3).** Prerequisite: Graduate standing and consent of instructor. Introduction to biological control systems. Systems in general, transient analysis and frequency analysis of physical systems. The respiratory chemostat, the cardiovascular regulator, and neural modeling.
- 5304. Biomechanics (3:2:3).** Prerequisite: Graduate standing or consent of instructor. Introduction and historical development, theoretical fundamentals for a mechanics of the body. The link system of the body, kinematic aspects of extremity joints.
- 5307. Inventory Systems (3:3:0).** Prerequisite: Graduate standing or instructor's consent. Cost structure of inventory systems. The deterministic systems; dynamic inventory systems; stochastic systems. Inventory systems under deterioration and repairs.
- 5308. Activity Scheduling (3:3:0).** Prerequisite: Graduate standing or instructor's consent. Quantitative methods for scheduling of activities and resources. Activity sequencing

algorithms; PERT-CPM networks. Measure of optimality, analytical and computational methods; optimizing and approximating techniques.

5311. **Principles of Optimization (3:3:0).** Prerequisite: Graduate standing or instructor's consent. Quantitative procedures for optimization search techniques; gradient methods, steepest ascent.
5312. **Queueing Theory (3:3:0).** Prerequisite: Graduate standing or instructor's consent. Waiting lines with deterministic or stochastic demand and service times. Arrival and service time distributions; queue discipline; system state equations; analytical and simulation solutions; applications.
5313. **Network Flows (3:3:0).** Prerequisite: Consent of instructor. Elements of undirected and directed graphs; static flows; cuts; maximal flows; max flow-min cut theorem; feasibility theorems; Hitchcock problem; minimal cost flow problem; dynamic flows; multi-commodity flows.
5314. **Multistage Decision Processes (3:3:0).** Prerequisite: Graduate standing or instructor's consent. Calculus of variations; dynamic programming; markov- renewal programming; markovian decision processes; adaptive control; maximum principle; minimax strategy and multistage decision processes; maximum transforms.
5315. **Non-Linear Programming (3:3:0).** Prerequisite: IE 5311, graduate standing, or instructor's consent. Convexity; Kuhn-Tucker conditions; theory of duality; convex programming; geometric programming.
5316. **Reliability Theory (3:3:0).** Prerequisite: 3 hours of statistics or instructor's consent. Reliability analysis with emphasis on the exponential, Weibull, gamma, log normal and extreme value distributions; reliability of systems, redundancy; maintainability and availability.
5317. **Design of Experiments (3:3:0).** Prerequisite: 6 hours of statistics. Analysis of variance, factorial experiments, randomized blocks, Latin squares, split-plot design, nested designs, confounding systems, fractional replication, multiple correlation, and the general linear model.
5318. **Selected Topics in Advanced Statistics (3:3:0).** Prerequisite: 6 hours of statistics or instructor's consent. Selected topics chosen from such areas as nonparametric statistical methods; sequential analysis; multivariate analysis; etc. May be repeated in different areas.
5319. **Engineering Stochastic Processes (3:3:0).** Prerequisite: 6 hours of statistics. Recurrent events; random walks; markov processes; birth-and-death processes; diffusion processes; branching processes. Normal processes; Weiner processes; spectral properties. Engineering applications of stochastic processes.
- 5321, 5322. **Decision Theory and Management Science (3:3:0 each).** Prerequisite: Graduate standing or instructor's consent. Concepts and principles of decision models; theory and practice of management planning and administrative control; decision theory, cybernetics and management science.
5331. **Theoretical Studies in Advanced Industrial Engineering Topics. (3:3:0).** Prerequisite: Graduate standing and departmental approval. Individual theoretical study of advanced topics selected on the basis of departmental recommendation. May be repeated.
5332. **Experimental Investigation in Advanced Industrial Engineering Topics (3:0:9).** Prerequisite: Graduate standing and departmental approval. Individual experimental study of advanced topics selected on the basis of departmental recommendation. May be repeated.
5341. **Simulation Models for Operations Analysis (3:3:0).** Prerequisite: instructor's consent. Application of simulation techniques to optimization of large scale operations. Production-distribution models; gaming techniques; model construction; validation of simulation models; limitations of simulation techniques.
5351. **Material Removal Theory (3:2:3).** Prerequisite: Graduate standing or instructor's consent. Mechanics of chip formation; theoretical aspects of tool wear and tool life evaluation; machinability; machining economics; cutting fluids and thermal aspects.
5352. **Advanced Manufacturing Engineering (3:2:3).** Prerequisite: Graduate standing or consent of instructor. Analysis and design of manufacturing processes with emphasis on automated production systems; simulation models of production processes; manufacturing research and development.
5361. **Advanced Engineering Economic Analysis (3:3:0).** Prerequisite: Graduate standing and instructor's consent. Continuation of Engineering Economic Analysis including funds flow, utility, price changes, investment, growth, replacement, taxes, capital budgeting and managerial economics.
5362. **Economic Decision Theory (3:3:0).** Prerequisite: Graduate standing and instructor's consent. Sources of information, prediction and judgment, subjective probability bidding policy. Statistical decision theory including utility functions, risk and uncertainty, minimax and Bayes strategy.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.
- 731, 732. **Research (3 each).** May be repeated for credit.
831. **Doctor's Dissertation (3).** Enrollment required at least four times.

## **Courses in Engineering Graphics.**

Engineering graphics courses are required for all engineering students to familiarize them with the graphic language of the engineer.

### **FOR UNDERGRADUATES**

121. **Engineering Graphics I (2:1:3).** 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.
122. **Engineering Graphics II (2:1:3).** Prerequisite: EGR 121. Graphical presentation of data, fundamentals of nomography, advanced space relationships, concepts of surface intersections and developments.



136. **Engineering Graphics (3:1:6).** Introduction to space relationships; principles of size and shape pertinent to engineering, free-hand sketching, orthographics, pictorals, graphical presentation of data, engineering geometry and nomography.

## Department of Mechanical Engineering

This department supervises the following degree programs: **MECHANICAL ENGINEERING, Bachelor of Science in Mechanical Engineering, Master of Science in Mechanical Engineering, Doctor of Philosophy.** The undergraduate curriculum in the table below allows for an emphasis in either materials engineering or in thermal engineering during the senior year.

### Mechanical Engineering Curriculum.

FIRST YEAR*			
Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Anal. I	3	E GR 136, Engr. Graphics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
15**		15**	
SECOND YEAR			
Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	MATH 335, Higher Math. for Engrs. & Scits. I	3
PHYS 143, Prin. of Physics I	4	PHYS 241, Prin. of Physics II	4
E E 233, Elect. Sys. Anal.	3	E E 234, Electronic Instr.	3
M E 3314, Mechanisms	3	C E 233, Statics	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
16**		16**	
THIRD YEAR			
Fall		Spring	
C E 332, Dynamics	3	M E 3315, Stress Analysis	3
M E 3321, Engr. Thermo. I	3	M E 3318, Mech. Engr. Instr. or	
M E 3341, Materials I	3	M E 3316, Mech. Response Th.	3
M E 3316, Mech. Response Th. or		M E 3342, Materials II	3
M E 3318, Mech. Engr. Inst.	3	Elective (Humanity)	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
15		15	
SUMMER SESSION			
First Term		Second Term	
M E 4312, Mech. Engr. Lab. I	3	M E 4313, Mech. Engr. Lab. II	3
M E 4335, Design I	3	M E 4336, Design II	3
6		6	
FOURTH YEAR			
Fall		Spring	
M E 4314, Fluid Dynamics	3	M E 4315, Heat & Mass Transfer or	
M E 4333, Thermal Systems I	3	M E 4344, Thermal Transformations in solids	3
M E 4316, Dynamics	3	M E 4331, Special Problems	3
M E 4341, Materials III	3	M E 4334, Thermal Sys. II or	
M E 4342, Metal Physics or		M E 4346, X-Ray Metal.	3
Elective	3	M E 4321, Engr. Thermo. II or	
		M.E. 4345, Metal. Rate React.	3
15		Elective	3
		15	

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—134.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

### Courses in Mechanical Engineering.

#### FOR UNDERGRADUATES

3314. **Mechanisms (3:3:0).** Corequisite: MATH 235. Kinematic analysis and synthesis of cams, gears, linkages.
3315. **Stress Analysis (3:3:0).** Prerequisite: C E 233, MATH 335. Elastic behavior in tension, torsion, bending; stability, plane strain and plane stress.
3316. **Mechanical Response Theory (3:3:0).** Prerequisite: MATH 335. A unified introductory treatment of analytical and numerical solution techniques for mechanical systems.
3318. **Mechanical Engineering Instrumentation (3:2:3).** Corequisite: M E 3321. Calibration techniques and measurements with electronic, optical, and mechanical instrumentation.
3321. **Engineering Thermodynamics I (3:3:0).** Prerequisite: PHYS 241, MATH 335. Concepts of thermodynamics, properties, irreversibility, applications to systems.
3341. **Materials I (3:3:0).** Corequisite: M E 3321. Fundamental thermodynamic and chemical nature of the structure and properties of materials.

3342. **Materials II** (3:2:3). Prerequisite: M E 3341. Mechanical properties and behavior of engineering materials based on their metallurgical constitution.
4121. **Mechanical Engineering Seminar** (1:1:0). Prerequisite: Advanced standing and approval of departmental adviser. Individual study of engineering problems. May be repeated for credit in different areas.
- 4312, 4313. **Mechanical Engineering Laboratory I, II** (3:2:3 each). Prerequisite: M E 3318. Experimental and developmental testing of basic mechanical equipment.
4314. **Fluid Dynamics** (3:3:0). Prerequisite: M E 3321. Basic fluid and fluid flow concepts, fluid resistance, compressible flow, and hydrodynamic theory.
4315. **Heat and Mass Transfer** (3:3:0). Prerequisite: M E 3321. Heat transfer by conduction, convection, and radiation. Mass transfer in liquids, vapors, and gases.
4316. **Dynamics** (3:3:0). Prerequisite: MATH 335, C E 332. Newtonian dynamics of rigid bodies, Lagrange's equations, theory of small vibrations.
4321. **Engineering Thermodynamics II** (3:3:0). Prerequisite: M E 3321, MATH 335. Kinetic theory, basic chemical thermodynamics, non-equilibrium thermodynamics, introduction to statistical mechanics.
4331. **Special Problems in Mechanical Engineering** (3:3:0). Prerequisite: Advanced undergraduate standing. Individual study in advanced engineering areas. May be repeated for credit in different areas.
4332. **Special Experimental Problems in Mechanical Engineering** (3:0:9). Prerequisite: Advanced undergraduate standing. Individual experimental study in advanced engineering areas. May be repeated for credit in different areas.
4333. **Thermal Systems I** (3:3:0). Prerequisite: M E 3321. Analysis of thermal power and environmental system components; steady state behavior of such systems.
4334. **Thermal Systems II** (3:3:0). Prerequisite: M E 4333. Analysis and simulation of control of thermal power and environmental systems.
4335. **Design I** (3:3:0). Prerequisite: M E 3314, 3315. Analysis of stresses and deformations in and functions of machine elements.
4336. **Design II** (3:3:0). Prerequisite: M E 4335. Product analysis, design, development, and evaluation.
4341. **Materials III** (3:3:0). Prerequisite: M E 3341. Methods of forming and fabrication, their effects on materials, and the suitability of materials for various processes.
4342. **Metal Physics** (3:3:0). Prerequisite: M E 3321. Heterogeneous equilibria, molecular structures, free energy, thermochemistry, solutions.
4344. **Thermal Transformations in Solids** (3:2:3). Prerequisite: M E 3342. Applications of the principles of modifying the mechanical properties of metal alloys by thermally induced transformations.
4345. **Metallurgical Rate Reactions** (3:3:0). Prerequisite: M E 3342. Kinetics of heterogeneous reactions; diffusion, corrosion, oxidation, and creep.
4346. **X-Ray Metallography** (3:2:3). Prerequisite: M E 3342. Fundamentals of X-ray diffraction and emission methods applied to the study of the structure of metals.

## FOR GRADUATES

5121. **Graduate Seminar** (1:1:0). May be repeated for credit in different areas.
5311. **Biothermodynamics** (3:3:0).
5314. **Stress Analysis I** (3:2:3). Prerequisite: MATH 335, M E 3315. Theory and application of photoelasticity to static and dynamic stress analysis. Spring.
5316. **Mechanical Vibrations I** (3:3:0). Prerequisite: MATH 335, C E 332. Free and forced vibrations of linear and non-linear lumped parameter systems. Fall.
5317. **Mechanical Vibrations II** (3:3:0). Prerequisite: MATH 335, C E 332. Free and forced vibration of continuous, elastic structures. Spring.
5321. **Thermodynamics I** (3:3:0). Prerequisite: M E 4321. Quantum mechanics, information theory, intermolecular forces. Spring.
5322. **Thermodynamics II** (3:3:0). Prerequisite: M E 5323. Microscopic-scale analysis of non-equilibrium phenomena, irreversible thermodynamics. Not offered 1968-69.
5323. **Thermodynamics III** (3:3:0). Prerequisite: M E 4321. Non-equilibrium states and irreversible processes; description of systems in non-equilibrium states and analyses of transient and steady irreversible processes from the macroscopic viewpoint. Fall.
5324. **Heat Transmission I** (3:3:0). Prerequisite: M E 4314 or 4315. The fundamental principles of heat transmission by conduction; boundary value problems, separation; transform, integral, and numerical methods. Fall.
5325. **Heat Transmission II** (3:3:0). Prerequisite: M E 4314 or 4315. Fundamental principles of heat transmission by convection; theoretical and empirical methods of analysis. Spring.
5326. **Heat Transmission III** (3:3:0). Prerequisite: M E 4315. Fundamental principles of heat transmission by radiation; grey surfaces; network methods, absorbing media. Summer.
5327. **Aerodynamics I** (3:3:0). Prerequisite: M E 4314. Gas dynamics, external compressible flow, wave phenomena, potential theory. Spring.
5328. **Aerodynamics II** (3:3:0). Prerequisite: M E 4314. Boundary layer theory, viscous and turbulent flows, separation, thermal boundary layers. Fall.
5329. **Aerodynamics III** (3:3:0). Prerequisite: M E 5327 or 5328. Non-equilibrium gas dynamics, boundary layer interactions, aerodynamic heating, aerothermochemistry. Not offered 1968-69.
5331. **Theoretical Studies in Advanced Topics** (3:3:0). Prerequisite: Graduate standing. Individual theoretical study of advanced topics selected on the basis of the departmental adviser's recommendation. May be repeated for credit in different areas.
5332. **Experimental Studies in Advanced Topics** (3:1:6). Prerequisite: Graduate standing. Individual experimental study of advanced topics selected on the basis of the departmental adviser's recommendation. May be repeated for credit in different areas.
5333. **Design I** (3:2:3). Prerequisite: M E 5325. Synthesis of thermal systems, design and off-design characteristics, transient behavior of thermal systems. Spring.
5341. **Metallurgy I** (3:3:0). Prerequisite: M E 3341. Dislocations in metals; diffusion; phase transformations and precipitation; thermal, electronic, and structural properties of metals. Fall.
5342. **Metallurgy II** (3:3:0). Prerequisite: M E 3341. Corrosion and corrosion control, behavior of metals and alloys at elevated temperatures, field applications. Fall.
5343. **Thermodynamics of Solids** (3:3:0). Prerequisite: M E 3341. Physical chemistry and chemical thermodynamics of metals and metal alloys; utilization of metals. Spring.

5351. **Boiling Heat Transfer** (3:3:0). Prerequisite: M E 5324 or 5325. Bubble dynamics; nucleate, transitional and film boiling; critical heat fluxes, flow in boiling systems. Spring.
5361. **Control Systems Engineering** (3:3:0). Prerequisite: M E 4334 or equivalent. Basic techniques of feedback control, adaptive control, static and dynamic optimization. Summer.
630. **Master's Report** (3).
631. **Master's Thesis** (3). Enrollment required at least twice.
- 731, 732. **Research** (3 each). May be repeated for credit.
831. **Doctor's Dissertation** (3). Enrollment required at least four times.

## Department of Petroleum Engineering

This department supervises the following degree program: **PETROLEUM ENGINEERING, Bachelor of Science in Petroleum Engineering**. The curriculum includes basic engineering courses followed by specialized work essential to the practice of the profession of petroleum engineering. The curriculum appears in the table below.

### Petroleum Engineering Curriculum.

FIRST YEAR*			
Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EA&D 135, Engr. Anal. I	3	EGR 136, Engr. Graphics	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	
15**		15**	
SECOND YEAR			
Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	PHYS 241, Prin. of Physics II	4
PHYS 143, Prin. of Physics I	4	GEOL 144, Hist. Geology	4
GEOL 143, Phys. Geology	4	MATH 335, Higher Math. for	
GOVT 231, Amer. Govt., Org.	3	Engrs. & Scis. I	3
CHE 330, Eng. Matl. Sci.	3	CE 233, Statics	3
P.E., Band, or Basic ROTC		GOVT 232, Amer. Govt., Funct.	3
		P.E., Band, or Basic ROTC	
17**		17**	
SUMMER SESSION			
First Term		Second Term	
CE 332, Dynamics	3	CE 3311, Mech. of Solids	3
	3	ME 3321, Engr. Thermo.	3
		6	
THIRD YEAR			
Fall		Spring	
PETR 331, Petroleum Development	3	PETR 333, Petrol. Prod. Meth.	3
PETR 322, Rot. Drill. Fluids	2	PETR 320, Well Logging Meth.	2
EE 233, Elect. Sys. Anal.	3	PETR 314, Production Lab.	1
CHEM 343, Intro. Phys. Chem.	4	EE 234, Electronic Instr.	3
MATH 336, Higher Math. for		CE 3351, Mech. of Fluids	3
Engrs. & Scis. II	3	CE 3151, Mech. of Fluids Lab.	1
		Elective (Humanity)	3
15		16	
FOURTH YEAR			
Fall		Spring	
PETR 4121, Petrol. Engr. Seminar	1	PETR 4121, Petrol. Engr. Seminar	1
PETR 433, Reservoir Engr.	3	PETR 435, Adv. Nat. Gas Engr.	3
PETR 434, Nat. Gas Engr.	3	PETR 413, Nat. Gas Lab.	1
PETR 416, Reservoir Engr. Lab.	1	PETR 436, Adv. Res. Engr.	3
GEOL 332, Struct. Geology	3	PETR 420, Petrol. Prop. Eval. & Mgt.	2
HIST 231, Hist. of U.S. to 1877	3	BLAW 3313, Oil & Gas Law	3
Elective	3	HIST 232, Hist. of U.S. since 1877	3
17		16	

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—137.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

### Courses in Petroleum Engineering.

#### FOR UNDERGRADUATES

314. **Production Laboratory** (1:0:3). Prerequisite: Enrollment in PETR 333. Experiments in reservoir characteristics, core analyses, oil dehydration, corrosion, lease operation, and pumping well characteristics.
320. **Well Logging Methods** (2:2:0). Prerequisite: PETR 331 and PHYS 241. Well-logging theory and techniques as applied to quantitative formation analysis. Field examples and problems.

321. **Phase Behavior (2:2:0).** Prerequisite: PHYS 241 and enrollment in M E 3321. Phase behavior of multiple-component hydrocarbon systems. Applications.
322. **Rotary Drilling Fluids (2:1:3).** Prerequisite: Enrollment in PETR 331. Characteristics of drilling fluid. Control and alteration of fluid characteristics. Effects on drilling process.
330. **Introduction to Petroleum Industry (3:3:0).** Prerequisite: Junior standing. A general study of petroleum production technology for nonmajors.
331. **Petroleum Development Methods (3:3:0).** Prerequisite: Junior standing. Petroleum and basic rock properties. Rotary drilling, casing, cementing and oil well completion practices.
333. **Petroleum Production Methods (3:3:0).** Prerequisite: PETR 331. Oil well stimulation practices. Producing practices to include flowing, gas lift, hydraulic and sucker rod pumping systems.
413. **Natural Gas Laboratory (1:0:3).** Prerequisite: Registration in PETR 434 or 435. Natural gas analysis and testing; flow-metering devices; regulation and control devices; and natural gasoline techniques.
416. **Reservoir Engineering Laboratory (1:0:3).** Prerequisite: PETR 433. Experimental work in fluid flow through porous media relating basic parameters to the reservoir system.
420. **Petroleum Property Evaluation and Management (2:1:3).** Prerequisite: PETR 433. Economic, physical and analytical evaluation of hydrocarbon producing properties, emphasizing relative worth of investments based on engineering judgement, using actual oil properties.
430. **Special Natural Gas and Production Problems (3:3:0).** Prerequisite: PETR 333. Production problems including gas-oil ratio control, water control, decline curves, formation damage due to well completion, and well workovers.
433. **Reservoir Engineering (3:3:0).** Prerequisite: PETR 333. Fluid flow in porous media including unsteady-state flow; reservoir energy and producing mechanisms; application of material balance in reservoir performance calculations.
434. **Natural Gas Engineering (3:3:0).** Prerequisite: PETR 333. The properties and behavior of hydrocarbons and related systems, and the associated thermodynamics.
435. **Advanced Natural Gas Engineering (3:3:0).** Prerequisite: PETR 434. The production of natural gas and condensate reservoirs; processing, transportation, distribution, and measurement of natural gas and its derivatives.
436. **Advanced Reservoir Engineering (3:3:0).** Prerequisite: PETR 433. Frontal-advance theory and application; mechanics of secondary recovery processes; application to reservoir performance and analysis.
4121. **Petroleum Engineering Seminar (1:1:0).** Prerequisite: Advanced standing. Individual study of engineering problems of special interest and value to the student. May be repeated for credit.
4331. **Special Problems in Petroleum Engineering (3:3:0).** Prerequisite: Advanced standing. Individual studies in advanced engineering areas of special interests. May be repeated for credit.
4332. **Special Experimental Problems in Petroleum Engineering (3:0:9).** Prerequisite: Advanced standing. Individual experimental studies in current problems in advanced engineering technology of special interest. May be repeated for credit.

#### FOR GRADUATES

5121. **Graduate Seminar (1:1:0).** Required for petroleum engineering graduate students. May be repeated for credit.
5331. **Special Problems in Petroleum Engineering (3:3:0).** Prerequisite: Graduate standing and approval of departmental adviser. Individual theoretical study of selected advanced topics. May be repeated for credit in different areas.
5332. **Experimental Studies in Petroleum Engineering (3:1:6).** Prerequisite: Graduate standing and approval of departmental adviser. Individual experimental study of selected advanced topics. May be repeated for credit in different areas.
5343. **Advanced Studies in Fluid Flow Through Porous Media (3:3:0).** Prerequisite: Graduate standing. Miscible and immiscible flow; mathematical theory of flow; transient behavior; moving boundary problems; model theory; flow with change in phase.
5353. **Advanced Studies in Reservoir Recovery Processes (3:3:0).** Prerequisite: Graduate standing. Recovery process theory; miscible recovery systems; immiscible recovery systems; thermal and other recovery systems.

### Department of Textile Engineering

This department supervises the following degree programs: **TEXTILE ENGINEERING, Bachelor of Science in Textile Engineering**; **TEXTILE TECHNOLOGY AND MANAGEMENT, Bachelor of Science in Textile Technology and Management**. Degree requirements appear in the accompanying curriculum tables.

The textile engineering curriculum is recommended for those students desiring advanced study or careers in research, technical design, and technical management, while the textile technology and management curriculum is designed to aid in striking a balance between technological and business management sectors.

Sharing quarters with the Department of Textile Engineering is the Textile Research Center. The liaison between the department and the center is very close, with many staff members holding joint appointments in both, and facilities of the center used for laboratory training in courses embracing the most fundamental studies in fibers, textile production, finishing, testing and quality control.

**Textile Engineering Curriculum.****FIRST YEAR\***

Fall		Spring	
MATH 151, Anal. Geom. & Calc. I	5	MATH 152, Anal. Geom. & Calc. II	5
ENG 131, Coll. Rhet.	3	ENG 132, Coll. Rhet.	3
EGR 136, Engr. Graphics	3	EA&D 135, Engr. Anal. I	3
CHEM 141, Gen. Chem.	4	CHEM 142, Gen. Chem.	4
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

15\*\*

15\*\*

**SECOND YEAR**

Fall		Spring	
MATH 235, Anal. Geom. & Calc. III	3	PHYS 241, Prin. of Physics II	4
PHYS 143, Prin. of Physics I	4	EE 234, Electronic Instr.	3
EE 233, Elect. Sys. Anal.	4	MATH 335, Higher Math. for	
TE 231, Fiber Tech. & Micro. I	3	Engrs. & Scis. I	3
MATH 3318, Finite Math. Struct.	3	TE 232, Fiber Tech.	
P.E., Band, or Basic ROTC		& Micro. II	3
		CE 233, Statics	3
		P.E., Band, or Basic ROTC	

16\*\*

16\*\*

**SUMMER SESSION**

First Term		Second Term	
IE 3311, Prin. of Indus. Engr. I	3	IE 3321, Operations Research I	3
IE 3315, Engr. Statistics I	3	CH E 330, Engr. Matl. Science	3
	6		6

**THIRD YEAR**

Fall		Spring	
TE 335, Prin. of Fabric Des., Form & Anal. I	3	TE 336, Prin. of Fabric Des., Form & Anal. II	3
TE 331, Prin. of Fiber Proc. I	3	TE 332, Prin. of Fiber Proc. II	3
CE 332, Dynamics	3	Elective (Humanity)	3
ME 3321, Engr. Thermodynamics	3	CE 3311, Mech. of Solids	3
IE 3331, Work Anal. & Des.	3	IE 3334, Engr. Eco. Anal.	3
	15		15

**FOURTH YEAR**

Fall		Spring	
TE 433, Engr. Prin. of Text. Fin. I	3	TE 434, Engr. Prin. of Text. Fin. II	3
IE 4334, Fac. Planning & Des.	3	TE 431, Text. Test. & Qual. Contr.	3
HIST 231, Hist. of U.S. to 1877	3	HIST 232, Hist. of U.S. since 1877	3
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
Elective (Technical)	3	ME 4315, Heat & Mass Transfer	3
	15	TE 4121, Text. Engr. Seminar	1
			16

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—135.

\* See Alternate Freshman Year.

\*\* Exclusive of P.E., Band, or Basic ROTC.

**Textile Technology and Management Curriculum.****FIRST YEAR**

Fall		Spring	
MATH 131, Trigonometry	3	PHYS 141, Gen. Physics	4
MATH 133, Coll. Algebra	3	MKT 246, Intro. to Bus. Stat.	4
EGR 136, Engr. Graphics	3	ENG 132, Coll. Rhet.	3
ENG 131, Coll. Rhet.	3	CHEM 142, Gen. Chem.	4
CHEM 141, Gen. Chem.	4	P.E., Band, or Basic ROTC	

16\*

15\*

**SECOND YEAR**

Fall		Spring	
PHYS 142, Gen. Phys.	4	ECO 235, Prin. of Eco.	3
TE 231, Fiber Tech. & Micro. I	3	TE 232, Fiber Tech. & Micro. II	3
ACCT 234, Elem. Acct. I	3	ACCT 235, Elem. Acct. II	3
ENG 233, Tech. Writing	3	CHEM 341, Intro. Org. Chem.	4
GOVT 231, Amer. Govt., Org.	3	GOVT 232, Amer. Govt., Funct.	3
P.E., Band, or Basic ROTC		P.E., Band, or Basic ROTC	

16\*

16\*

**THIRD YEAR**

Fall		Spring	
TE 331, Prin. of Fiber Proc. I	3	IE 321, Computer Prog. Tech.	2
TE 335, Prin. of Fabric Des., Form. & Anal. I	3	TE 332, Prin. of Fiber Proc. II	3
MGT 331, Indus. Mgt.	3	TE 336, Prin. of Fabric Des., Form. & Anal. II	3
MKT 332, Prin. of Mkt.	3	MGT 4331, Collective Bargaining	3
HIST 231, Hist. of U.S. to 1877	3	G SP 338, Bus. & Prof. Speech	3
IE 338, Elem. of Meth. Anal.	3	HIST 232, Hist. of U.S. since 1877	3

18

17



## FOURTH YEAR

Fall		Spring	
TE 4331, Spec. Prob. in Text. Engr.	3	TE 431, Text. Test. & Qual. Contr.	3
TE 433, Engr. Prin. of Text. Fin. I	3	TE 434, Engr. Prin. of Text. Fin. II	3
BLAW 338, Bus. Law I	3	TE 4332, Spec. Exp. Prob. in Text. Engr.	3
MGT 435, Employee Supervision	3	MGT 431, Job Eval. & Wage Admin.	3
MKT 439, Sales Mgt.	3	**Elective	3
Elective	3		
18		15	

Minimum hours required for graduation, exclusive of P.E., Band, or Basic ROTC—131.

\* Exclusive of P.E., Band, or Basic ROTC.

\*\* Junior or senior level to be selected from Business Law, Management, Marketing, or Industrial Engineering.

## Courses in Textile Engineering.

## FOR UNDERGRADUATES

230. **Applied Textiles (3:3:0).** An introductory study of textile fibers, yarn manufacturing, fabric design, analysis and formation and textile finishing. Not for textile engineers.
231. **Fiber Technology and Microscopy I (3:2:3).** Prerequisite: CHEM 142. Physics and chemistry of polymers; growth marketing and properties of natural fibers; microscopic examination of fibers.
232. **Fiber Technology and Microscopy II (3:2:3).** Prerequisite: TE 231. Polymerization techniques; production and properties of man-made fibers; cross sectioning and fiber identification.
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.
335. **Principles of Fabric Formation, Design, and Analysis I (3:1:6).** Prerequisite: TE 232. Theory and practice in designing, forming and analyzing plain and fancy fabrics. Laboratory study and engineering analysis of fabric forming mechanisms.
336. **Principles of Fabric Formation, Design, and Analysis II (3:1:6).** Prerequisite: TE 335. Theory and practice in designing, forming, and analyzing complicated fabric structures for special applications and engineering analysis of mechanisms for fabricating such structures.
431. **Textile Testing and Quality Control (3:2:3).** Instrumentation and test procedures for process control and product performance. Rigorous statistical treatment of test data and preparation of control charts.
433. **Engineering Principles of Textile Finishing I (3:2:3).** Prerequisite: TE 232, 336. Water treatment and waste disposal; textile drying; theory and practice of operations prior to dyeing.
434. **Engineering Principles of Textile Finishing II (3:2:3).** Prerequisite: TE 433. Elementary theory of color measurement; theory and practice in dyeing, printing, and finishing procedures.
4121. **Textile Engineering Seminar (1:1:0).** Prerequisite: Approval of department chairman. Individual study of engineering problems of special interest. May be repeated for credit.
4331. **Special Problems in Textile Engineering (3:3:0).** Prerequisite: Approval of department chairman. 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: Approval of department chairman. Individual experimental studies in current problems in advanced engineering technology. May be repeated for credit.

## FOR GRADUATES

- 531, 532. **Theory of Color Measurement I and II (3:2:3 each).** Prerequisite: TE 434 or permission of department chairman. Theory of color perception; mathematics of color measurement; theory and practice of color matching.
- 533, 534. **Chemical Analysis of Textile Materials I and II (3:2:3 each).** Prerequisite: TE 232, CHEM 242, 336. Identification of textile fibers and finishes, using microscopic, spectrographic and chromatographic techniques, as well as differential thermal analysis; quantitative analysis of fiber blends.
5331. **Special Problems in Textile Engineering (3:3:0).** Prerequisite: Graduate standing and approval of department chairman. Individual studies in advanced textile engineering or textile finishing.
5332. **Experimental Studies in Textile Engineering (3:0:9).** Prerequisite: Graduate standing and approval of department chairman. Individual laboratory studies in advanced textile engineering or textile finishing.

## College of Home Economics

The College of Home Economics was one of the four initial divisions of the University when it opened in 1925. Since then this college 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.

The objectives of the College 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 college 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 College of Home Economics designs its offerings to serve both men and women in three groups: students majoring in home economics preparing for a career in that field; students registered in other colleges of the University who wish training either for homemaking or for supplementing their degree plans; and persons in the area served by the University who wish to take refresher courses in home economics or to work toward an advanced degree.

**Course Load.** Normally, students in the College 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 College of Home Economics at Texas Tech University is its faculty-student advisory program.

**Aid to Students.** A number of student 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 chairman of her department, or the dean.

**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 four areas of home economics: clothing and textiles, food and nutrition, child development and family relations, and home management, as well as a beginning course in art in the College of Arts and Sciences. The required freshman course, Personal Development (CD 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, therefore, each student should plan carefully the scheduling of courses needed to fulfill the degree requirements in order to determine her expected date of graduation.

**General Home Economics.** The degree program in general home economics is designed for those students who wish a broad background of preparation for homemaking and related occupations but who do not wish to specialize in a professional area of home economics or of art. The general home economics program provides two options for a Bachelor of Science degree in home economics.

**A. Undifferentiated Option**

This program is widespread over all areas of home economics and the humanities. It is usually referred to as the general option.

**B. Interior Design Option**

This nonprofessional program in the College of Home Economics is provided for students who wish extra study in interior design in the College of Arts and Sciences in addition to the broad background in home economics and humanities provided in the undifferentiated option.

A professional major in interior design is available under the Bachelor of Fine Arts degree in the Department of Art in the College of Arts and Sciences.

**Graduate Study.** The departments in the College of Home Economics participate extensively in the master's degree programs offered by Texas Tech University. For details see the *Catalog of the Graduate School*.

**General Degree Requirements of the College of Home Economics.** The College of Home Economics offers work leading to the degree of Bachelor of Science in Home Economics with a major in 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. Included in the general major is an option in interior design for students who wish an emphasis in this area. All undergraduate degree programs in home economics lead to the Bachelor of Science degree. The general requirements of the College of Home Economics for all programs are summarized in the three groups below. In the following section the special requirements for each program are indicated.

- I. Foundation courses in humanities and social and natural sciences, including the uniform requirements of the University (50 semester hours); ART 132 or 136; Social and Natural Sciences, 19 semester hours including SOC 230 or 233 and ZOOL 243 or BIOL 142. Courses which may satisfy science requirements are courses in Anthropology, Biology, Chemistry, Economics, Entomology, Geography, Geology, HMG 233, Horticulture, Mathematics, Philosophy, Physics, Psychology, and Sociology (except SOC 235).
- II. Home Economics core courses to provide basic concepts in personal and family living (17 semester hours).
- III. Additional required and elective courses as specified in major degree programs to complete a total of a minimum of 127 semester hours for graduation—these degree programs vary in requirements from 127 semester hours to 140 semester hours for some double majors.

Adjustments in degree requirements are made on an individual basis for mature students and for men students majoring in home economics.

The various options meeting degree requirements are described by each department, followed by charts of specific course requirements.

**Interdisciplinary Program.** Students majoring in the Department of Management may qualify for a restaurant and institutional management option by taking 12 to 18 semester hours in food and nutrition courses in the College of Home Economics. The specific courses are selected in consultation with the Chairman of the Department of Food and Nutrition.

**Prenursing.** While Texas Tech University does not offer courses in nursing arts, it does provide the regular college-level courses required in all schools of nursing and which can be taken before enrollment in a specific school of nursing.

Prenursing students who come to Texas Tech University for some or all of their academic courses enroll in the College of Home Economics where an experienced counselor assists each student in the selection of courses each semester.

In general, two routes are open to prospective nursing students who come to Texas Tech University.

One, the student may take one or two years of academic college courses prior to transferring to a college or university offering a Bachelor of Science degree in nursing, or

Two, the student may prepare to qualify for admission to one of the two-year diploma programs of nursing in a hospital school of nursing.

## Department of Clothing and Textiles

This department supervises the following degree programs: *CLOTHING AND TEXTILES, Bachelor of Science in Home Economics* and *Master of Science in Home Economics*. Instruction is designed to prepare the graduate for a career in one of the many aspects of the clothing and textiles industry or for teaching clothing and textiles. In each of the programs, emphasis is placed on selection and purchase of clothing and textiles for the individual and for the home. One of four options may be chosen. A student in another college may have a minor in this department by completing 18 hours selected in conference with the department chairman.

### Clothing and Textiles Options.

#### A. Fashion Design Option

This curriculum is planned to help students develop originality and creativity in fashion design in preparation for careers in fashion.

#### B. Merchandising Option

The merchandising program combines the fashion work of the department with courses in the College 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 design or the merchandising option may have the advantage of an additional training period with the employing firm.

#### C. Textile Science Option

Textile science prepares the individual to enter scientific fields of clothing and textiles, such as research, 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. (Graduate study is needed for advancement in research.)

#### D. 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 for teaching or for fashion work in either professional or commercial areas.

### Clothing and Textiles Curriculum.

Fashion Design Option	Merchandising Option	Textile Science Option
I. FOUNDATION CORE		
ART 132 ENG 131, 132, 231, 232 or 233 GOVT 231, 232 HIST *231, 232 P.E., Band—4 semesters Social and Natural Sciences —19 hours including SOC 230 or 233 ZOOL 243 or BIOL 142  50 hours	ART 136 ENG 131, 132, 231, 232 or 233 GOVT 231, 232 HIST 231, 232* P.E., Band—4 semesters Social and Natural Sciences —19 hours including SOC 230 or 233 ZOOL 243 or BIOL 142 ECO 235  50 hours	Same as for Merchandising Option, but Social and Natural Sciences of 27 hours must include: CHEM 141, 142, 341 PHYS 141, 142 SOC 231 or 233 ZOOL 243 or BIOL 142  58 hours
II. HOME ECONOMICS CORE		
CD 112, 131 C&T 130 F&N 131 HMG 131 HEED 411, 433  17 hours	Same as for Fashion Design Option  17 hours	Same as for Fashion Design Option  17 hours

## III. MAJOR COURSES

C&T 231, 233, 237, 238, 332, 433, 434, 436	C&T 231, 233, 237, 332, 334 433 or 438, 434	C&T 231, 233, 331, 332, 431, 438, plus elective
24 hours	24 hours	21 hours

## IV. ADDITIONAL REQUIRED COURSES

ART 120, 121, 130, 131, 142, 232 Child Dev. elective or Fam. Rel. elective F&N 231 or 331 Home Mgt. elective	ACCT 234 Child Dev. elective or Fam. Rel. elective F&N 231 or 331 Home Mgt. elective MKT 332, 335 MKT 4315 or 334 MATH 135 or Math elective	ART 130 Child Dev. elective or Fam. Rel. elective F&N 231 or 331 Home Mgt. elective MATH 131 or 1315 MATH 151
26 hours	27 hours	20 hours

## V. ELECTIVES TO COMPLETE 127 HOURS MINIMUM

Electives, 10 hours (Recommended electives: Foreign language, Speech, Journalism)	Electives, 9 hours (Recommended electives: Speech; ART 130)	Electives 11 hours (Recommended electives: G SP 239 or 338; ENG 233; ECO 235)
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\* HIST 330 is acceptable in lieu of HIST 231 or 232.

## Courses in Clothing and Textiles.

## FOR UNDERGRADUATES

130. Apparel Selection (3:2:2). Wardrobe analysis, care of clothing, and consumer buying including some emphasis on textiles and the socio-psychological aspects of apparel.
132. Apparel and Textile Selection (3:3:0). For non-home economics majors. Selection in relation to the individual, to fashion, and to family needs.
228. Supplementary Construction (2:0:4). Additional experiences in application of principles and techniques of clothing construction.
231. Textiles for the Consumer (3:3:0). Selection, use, and care of textiles in relation to fiber composition, yarn and fabric structure, color and finish.
233. Introductory Clothing and Construction (3:1:4).
237. Apparel Design (3:1:4).
238. Rendering for Apparel Design (3:1:4). Prerequisite: ART 132 or 136, 120, 121; C&T 237. Drawing and rendering with emphasis on application of art principles.
331. Textile Fabrics: Properties and Performance (3:1:4). Prerequisite: C&T 231 and CHEM 133, 134 or 141, 142. Physical and chemical properties of fibers, dyeing and finishing, fabric performance.
332. Dressmaker Tailoring and Design (3:1:4). Prerequisite: C&T 130, 233.
334. Family Clothing (3:3:0). Basic philosophy of dress in the American culture; wardrobe planning and buying procedures for family members with emphasis on children's clothing.
411. Special Problems in Clothing and Textiles (1:0:3). Prerequisite: C&T 332. May be repeated for 2 or 3 hours of credit.
431. Textile Testing and Analysis (3:1:4). Prerequisite: C&T 231, 331, and CHEM 141, 142.
432. Dress Design Through Draping (3:1:4). Prerequisite: C&T 332, 237.
433. History and Philosophy of Dress (3:3:0).
434. Fashion Fundamentals (3:3:0). Analysis of fashion relative to social, psychological and economic change. Significance of fashion to merchandising.
436. Flat Pattern Design (3:1:4). Prerequisite: C&T 237, 332.
438. Historic Textiles (3:3:0).
439. Textile and Clothing Economics (3:3:0). Study of economics of textile and clothing production and the world-wide market, with emphasis on the United States textile industry.
4330. Problems in Upholstery (3:1:4). Consumer problems in upholstered furniture; finishing or refinishing chair frame and upholstering; emphasis on preparation for teaching para-professionals at the secondary level.
4331. Draperies and Other Household Textiles (3:2:2). Consumer problems in household textiles; selection and construction of draperies.
4370. Communication Media in Clothing (3:3:0). Problems in communication through display, demonstrations, and related media for careers.

## FOR GRADUATES

511. Advanced Clothing Problems (1:0:3). May be repeated for credit.
518. Seminar in Clothing and Textiles (1:1:0). May be repeated for credit.
530. Clothing and Human Behavior (3:3:0). Survey of sociopsychological theories related to human behavior, clothing practices, and consumer decisions.
531. Special Problems in Clothing and Textiles (3:1:4). May be repeated for credit.
532. New Developments in Textiles (3:3:0). Trends and developments in textile fibers, fabrics, and finishes.
536. Advanced Clothing Design (3:1:4). Prerequisite: C&T 436 or equivalent. Flat pattern techniques applied to advanced clothing design problems, including clothing for the physically handicapped.
539. Economics of Textile and Clothing Industries (3:3:0). Prerequisite: C&T 439 or 3 semester hours in economics. Factors affecting production and consumption of textiles and clothing in economically developed and underdeveloped areas of the world.
5302. Cultural Bases of Clothing (3:3:0). Influence of ethnic backgrounds of people of different socioeconomic levels in the selection and consumption of clothing.
5303. Readings in Clothing and Textiles (3:3:0). Survey of current literature in clothing and textiles including implications for the future.
5304. Methods for Teaching Paraprofessionals in Clothing and Textiles (3:3:0).



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 elementary grade; special attention to consumer problems for the personal use of class members.
5340. **Tailoring Problems (3:1:4).** Evaluation and application of advanced tailoring concepts.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

## Department of Food and Nutrition

This department supervises the following degree programs: **FOOD AND NUTRITION, Bachelor of Science in Home Economics, Master of Science in Home Economics.**

These programs emphasize the increasingly important role of food and nutrition in the personal lives of people as well as in the operation of institutions of many types, such as hospitals, schools and colleges, industries, and military establishments. The aim of this department is to add to the liberal education of students through a knowledge of food and nutrition and to provide students with a sound foundation for professional careers in these areas.

**Advanced Standing.** The Department of Food and Nutrition will permit students to achieve advanced standing in certain courses by demonstrating competency in basic prerequisites. Students who show competency in F&N 131 will be directed to choose more advanced courses in the Department of Food and Nutrition. Procedures for judging competency will be administered prior to registration each semester.

### Food and Nutrition Options.

#### A. *Dietetics Options—Therapeutic and Administrative*

These curricula meet the academic requirements for admission to approved dietetic internships as well as for membership in the American Dietetic Association. Graduates trained in these options qualify as dietitians for food service in institutions of every type, including both civilian and military hospitals, school cafeterias, college and university dormitories and student unions, commercial and industrial restaurants and cafeterias, and private club dining rooms.

The different branches of the military organizations of the United States need dietitians so urgently that each one has programs of financial assistance for students majoring in dietetics as well as for their internship.

#### B. *Community Nutrition Option*

This program is planned for students interested in the betterment of community health; it will prepare students to fill positions in nutrition services of departments of public health, social and welfare agencies, commercial organizations, and government agencies, such as the Extension Service and the Peace Corps. Electives should be chosen with the special area of interest in mind. Individual programs may be developed by special consultation.

#### C. *Research Option*

The increasing stress placed on people trained for research requires that individuals prepare for this work during the undergraduate curriculum. The preparation for a research career in the area of nutrition requires additional training in chemistry and other sciences.

#### D. *Business and Merchandising Option*

This option is designed to meet the academic training of those interested in food photography and writing for news media, in developing recipes and products in test kitchens of various food industries, in presenting food programs on radio and television, and in directing consumer service of equipment and utility companies.

#### E. *Double Major Option*

The requirements of any option in food and nutrition may be combined with the requirements for a major in home economics education, with the number of hours required for graduation depending upon the option chosen.

**Food and Nutrition Curriculum.**

<b>Administrative Dietetic Option</b>	<b>Therapeutic Dietetic Option</b>	<b>Research Option</b>	<b>Business and Merchandising Option</b>
<b>I. FOUNDATION CORE</b>			
ART 136 ENG 131, 132, 231, 232, or 233 GOVT 231, 232 HIST *231, 232 P.E. or Band— 4 semesters Social and Natural Sciences, 26 hours, including MBIO 231 CHEM 141, 142 PSY 330 SOC 230 or 233 ZOO 243  57 hours	ART 136 ENG 131, 132, 231, 232, or 233 GOVT 231, 232 HIST *231, 232 P.E., or Band— 4 semesters Social and Natural Sciences, 22 hours, including CHEM 141, 142, 341, 342 SOC 230 or 233 ZOO 243  53 hours	ART 136 ENG 131, 132, 231, 232, or 233 GOVT 231, 232 HIST *231, 232 P.E., or Band— 4 semesters Social and Natural Sciences, 31 hours, including CHEM 141, 142, 241, 242, 341, 342 SOC 230 or 233 ZOO 243  62 hours	ART 136 ENG 131, 132, 231, 232, or 233 JOUR 231, 338 GOVT 231, 232 HIST *231, 232 P.E., or Band— 4 semesters Social and Natural Sciences, 22 hours, including MBIO 231 CHEM 133, 134 or 141, 142 PSY 330 SOC 230 or 233 ZOO 243 ECO 235  59 hours
<b>II. HOME ECONOMICS CORE</b>			
CD 112, 131 C&T 130 or 233 F&N 131** HMG 131 HEED 433, 411 17 hours	CD 112, 131 C&T 130 or 233 F&N 131** HMG 131 or 231 HEED 433, 411 17 hours	Same as for Dietetic Options  17 hours	Same as for Dietetic Options  17 hours
<b>III. MAJOR COURSES</b>			
F&N 231, 235, 236, 331, 334, 338, 339, 421 meets American Dietetic Assn. academic requirements 23 hours	F&N 231, 235, 236, 331, 334, 338 or 339 or 412, 421, 424, 432, 436 or 438 26-27 hours	F&N 231, 331, 334, 432, 436, plus electives 21 hours	F&N 231, 331, 334, 422, 425, 436, 438, plus electives 21 hours
<b>IV. ADDITIONAL REQUIRED COURSES</b>			
Child Dev. elective or Fam. Rel. elective C&T 231 HMG 432 or 435 MG 334 12 hours	Child Dev. elective or Fam. Rel. elective C&T 231 Home Mgt. elective MG 334 or PSY 330 12 hours	Child Dev. elective or Fam. Rel. elective C&T 231 HMG 232 or 435 9 hours	Child Dev. elective or Fam. Rel. elective C&T 231 HMG 333 MKT 332, 331 or 334 G SP 133 or 338 18 hours
<b>V. ELECTIVES TO COMPLETE 127 HOURS MINIMUM</b>			
Electives, 18 hours	Electives, 18 hours	Electives, 23 hours	Electives, 12 hours

\* HIST 330 is acceptable in lieu of HIST 231 or 232.

\*\* Based on pretest score, F&amp;N 131 may be replaced by another food and nutrition course.

**Courses in Food and Nutrition.****FOR UNDERGRADUATES**

111. **Food Service Workshop (1:0:3).** Admission by special approval. May be used for degree credit with dean's approval.
131. **Nutrition and Food (3:2:2).** Science of nutrition and food as applied to everyday living.
211. **Special Problems in Food Preparation (1:0:2).** Prerequisite: F&N 131. Development of manipulative skills in food preparation.
231. **Principles of Food Preparation (3:1:4).** Scientific principles to food preparation.
235. **Quantity Food Production and Service (3:2:3).** Prerequisite: F&N 231 or consent of instructor. The application of scientific food preparation principles to quantity production. Includes field trips and laboratory experiences in quantity operations.
236. **Food Service Organization and Management (3:3:0).** Prerequisite: F&N 235 or consent of instructor. The role and responsibilities of management in food service. Emphasis on human behavior, personnel management, and industrial relations. Study of food systems operations and aspects of appropriate control.

331. **Meal Management (3:1:4).** Management of time, money, energy, and equipment in planning, purchasing, preparing, and serving nutritious and satisfying family and guest meals.
  334. **Human Nutrition (3:2:3).** Prerequisite: Human anatomy and physiology or other biological science. Physiological functioning of nutrients, their availability, and emphasis in menu and dietary planning; bioassay and dietary analysis as tools in teaching and in research.
  338. **Food Service Equipment, Layout, and Design (3:2:3).** Prerequisite: F&N 236 or consent of instructor. Characteristics of various food service facilities with emphasis on layout, design, and selection, operation, and care of equipment.
  339. **Quantity Food Purchasing (3:2:3).** Prerequisite: F&N 236 or consent of instructor. Current economic, legislative, commercial, and industrial developments as they affect quantity food purchasing. Laboratory experiences with various purchasing systems to explore current procedural controls.
  411. **Problems in Food and Nutrition (1:1:0).** May be repeated for credit.
  412. **Field Work in Nutrition (1:0:3).** Prerequisite: F&N 423 or 424 or concurrent. Experience in hospital and community centers to enhance understanding of nutrition of people. May be repeated for credit.
  421. **Advanced Food Production Management (2:1:3).** Prerequisite: F&N 236 and 339 or consent of instructor. Practical experiences in quantity food management.
  422. **Food and the Consumer (2:2:0).** Prerequisite: Junior standing. Technological advances and practices in food production, preservation, processing, and merchandising.
  423. **Community Nutrition (2:2:0).** Prerequisite: F&N 334. The nutritional status and needs of groups of people in a community including preschool and school children, welfare cases, the aged, and the culturally deprived.
  424. **Diet Therapy (2:2:0).** Prerequisite: F&N 334 and organic chemistry. Physiological and biochemical abnormalities in certain diseases, and principles underlying nutritional therapy.
  425. **Food Demonstrations (2:1:2).** Prerequisite: F&N 231 or consent of instructor. Study, observation, and practice of demonstration methods used with food in teaching, merchandising, and television.
  432. **Advanced Human Nutrition (3:3:0).** Prerequisite: Physiological chemistry. Concepts of normal nutrition in relation to the chemistry and physiology of the human body.
  436. **Experimental Methods with Food (3:1:6).** Prerequisite: F&N 331 and chemistry. Investigation of the chemical and physical factors influencing quality in food; consideration of proportions, manipulation of ingredients, and additives in preparation.
  438. **Cultural Aspects of Food (3:3:0).** Prerequisite: Junior standing or consent of instructor. A study of the historical, social, psychological, economic, religious, and aesthetic significance of food customs in various cultures.
- FOR GRADUATES
516. **Nutrition and the Adolescent (1:1:0).** The nutritional needs, dietary habits, and motivation of the adolescent.
  517. **World Nutrition (1:1:0).** A study of food supply for population groups with concern for their culture, customs, health, and nutritional needs.
  518. **The Consumer and Food Technology (1:1:0).** Trends in food production and marketing; implications and guidelines for the consumer.
  519. **Nutrition and Gerontology (1:1:0).** Nutrition in the physiology of aging; dietary management in geriatric institutions; dietary consultation for long-term care centers.
  520. **Vitamins and Minerals (2:2:0).** Prerequisite: F&N 334 or 432 or consent of instructor. Nutritional roles, interrelationships, measurement of nutritional value, human requirements, and metabolic processes in health and disease.
  521. **Proteins and Amino Acids (2:2:0).** Nutritional roles, interrelationships, measurement of nutritional value, human requirements, and metabolic processes in health and disease.
  522. **Lipids and Carbohydrates (2:2:0).** Nutritional roles, interrelationships, measurements, consumption, and metabolic processes in health and disease.
  523. **Seminar in Food and Nutrition (2:2:0).** Prerequisite: Consent of instructor. May be repeated for credit.
  524. **Relations between Nutrition and Diseases (2:2:0).** Prerequisite: F&N 334 or 432 or consent of instructor. Physiological and metabolic bases for dietary modification in disease in which nutrition plays a major role in maintaining cellular homeostasis in man.
  525. **Methods of Teaching Nutrition (2:2:0).** Prerequisite: Basic background knowledge of nutrition. Emphasis on community nutrition programs, occupational training classes, and nutrition education of school age groups with consideration of different cultural and socioeconomic backgrounds.
  526. **Advanced Problems in Food Service Management (2:2:0).** Prerequisite: Consent of instructor.
  527. **Seminar in Food Service (2:2:0).** Prerequisite: Consent of instructor.
  530. **Introduction to Food and Nutrition Research (3:3:0).** Prerequisite: Consent of instructor. Introduction to and critical evaluation of research designs and methodology. Guidance and individual experiences in planning and reporting a problem in food research and in nutrition research.
  532. **Food Service Systems (3:3:0).** Prerequisite: Consent of instructor. Principles of food systems operations currently used and in developmental stages.
  534. **Advanced Problems in Human Nutrition and Foods (3:3:0).** May be repeated for credit.
  535. **Research in Food Science (3:1:6).** Prerequisite: Consent of instructor. Principles and use of specialized instruments and techniques; management of laboratory animals. Execution, interpretation, and evaluation of results of individual problems.
  536. **Research in Nutrition (3:1:6).** Prerequisite: Consent of instructor. Principles and use of specialized instruments and techniques; management of laboratory animals. Execution, interpretation and evaluation of results of individual problems.
  5335. **Principles and Applications of Nutrition for Elementary Teachers (3:3:0).** Principles of nutrition, the nutrient and food requirements of the school child, and techniques for motivating children to sound food habits.
  630. **Master's Report (3).**
  631. **Master's Thesis (3).** Enrollment required at least twice.

## Department of Home Economics Education

This department supervises the following degree programs: HOME ECONOMICS EDUCATION, *Bachelor of Science in Home Economics* and *Master of Science in Home Economics*.

These programs are designed primarily for those who plan a career in teaching vocational homemaking in secondary schools. The degree program satisfies the legal requirements of Texas for a Special Vocational-Homemaking Teaching Certificate. Additional preparation is given for careers such as home demonstration positions in the Agricultural Extension Service, demonstration work with public utility programs and other businesses, religious and welfare work, and responsible positions in other fields related to home economics. They also provide a valuable foundation for the vocation of homemaking.

**Teacher Education.** Each year a large number of West Texas high schools cooperate with the University in its student teaching program for home economics education students. 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.

Each student working toward a teacher's certificate must file a certification plan with the Department of Home Economics Education during the last semester of the sophomore year.

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 during the first semester of the junior year to enroll in student teaching.
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 and art courses will be accepted in establishing this average.
4. Must pass the health examination required of teachers in the school system in which the student teaching is performed.
5. Must present evidence that she is free from extreme handicaps that are judged by the Committee on Student Teaching to be detrimental to effective classroom instruction.
6. Must demonstrate proficiency in the use of the English language by a grade point average of 2.25 or higher in English courses or pass the English Proficiency Test.
7. Students transferring to Texas Tech University who wish to be recommended for certification must complete at least 3 semester hours at the University in each of the subject matter departments in the field of home economics. This requirement may be increased on the recommendation of the Chairman of the Department of Home Economics Education.

All persons applying for the teaching certificate are required to take the National Teacher Examination during the last semester of their college program.

**Double Major Option.** A major in home economics education can be combined with one or more options in each of the other departments in home economics. For the specific course requirements for a double major with home economics education see the curricula of the various departments of the College of Home Economics.

### Home Economics Education Curriculum.

#### I. Foundation Core

ART 136, 3331  
 ENG 131, 132, 231, 232, or 233  
 GOVT 231, 232  
 HIST 231, 232\*  
 P E or Band—4 semesters

Social & Natural Sciences  
 19 hours including SOC 230 or 233  
 ZOOL 243 or BIOL 142

53 hours

## II. Home Economics Core

C D 112, 131, 233 or 331  
F R 235  
HMGT 131 or 231, 432

C&T 130, 233, 332  
F&N 131\*, 231, 331, 334

34-37 hours

## III. Professional Development Courses

ED 332  
S ED 334 or ED 4315  
HEED 331, 411, 428, 432, 434, or  
436, 461

24 hours

## IV. Additional Required Courses

Electives in Home Economics should  
be selected in consultation with a  
Home Economics Education adviser

Home Mgt. Elective or  
Child Dev. elective or  
Fam. Rel. elective  
C&T 231 or elective

9 hours

## V. Electives to Complete 127 Hours Minimum

Electives

4-7 hours

\* HIST 330 is acceptable in lieu of HIST 231 or 232.

\*\* F&N 131 may be omitted by passing a proficiency test.

## Courses in Home Economics Education.

## FOR UNDERGRADUATES

331. Principles of Vocational Home Economics Education (3:3:0). Prerequisite or parallel: ED 332. For majors. Study and observation of vocational home economics programs in various school communities; critical review of literature; emphasis on principles of learning, formulating instructional objectives, identifying key concepts, and selecting and using appropriate resources.
411. Home Economics Seminar (1:1:0). Emphasis upon professional aspects of employment, relation of the total curriculum to professional use, current problems in home economics, and continued growth of the home economists.
414. Problems in Home Economics Education (1:1:0). Prerequisite: HEED 331. For majors and nonmajors. Communications principles and techniques for effective interaction. Emphasis on use of oral and written communication in mass media, including radio, press, and television as tools for interpreting professions in home economics.
426. Problems in Student Teaching (2:0:4). Parallel: HEED 432. Prerequisite: HEED 331. Teaching experiences with various socioeconomic, ethnic and age groups in different community settings.
432. Methods of Teaching Home Economics (3:3:0). Prerequisite: HEED 331; prerequisite or parallel: ED 334 or 4315. Development of plans for providing effective learning in consumer and homemaking education; selection, use, and evaluation of learning experiences; an analysis of teaching procedures, vocational home economics classes and programs.
433. Introduction to Research in Home Economics (3:3:0). Exploration of scientific methods in experimental and applied research; interpretation and application of teaching-learning theories.
434. Current Issues and Developments in Home Economics Education (3:3:0). Social forces affecting families and individuals, and their significance to program and curriculum development for adult and secondary levels in home economics education. Emphasis on research and program development and evaluation for home economists in extension, secondary schools, classroom, and business.
436. Home, School, and Community Experiences in Home Economics Education (3:3:0). Methods of evaluating the growth of the learner; provisions for effective learning in home economics through experiences in home, school, community, and Future Homemakers of America; identification and application of behavioral research in relation to all aspects of the total vocational home economics program.
461. Student Teaching in Home Economics (6). Prerequisite: HEED 432. Attainment of admission standards to student teaching.

## 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.
518. Seminar in Home Economics (1:1:0). Comprehensive consideration of research in home economics; presentation and consideration of individual student research problems in progress.
530. Readings in Home Economics Education (3:3:0). A critical review of representative and authoritative literature dealing with philosophy, learning, curriculum innovation, evaluation in home economics. Focus may be on intercultural aspects affecting teaching-learning.
531. Administration and Supervision of Home Economics Education (3:3:0). Administration and supervision of typical home economics programs; decision-making based on social and psychological factors affecting program emphasis.



532. **Curriculum Development in Home Economics (3:3:0).** Philosophy and development of vocational home economics programs for secondary schools or junior and senior colleges; survey of legislation, recent curriculum developments, and trends affecting home economics programs.
533. **Evaluation in Home Economics (3:3:0).** Procedures for appraisal of progress in the total program in home economics. Development of evaluative instruments for cognitive and affective learning 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.
535. **Analysis and Organization of Teaching Media (3:3:0).** Techniques for identifying, preparing, analyzing, and evaluating media for instructional purposes.
536. **Problems in Home Economics Education (3:3:0).** Individual and group problems according to special interests and needs of the class. May be repeated for credit.
537. **Techniques of Supervision in Home Economics (3:3:0).** Philosophy, responsibilities, and techniques of supervision in home economics. Designed for experienced home economists.
538. **Communication Designs in Teaching-Learning (3:3:0).** Techniques of interaction and effective leadership. Information theory, cybernetics, and systems approaches applied to the classroom.
539. **Organization and Administration of the Home Economics Gainful Employment Program (3:3:0).** Designed to prepare teachers of vocational home economics wage earning programs.
630. **Master's Report (3).**
631. **Master's Thesis (3).** Enrollment required at least twice.

## **Department of Home and Family Life**

This department supervises the *Bachelor of Science in Home Economics* program in HOME AND FAMILY LIFE. Through affiliation with Merrill-Palmer Institute of Human Relations, Detroit, Michigan, competent advanced students have the privilege of selecting to do a term or semester of work in Detroit to broaden the scope of their professional training.

As the name suggests, this department provides the opportunity to study the various phases of the life of an individual from infancy through maturity with the interplay of the many aspects of personal, family, and community relationships. Students desiring to major in this department are prepared for homemaking and for several areas of professional work.

### **Home and Family Life Options.**

#### **A. Child Development**

In this area the student develops an understanding of the various stages and facets of child growth and development through a succession of courses in the field as well as experiences in the preschool laboratory. Opportunity is given for the student to observe and work with young children at various stages of growth and development. These experiences assist the students in recognizing and establishing skills in working with young children and in developing basic concepts in child guidance. Laboratory experiences provide the college students with an insight and, hopefully, a better understanding of their own development and behavior. Teaching and working in preschool centers provides a challenging and worthwhile career for one who is interested in the younger child. Those who wish to continue in advanced education in this area are well prepared to do so. Others who are interested in services for children and their families may seek additional training in areas that will further equip them for positions in child welfare, parent education, special education, and in such services as Girl Scouts and Campfire Girls.

#### **B. Family Relations**

Study in the family relations area provides the student with an opportunity to gain information and to examine attitudes as they relate to dating, courtship, and marriage.

A variety of courses related to all phases of the family life cycle are available to the student who has either functional or professional goals. Those who wish to continue in advanced education in this field are prepared to do so. Others who are interested in community services may find they have opportunities for employment in welfare agencies. These family relations courses provide excellent background for further work in specific fields and, with additional work, for employment in social welfare, special education, and counseling.

#### **C. Home Management**

This area encompasses the study of personal and home management, family finance, consumer education, housing, and equipment. Majors in the

option are prepared to serve as professional home economists with utility and household equipment companies, the extension service and in family financial counseling as well as homemaking. It offers the opportunity to study personal and home management including decision-making as a means of attaining personal and family goals. Emphasis is placed on clarifying values, deciding on standards, and setting goals to give purpose and direction to the management of human and material resources especially money, time, and energy.

As effective management requires both theory and practical ability, home management gives single women students the opportunity to live in apartments and mobile homes where they gain experiences in group living and managing. Married students carry on managerial experiences in their own homes according to their own needs.

### Home and Family Life Curriculum.

#### Child Development

#### Family Relations

#### Home Management

#### I. FOUNDATION CORE

ART 136 ENG 131, 132, 231, 232 GOVT 231, 232 *HIST 231, 232 P.E. or Band—4 semesters **Social & Natural Sciences 19 hours, including SOC 230 or 233 ZOO 243 or BIOL 142	ART 136 ENG 131, 132, 231, 232 GOVT 231, 232 *HIST 231, 232 P.E. or Band—4 semesters **Social & Natural Sciences 19 hours, including SOC 230 or 233 ZOO 243 or BIOL 142	ART 136 ENG 131, 132, 231, 232 GOVT 231, 232 *HIST 231, 232 P.E. or Band—4 semesters **Social & Natural Sciences 19 hours, including SOC 230 or 233 ZOO 243 or BIOL 142 HMG 233 ECO 235
50 hours	50 hours	50 hours

#### II. HOME ECONOMICS CORE

C D 112, 131 C&T 130 F&N 131 HMG 131 or 231 HEED 433, 411	C D 112, 131 C&T 130 F&N 131 HMG 131 or 231 HEED 433, 411	C D 112, 131 C&T 130 or 233 F&N 131 HMG 131 or 231 HEED 433, 411
17 hours	17 hours	17 hours

#### III. MAJOR COURSES

C D 231 or 234, 233, 236, 332, 461 F R 235 or 334	C D 233, 236 F R 235, 334, 436, 438 or 439 Child Dev. elective	HMG 232, 331, 333, 431, 432, 433, 435
21 hours	21 hours	21 hours

#### IV. ADDITIONAL REQUIRED COURSES

ART 3317 ED 4344 F&N 334 HMG 432 Home Mgt. elective Cloth. & Text. elective	Behavioral Science elective F&N 334 HMG 433 Home Mgt. elective Cloth. & Text. elective Arts & Science elective	ART 3331 C D 233 or 331 F R 235 or 335 C&T 231 and elective F&N 331, 334, 425 JOUR 233 or GSP 333
18 hours	18 hours	26 hours

#### V. ELECTIVES TO COMPLETE 127 HOURS MINIMUM

Electives, 21 hours	Electives, 21 hours	Electives, 13 hours
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\* HIST 330 is acceptable in lieu of HIST 231 or 232.

\*\* Mathematics may be counted as a science.

### Courses in Child Development.

#### FOR UNDERGRADUATES

111. Nursery School Organization and Management (1:1:0). Basic principles of the preschool program.
112. Personal Development (1:1:0). Relationship of the student to college; survey of the field of home economics; personal and academic group guidance.
113. Child Development and Behavior (1:1:3).

131. **Personal Relationships (3:2:2).** Guidance in gaining competence in satisfying interpersonal relationships; observation and study of behavior.
231. **The Infant (3:3:0).** Physical and psychological preparation of the family for parenthood, study of prenatal development, infant behavior, care and growth to age two.
233. **Child Growth and Development (3:2:3).** Study of growth and development of the child and his relationship with his family, peers, and teachers. Observation and participation in child development laboratory.
234. **The Child from Two to Four (3:2:2).** Systematic study of the physical, psychological, social and intellectual development of the child. Observations in the child development laboratory and in the family.
236. **Child Guidance (3:2:3).** Current concepts underlying behavior and methods of working with children.
330. **Development in Early Childhood (3:2:2).** Study of the young child as a person, and of the influence of his environment in the early years as the child grows and develops within himself, the family, and community. Designed for elementary education majors.
331. **Later Childhood (3:2:3).** Development of the child from six to twelve years of age. Laboratory experience with school age children.
332. **Organization, Methods, and Materials in the Preschool Program (3:2:3).** Prerequisite: C D 233 and 236. Program planning for preschool children. Experience in using methods and materials appropriate to the preschool level.
411. **Special Problems in Child Development (1:1:0).** Prerequisite: Senior classification. May be repeated for credit.
434. **Parent Involvement (3:2:2).** Prerequisite: Senior classification. Philosophy and techniques in working with parents. Observation and participation with parent groups, parent conferences, home and community visitation.
461. **Student Teaching in the Preschool (6).** Prerequisite: Senior classification and approval of department chairman in home and family life. Observation and direction of a program in a preschool situation.

## FOR GRADUATES

518. **Seminar in Child Development and Family Relations (1:1:0).** Prerequisite: Graduate standing. May be repeated for credit.
530. **History and Philosophy of Child Development (3:3:0).** An interdisciplinary emphasis on the development of infants and preschool children with implications for the future.
531. **Individual Study in Child Development (3).** Readings and reports of literature; emphasis on increased responsibility for planning and guiding groups of young children through selected individual problems.
532. **Development of Basic Processes in Young Children: Psychomotor, Affective, Cognitive and Social (3:3:0).** Studies of the development of the child from birth through early years.
533. **International and Intercultural Aspects of Child Development (3:3:0).** Readings in and experiences with other cultures and races in the United States and abroad. May be repeated for credit.
534. **Special Topics in Child Development (3:3:0).** Prerequisite: Graduate standing. Advanced study of current research in child development.

## Courses in Family Relations.

## FOR UNDERGRADUATES

235. **Courtship and Marriage (3:3:0).** Designed to consider the role of interpersonal relationships of dating, courtship and engagement.
333. **Early Years of Marriage (3:3:0).** Considerations of the problems of adjustment, interaction, establishment, and growth of the beginning family. Limited to child development and family relations majors and married students.
334. **The Contemporary Family (3:3:0).** Analysis of family interaction patterns with an introduction to family research. A study of family heritage, development, and networks emphasizing the successful family and socio-cultural variations of family forms.
335. **The Adolescent in the Family (3:3:0).** Prerequisite: C D 233 or approval of department chairman. The adolescent's relationship to his family, his peer group, and to society.
430. **Readings and Research in Family Life Education (3:3:0).** Prerequisite: Consent of instructor. Supervised independent work in selected areas. Extensive reading of more advanced literature in a particular field or carefully planned research.
433. **The Family (3:3:0).** Prerequisite: FR 235 or consent of chairman. The family as affected by composition, resources, traditions, with an introduction to family research.
436. **Community and Professional Responsibilities to Children and Families (3:3:0).** Study of community resources as they relate to welfare of children and families.
438. **Exceptional Children in the Family (3:2:3).** Personal-social development of exceptional children; family attitudes and responsibilities; utilization of community resources; co-operative laboratory work with related departments.
439. **Family Life in the Middle and Later Years (3:3:0).** Prerequisite: Junior standing. Needs that arise from changes in family relationships, living arrangements, income, and employment.

## FOR GRADUATES

530. **Marriage Counseling (3:3:0).** Prerequisite: Consent of instructor. Designed especially for students whose professional aim or achievement places them in a counseling relationship with people in marital difficulty; touching areas of study including dynamics of personality development, theories of counseling and psychotherapy, the dynamics of family living, and workable knowledge of ethics, values, and philosophy.
531. **Individual Study (3).** Prerequisite: Consent of instructor. Directed individual study for students majoring in child development and family relations.
532. **Issues in Family Life Education (3:3:0).** History, philosophy, and current issues in family life education.
533. **Materials and Procedures in Teaching Family Life Education (3:3:0).** An evaluation of materials, resources, and procedures in family life education for teachers in schools, colleges, churches, and social agencies.
5336. **Advanced Interpersonal and Family Relations (3:3:0).** Group processes; factors influencing personal family adjustment; methods and techniques of teaching and counseling.

## Courses in Home Management.

## FOR UNDERGRADUATES

131. **Personal and Family Management (3:3:0).** For unmarried freshmen only. Development of basic managerial concepts; emphasizing values, goals, standards, decision-making and utilization of resources.
231. **Managerial Competency (3:3:0).** For students with 25 or more semester hours, or married, who have not had HMG 131. Contemporary methods for achieving personal and family goals through use of resources. Opportunity to develop individual potential.
232. **General Home Management (3:3:0).** For students who have had HMG 131, 231, or equivalent. Evaluation and use of resources in relation to family goals emphasizing financial security.
232. **General Home Management (3:3:0).** For students who have had HMG 131, 231, or equivalent. Philosophy of home management; work simplification, planning for family financial security; and general management of all the family's resources.
233. **Physical Sciences in the Home (3:2:3).** Application of selected principles of physics and chemistry in the home. May count as a science in the School of Home Economics.
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.
335. **Family Finance and Consumer Education (3:3:0).** Principles involved in family finance and the implications for consumer education.
411. **Problems in Home Management (1:1:0).** Prerequisite: Senior standing. Individual study of selected areas of home management. May be repeated up to 3 semester hours.
431. **Advanced Housing for the Family (3:1:4).** Prerequisite: HMG 331. New trends in housing, community and city development, home ownership, legal procedures, and financing.
432. **Home Management Living (3).** Prerequisite: 6 semester hours in home management. One-half semester residence with supervised experience in home living, including money and time management. Married students maintain a home in the community and work on home management problems with supervision.
433. **Advanced Household Equipment (3:1:4).** Prerequisite: HMG 333. New developments in home equipment; residential lighting, air conditioning; laboratory experience and demonstration and planning for homemakers with physical and financial limitations.
435. **Consumer Problems (3:3:0).** Motivation, protection, buymanship, credit, insurance, investment and estate planning.

## FOR GRADUATES

511. **Individual Problems (1:1:0).** Individual study in home management, housing, equipment, family economics, or consumer education. May be repeated for credit.
518. **Seminar in Home Management (1:1:0).** Analysis and evaluation of research in home management, housing, equipment, or consumer education. May be repeated for credit.
532. **Socioeconomic and Psychological Foundations of Home Management (3:3:0).** Prerequisite: 12 semester hours in social sciences and home management. Implications of the social sciences on family decisions and management in different cultural environment.
533. **Work Analysis in the Home (3:3:0).** Prerequisite: 9 semester hours in home management, housing or equipment. Functional research basis for activities of the home.
534. **Family Economics (3:3:0).** Prerequisite: 9 semester hours in family finance and economics. Economic status of families at all income levels; factors influencing their standard of living; interrelationships with the economy.
535. **Current Consumer Issues (3:3:0).** Analysis of current consumer problems and decision-making responsibilities. Policies and programs for consumer protection and education.
536. **Home Management and Housing for the Physically Handicapped (3:1:4).** Prerequisite: Consent of instructor. Adaptation of managerial procedures and facilities to needs of the handicapped.

## Interdisciplinary Programs

### Computer Science

A program in computer science is available as a minor or option for the bachelor's, master's, or doctor's degree for students in all colleges at Texas Tech. The program is supervised by the Computer Science Committee, and students desiring admission to the program should apply to the committee. Admission is subject to the approval of the academic department which will grant the major degree.

The undergraduate requirements include an introductory course in computer programming (CS 2311, 2312, 2341, or 3231), CS 4314, and additional courses in computer science or in computer-related areas to total 18 hours. Courses not listed as computer science, but which may be defined as computer related, may be counted toward minors and options with the approval of the committee and the academic department involved.

The master's degree requirements include CS 5312 and additional courses in computer science or computer-related areas to total 9 hours.

The doctor's degree requirements include CS 5312, 5313, 5316, and additional courses in computer science or computer-related areas to total 18 hours.

Inquiries about these programs should be addressed to Dr. George S. Innis, Chairman of the Computer Science Committee.

### Courses in Computer Science.

#### FIR UNDERGRADUATES

- 2311. **Introduction to Computer Science I (3:3:0).** An introductory course in computer programming for students in mathematically oriented fields. History of computers; organization and components; FORTRAN language and algorithmic processes; prepares the student for use of Computer Center facilities. Degree credit not given for both EA&D 135 and 2351. (EA&D 2351)
- 2312. **Introduction to Computer Science II (3:3:0).** Similar to EA&D 2351 except that the course emphasizes the nonmathematical approach. (EA&D 2352).
- 2341. **Electronic Data Processing I (3:3:0).** A study of general purpose, digital, electronic computers and applications adaptable to automation; computer fundamentals, flowcharts, programming, basic COBOL and FORTRAN IV, systems, control, and data cards. (ACCT 232)
- 3131. **Computer Programming Techniques Laboratory (1:0:3).** Prerequisite: IE 321 or concurrent enrollment. Computer programming techniques and methods applied to programming exercises. (IE 311)
- 3231. **Computer Programming Techniques (2:2:0).** Prerequisite: Instructor's consent. Programming techniques for digital and analog computers. Degree credit not given for both this course and EA&D 135. (IE 321)
- 411. **Electrical Engineering Seminar (1:1:0).** Prerequisite: Advanced standing and approval of department chairman. Individual study of engineering problems of special interest and value to the student. May be repeated for credit in different areas. (EE 4121)
- 431. **Special Problems in Computer Science (3:3:0).** Prerequisite: MATH 335 and senior standing. Individual studies in computer technology in special areas. May be repeated. (EA&D 4333)
- 4311, 4312. **Digital Computations I, II (3:3:0 each).** Prerequisite: EA&D 124, MATH 335. Application of numerical analysis to solution of linear and nonlinear engineering systems problems. The approximation problem applied to engineering systems. Matrix methods in engineering. (EA&D 4341, 4342)
- 4313. **Analog Computations (3:2:3).** Prerequisite: MATH 335, EA&D 135. Analysis of selected engineering problems using the analog computer. Auxiliary devices used with analog computer. (EA&D 4343)
- 4314. **Digital Programming Systems (3:3:0).** Prerequisite: EA&D 2351, or equivalent, and consent of instructor. Computer software systems. Compilers, assemblers, and loaders. Definition of functions and the analysis of current approaches to satisfying functional needs.
- 4315. **Problem Oriented Computer Languages (3:3:0).** Prerequisite: EA&D 2351 or 2352. Language structure; introduction to COBOL, ALGOL, and other languages, such as PL/I, SIMSCRIPT, IPL-V, etc. Stress placed upon the use of the computer as a problem-solving device. (EA&D 4354)
- 4316. **Computer Applications to Numerical Methods (3:3:0).** Prerequisite: EA&D 4353. Computer programming applied to numerical error, significant digit arithmetic procedures,



- classes of error, expression evaluation; solution to nonlinear expressions, interpolation. Systems of equations; Newton's method, Euler's method, Runge-Kutta. (EA&D 4356)
4321. **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. (E E 4311)
4324. **Finite State Machines (3:3:0)**. Prerequisite: Senior or graduate standing or consent of instructor. An introduction to the design and analysis of finite state machines. Transition tables. Minimal and linear machines. (E E 4314)
- 4350, 5351. **Introduction to Numerical Analysis I, II (3:3:0 each)**. Prerequisite: MATH 332 or 335. Interpolation; approximations; numerical integration and differentiation; roots of polynomial equations; numerical quadrature; solution of ordinary differential equations. (MATH 4310, 4311)
4352. **Mathematical Programming (3:3:0)**. Prerequisite: MATH 152. Linear inequalities; linear programming algorithms; networks; parametric and discrete linear programming; nonlinear and dynamic programming; optimal decision techniques; application. (MATH 4327)

## FOR GRADUATES

511. **Seminar (1:1:0)**. (I E 512)
531. **Special Problems in Advanced Computer Science and Technology (3:3:0)**. (EA&D 5333)
5311. **Computer Logic Design and Switching Theory (3:3:0)**. (EA&D 5351)
- 5312, 5313. **Computer Systems Organization and Programming I, II (3:3:0 each)** (EA&D 5352, 5353)
5316. **Formal Computer Language (3:3:0)**. (EA&D 5356)
5317. **Information Retrieval I (3:3:0)**. (EA&D 5357)
5318. **Introduction to Artificial Intelligence (3:3:0)**. (EA&D 5358)
5320. **Sampled Data and Digital Control Systems (3:3:0)**. (E E 5315)
5321. **Digital Systems (3:3:0)**. (E E 5321)
5325. **Information Theory (3:3:0)**. (E E 5325)
5329. **Digital Computer Design (3:2:3)**. (E E 5393)
5331. **Simulation Models for Operations Analysis (3:3:0)**. (I E 5341)
5341. **Computer Models for Business, Industry, and Government (3:3:0)**. (MGMT 5316)

## Official Directory 1970-1971

### Board of Regents 1970-1971

#### Officers

RETHA R. MARTIN, Chairman  
R. TRENT CAMPBELL, Vice Chairman  
MRS. FREDA PIERCE, Secretary

#### Members of the Board

MARSHALL FORMBY	Plainview
ROY FURR	Lubbock
RETHA R. MARTIN	Lubbock
Term Expires January 31, 1973	
WAGGONER CARR	Austin
FIELD SCOVELL	Dallas
JUDSON F. WILLIAMS	El Paso
Term Expires January 31, 1975	
R. TRENT CAMPBELL	Houston
FRANK JUNEILL	San Angelo
JAMES J. LING	Dallas

### Principal Administrative Officers

- Grover Elmer Murray, Pres. & Prof. of Geosciences, 1966. B.S., North Carolina, 1937; M.S., Louisiana State, 1939; Ph.D., 1942.
- Glenn E. Barnett, Executive V. Pres. & Prof. of Education, 1968. B.S. in Ed., Teachers Coll. (Kansas City), 1937; M.Ed., Missouri, 1939; Ed.D., 1943.
- Sabe McClain Kennedy, V. Pres. for Academic Affairs & Prof. of Government, 1946, 1966. B.A., Texas Tech, 1943; M.A., 1946; Ph.D., Colorado, 1952.
- G. C. Gardner, Jr., V. Pres. for Financial Affairs, 1969. B.B.A., Houston, 1950; M.B.A., Indiana, 1954.
- Bill J. Parsley, V. Pres. for Public Affairs, 1966, 1970. B.A., Texas Tech, 1952; LL.B., Texas (Austin), 1956.
- Owen L. Caskey, V. Pres. for Student Affairs & Prof. of Education, 1947, 1968. B.S., Texas Tech, 1947; M.Ed., 1948; Ed.D., Colorado, 1952.
- Orlo E. Childs, V. Pres. for Research, 1970. B.S., Utah, 1935; M.S., 1937; Ph.D., Michigan, 1945.
- Fred Durnford Rigby, Assoc. V. Pres. for Academic Affairs & Prof. of Mathematics, Statistics, and Computer Science, 1940, 1968. B.A., Reed Coll., 1935; M.S., State U. of Iowa, 1938; Ph.D., 1940.
- Monty Earl Davenport, Assoc. V. Pres. & Assoc. Prof. of Mechanical Engineering, 1956, 1968. B.S., Texas Tech, 1956; M.S., Stanford, 1958; Ph.D., 1962.
- Fredric John Wehmeyer, Asst. V. Pres. for Administrative Services, 1961, 1969. B.B.A., Texas (Austin), 1958.

### General Faculty and Administration

#### General Administration

- Baker, Jean K., Asst. to Pres., 1966.
- Beckwith, Bicknell K., Dir. of Development and Information Services, 1970. B.B.A., New Mexico (Albuquerque), 1960.
- Briggs, Fredy Elwood, Dir., Office of Research, 1969. B.B.A., Texas Tech, 1960; M.B.A., 1966.
- Burgess, Hubert L., Dir., Student Loan Payment & Check Collections, 1934.
- Church, Frank Clement, Traffic & Parking Counselor, 1967. B.S., Louisiana State, 1941; M.S., 1951.
- Clewell, Florence Evelyn, Dir., Office of Institutional Research, 1929, 1967. B.A., Oklahoma, 1929.
- Crawford, Jesse Earl, Central Stores & Property Mgr., 1958. B.S., Mississippi State, 1951.
- Daniel, Benge Robert, Mgr., Texas Tech Press, 1951. B.S., North Texas State, 1936; M.S., 1940.
- Daniels, Billie Gene, Chief Security Officer, 1959.
- Dean, William Frank, Dir., Student Publications & Part-time Instr. in Journalism, 1967. B.B.A., Texas Tech, 1961; M.Ed., 1965.
- Downing, Olan Ray, Dir., Building Maintenance & Utilities, 1936, 1961. Reg. Prof. Engr. (Texas).
- Duvall, Virginia Straley, Administrative Asst. to V. Pres. for Student Affairs, 1968. B.S., Purdue, 1962; M.S., Indiana, 1965.
- Forman, Ellis Ray, Asst. Mgr., Bookstore, 1934, 1939. B.A., Texas Tech, 1932.
- Harvey, Julia S., Centrex Chief Telephone Operator, 1953.
- House, Jerry Piott, Asst. Purchasing Agent, 1964. B.B.A., Texas Tech, 1955.
- Igo, Norman Garrett, Dir., New Construction, 1969. B.S. in C.E., Texas Tech, 1943; B.S.A.E. Texas (Austin), 1948; Reg. Prof. Engr. (Texas).
- Kirkwood, Jerry, Campus Planning Comm., Coordinator & Arch. Draftsman, 1957, 1966. B.Arch., Texas Tech, 1954; Reg. Arch. (Texas).

- Kitchen, James William**, Dir., Care & Maintenance of Grounds & Assoc. Prof. of Park Administration & Horticulture, 1964. B.S., Texas Tech, 1951; M.S., 1952; Ph.D., Texas A & M, 1964.
- Klett, Ramon Hollis**, Supt., Texas Tech Research Center & Visiting Assoc. Prof. of Animal Science, 1969. B.S., Texas A & M, 1958; M.S., 1963; Ph.D., Oregon State, 1966.
- Libby, Charles Frederick**, Dir., Building Operations, 1949, 1950.
- McElroy, D. M.**, Dir., Continuing Education & Mgr., KTX-TV, 1959, 1962.
- Moss, Carolyn Edwards**, Administrative Asst. to V. Pres. for Academic Affairs, 1960, 1966.
- Northcutt, Jim J.**, Dir., Environmental Health & Safety, 1965. B.S., Southwestern State (Oklahoma), 1954; M.Ed., West Texas State, 1959; Reg. Prof. Sanitarian (Texas).
- Schmidt, Howard William**, Consulting Arch., New Construction, 1966. B.Arch., Texas Tech, 1950; Reg. Arch. (Texas).
- Seay, David T.**, Deputy Dir., Information Services, 1970. B.A., Texas Tech, 1965.
- Shaver, William Richard**, Resident Counsel, 1969. B.B.A., Southern Methodist, 1949; J.D., Southern Methodist School of Law, 1951; Law License (Texas).
- Smith, Elvis Dean**, Purchasing Agent, 1960, 1963. B.B.A., Texas Tech, 1949; M.B.A., 1951.
- Smith, Hollis Royce**, Comptroller, 1958, 1968. B.B.A., Texas Tech, 1958.
- Snelling, Virginia Lee**, Head, Payroll Dept. & Employee Benefits, 1928, 1961. B.A., Texas Tech, 1931.
- Strawn, Charles B.**, Dir. of Personnel, 1970. B.A., California (Berkeley), 1950.
- Taylor, John Gates**, Business Mgr., 1949, 1963.
- Templeton, Larry Hugh**, General Mgr., Bookstore, 1963, 1969. B.B.A., Texas Tech, 1960.
- Thompson, DeWitt Peyton**, Deputy Dir. for Development, 1968, 1970. B.A., Southern Methodist, 1933.
- Winegar, Marshall A.**, Supervisor, Stenographic Bureau, 1953, 1963.
- Winford, Murrell M.**, Military Property Custodian, 1968, 1969.

### Admission and Registration

- Boze, Floyd D.**, Dean of Admissions & Prof. of Education, 1958, 1965. B.S., East Texas State, 1938; M.S., 1938; Ed.D., Tennessee, 1955.
- Arterburn, Elmer Forrest, Jr.**, Asst. to Dean of Admissions, 1956, 1969. B.B.A., Texas Tech, 1952.
- Peterson, Derwood Niles**, Registrar, 1969. B.S., Texas Tech, 1955.
- Derr, Edward Cardwell**, Asst. to the Registrar, 1969. B.A., Baylor, 1932; T.H.M., Southwestern Baptist Theological Seminary, 1935.
- Reid, Maryanne**, Dir., Foreign Student Admission & Asst. Prof. of Education, 1966, 1967. B.S., Northwestern, 1952; M.A., California (Los Angeles), 1955; Ed.D., Texas Tech, 1967.
- Wickard, Charles Don**, Asst. Registrar, 1969. B.M.Ed., Eastern New Mexico, 1967; M.E., 1968.

### Computer Center

- Innis, George Seth**, Dir. & Assoc. Prof. of Mathematics and Computer Science, 1967, 1969. B.A., Texas (Austin), 1958; M.A., 1961; Ph.D., 1962.
- Adkins, Alonzo F.**, Instr., 1963, 1968. B.S. in E.E., Texas Tech, 1961; M.S. in E.E., 1963.
- Dendy, Donna A.**, Computer Center Library, 1970.

- Hall, Leo Neil**, Computer Programmer, 1967.
- Haynes, Robert O.**, Supervisor of Operations, 1966, 1969. B.A., Texas Tech, 1968.
- Marxen, Richard**, Education and Training, 1968, 1969.
- McKinley, Patricia A.**, Supervisor of Computer Operations, 1966, 1969.
- Roberts, Lou Ann**, Research Assoc. & Asst. Prof. of Computer Science, 1967, 1969. B.S., Texas (El Paso), 1955; M.S., Texas Tech, 1960; Ph.D., California (Los Angeles), 1967.
- Scott, Sally J.**, Administrative Asst., 1968, 1969.
- Shavor, Kenneth M.**, Computer Programmer, 1968, 1969. B.A., Texas (Austin), 1963.
- Vines, Darrell L.**, Systems Engr. & Assoc. Prof. of Electrical Engineering and Computer Science, 1966, 1969. B.A., McMurry, 1959; B.S. in E.E., Texas Tech, 1959; M.S. in E.E., 1960; Ph.D., Texas A & M, 1967.
- Whitmill, Michael R.**, Computer Programmer, 1967, 1969. B.S., Texas Tech, 1968.
- Wood, George William**, Computer Programmer, 1967, 1968.

### Ex-Students Association

- James, Philip Wayne**, Exec. Dir., 1957, 1960. B.S. in Ed., Texas Tech, 1957; M.Ed., 1964.
- Gustwick, Anthony W.**, Asst. Dir., 1962, 1966. B.S. in Ind. Mgt., Texas Tech, 1962.
- Carter, Larry**, Special Asst., 1969. B.S., Texas Tech, 1969.
- Huffman, George Berl**, Dir., Public Relations, 1935, 1970. B.A., Trinity, 1928.

### Institute for Evaporite Studies

- Jacka, Alonzo David**, Dir. & Prof. of Geo-sciences, 1959, 1969. B.S., Beloit, 1953; M.S., Wisconsin, 1957; Ph.D., Rice, 1960.

### Intercollegiate Athletics

- King, J. T.**, Dir. of Athletics, 1958, 1970. B.S., Texas (Austin), 1938.
- Robison, Polk Fancher**, Athletic Administrator of Finance and Development & Assoc. Prof. of Health, Physical Education, and Recreation for Men, 1942, 1970. B.A., Texas Tech, 1934.
- Baker, Arthur Wellington**, Asst. Football Coach, 1970. B.A., Presbyterian Coll., 1953.
- Bass, Robert Eugene**, Head Basketball Coach, 1969. B.S. in P.E., Oklahoma Baptist, 1950; M.Ed. in P.E., Oklahoma, 1954.
- Bell, Richard Murry**, Asst. Football Coach, 1970. B.S., Arkansas, 1958; M.A., 1962.
- Bissell, Robert Willey**, Football Trainer, 1970. B.S., DePaul, 1964; M.A., Indiana, 1966.
- Brown, Robert Clay**, Asst. Football Coach, 1970. B.S., William & Mary, 1959.
- Carlen, James Anthony, III**, Head Football Coach, 1970. B.S., Georgia Inst. of Technology, 1955.
- Carpenter, Ralph**, Sports Information Dir., 1967.
- Condron, Robert Stuart**, Asst. Sports Information Dir., 1968. B.B.A., Texas Tech, 1968.
- Conley, John Francis, Jr.**, Asst. Football Coach, 1961. B.S., Kansas State, 1949; M.S., 1953.
- Evans, Dale Maxwell**, Asst. Football Coach, 1970. B.A., M.A., West Virginia, 1962.
- Fligg, Jack Carlyle**, Asst. Football Coach, 1970. B.S., Oglethorpe, 1954; M.A., George Peabody, 1959.
- Hilliard, James Vernon**, Head Track Coach, 1964. B.B.A., Baylor, 1933; M.Ed., Hardin-Simmons, 1962.
- McNally, James Faber**, Swimming Coach & Asst. Prof. of Health, Physical Education, and Recreation for Men, 1952, 1964. B.S., Oklahoma, 1952; M.Ed., Texas Tech, 1957.

- Meyers, Gerald**, Asst. Varsity Basketball Coach & Head Freshman Basketball Coach, 1970. B.S., Texas Tech, 1959; M.A., 1966.
- Mitchell, Paul Eugene**, Part-time Golf Coach, 1960.
- Oglesby, Gerald J.**, Asst. Basketball Coach, 1969. B.S., Oklahoma Baptist, 1959; M.Ed., Texas A & M, 1965.
- Philbrick, George Rex**, Tennis Coach & Prof. of Health, Physical Education, and Recreation for Men, 1947, 1961. B.S., Texas Tech, 1939; M.Ed., Texas (Austin), 1950.
- Ragland, Jimmy**, Asst. Football Coach, 1970. B.A., Tennessee Polytechnic Inst., 1963.
- Richards, Richard Gordon**, Academic Counselor, 1969. B.F.A., Oklahoma, 1936.
- Segrist, Kal Hill, Jr.**, Head Baseball Coach & Instr. in Health, Physical Education, and Recreation for Men, 1964, 1967. B.S., North Texas State, 1962; M.Ed., Texas Tech, 1965.
- Sparks, Don Lewis**, Athletic Department Trainer & Part-time Instr. in Health, Physical Education, and Recreation for Men, 1958. B.S., Texas Wesleyan, 1950.
- Stiles, Jess**, Asst. Football Coach, 1969. B.S., Midwestern, 1954.
- Sturtz, Ruth Carrington**, Ticket Mgr., 1967.
- Taylor, Marshall Lee**, Asst. Football Coach, 1970. B.S., Tennessee Technological U., 1956; M.A., 1969.
- Wilson, Marion Thomas**, Asst. Football Coach, 1966, 1967. B.S. in Ed., Texas Tech, 1967.

### International Center for Arid and Semi-Arid Land Studies

- Conselman, Frank Buckley**, Dir. & Prof. of Geosciences, 1969. Sc.B., New York, 1930; Sc.M., 1931; Ph.D., Missouri, 1934; Cert. Prof. Geol.
- Bailey, Eleanor June Goosby**, Administrative Asst., 1966. B.A., Abilene Christian, 1965.
- Humphrey, Joseph Lee**, Deputy Dir. for Administration & Instr. in Accounting, 1968, 1970. B.B.A., Texas Tech, 1962; M.B.A., 1964.
- Traylor, Idris Rhea, Jr.**, Deputy Dir. for Academic Affairs & Assoc. Prof. of History, 1960, 1967. B.A., Texas (Austin), 1957; M.A., 1959; Ph.D., Duke, 1965.

### Library

- Janeway, Ray Curtis**, Librarian, 1949. B.A., Kansas, 1938; B.S. in L.S., 1941; M.S., Illinois, 1944.
- Brand, Charlotte Mae Venn**, Asst. Catalog Libr., 1969. B.A., Miami, 1943; M.S. in L.S., Texas (Austin), 1953.
- Dickson, Margaret Asher**, Asst. Catalog Libr., 1957, 1965. B.S., Texas Tech, 1943; M.L.S., Texas Woman's, 1964.
- Goddard, Susanne Sandborn**, Asst. Catalog Libr., 1963. B.A., North Texas State, 1956; B.S. in L.S., 1957.
- Goodman, Virginia Suddath**, Catalog Libr., 1966. A.B., Oklahoma, 1933; A.E. in L.S., 1940.
- Gordon, Mary Frances**, Reference Libr., 1963. B.S., West Texas State, 1938; B.A. in L.S., Oklahoma, 1942.
- Green, Mary Ruby**, Assoc. Reference Libr., 1966. B.S., Texas Tech, 1938; M.A. in L.S., Denver, 1954.
- Greenhill, Virginia Lee**, Asst. Catalog Libr., 1960. B.A., North Texas State, 1960.
- Hendrick, Karen Jan**, Assoc. Reference Libr., 1969. B.A., Abilene Christian, 1965; M.L.S., Texas Woman's, 1966.
- Hicks, Clifford Wayne**, Assoc. Reference Libr., 1969. B.A., Chapman Coll., 1966.

- Hickson, Charlotte Ann**, Assoc. Reference Libr., 1968. B.A., Texas Woman's, 1968.
- Holloway, Sharon Kay**, Assoc. Reference Libr., 1970. B.S., Central State Coll., 1965; M.L.S., Texas Woman's, 1967.
- Huey, Charles Finley**, Asst. Order Libr., 1958, 1963. B.S., North Texas State, 1944; B.S. in L.S., 1962.
- Lewis, Kathryn Dibbens**, Periodicals Libr., 1961, 1962. B.A. in L.S., Oklahoma, 1936; M.A. in L.S., 1958.
- Lyeria, Gloria G.**, Assoc. Reference Libr., 1952, 1967. B.S., North Texas State, 1950; M.S., 1952.
- Maxwell, Dolores Melvin**, Assoc. Reference Libr., 1963. B.A., Denver, 1944; M.A., Wisconsin, 1949; M.A. in L.S., 1963.
- Morrison, Sibyl Pirtle**, Order Libr., 1947, 1964. B.S. in Ed., Texas Tech, 1940; B. L.S., California (Berkeley), 1947.
- Niell, Cora Fox Yonge**, Asst. Periodicals Libr., 1961, 1963. B.A., Texas Woman's, 1937.
- Palk, Nak Chin**, Asst. Catalog Libr., 1968. B.A., Han Kuk U. (Seoul, Korea), 1963; M.S. in L.S., East Texas State, 1968.
- Pitts, Pauline Dawn**, Asst. Catalog Libr., 1956. B.A., Southeastern State, 1930; B.A. in L.S., Oklahoma, 1936; M.S., Illinois, 1951.
- Platz, James Edward**, Assoc. Libr., 1949, 1955. B.A., Lawrence Coll., 1929; B.S. in L.S., Illinois, 1940.
- Savage, Katrina Adele**, Asst. Documents Libr., 1965. B.A., Texas Tech, 1964; M.L.S., North Texas State, 1965.
- Smith, Carol May**, Circulation Libr., 1968. B.S., Eastern Oregon Coll., 1951; M.Ed., Oregon, 1953; M.S. in L.S., 1967.
- Streit, Patricia Colleen**, Asst. Catalog Libr., 1969. B.A., Southwestern, 1965; M.S., East Texas State, 1966; M.S. in L.S., Texas Woman's, 1969.
- Temple, Frank Millett**, Assoc. Libr., 1951, 1963. B.S., Boston, 1950; B.S. in L.S., North Texas State, 1951; M.A., Texas Tech, 1959.
- Tucker, Ferrelline**, Documents Libr., 1942, 1949. B.A., Texas Tech, 1940; B.S. in L.S., California (Berkeley), 1949.
- Ullom, Linda Jane**, Assoc. Reference Libr., 1970. B.A., Texas Tech, 1968; M.L.S., Oklahoma, 1970.
- Wagner, Jene Wallace**, Bibliographer, 1967.

### Museum

- Kingman, Eugene**, Acting Dir. & Dir. of Exhibits and Programs, also Assoc. Dir. for Art, 1959. B.A., Yale, 1932; B.F.A., 1935; Dr. of Fine Arts (Hon.), Creighton, 1968.
- Rogers, Jerry Leon**, Assoc. Dir. & Dir., Ranch Complex, 1969. B.A., Texas Tech, 1962; M.A., 1965.
- Allgood, Patricia**, Exhibits Preparator, 1970. B.A., Texas Tech, 1950.
- Bundy, Mardema Locke**, Mgr., Sales Desk and Publications, 1964.
- Keay, Lou Carter**, Field Representative, 1965; B.L.I., Emerson, 1948.
- McLaughlin, Charles M.**, Assoc. Dir. for Administration, 1970.
- Mills, Betty Jo**, Asst. Curator of Collections, 1959. B.S. in H.E., Texas Tech, 1941; M.S. in H.E., 1969.
- Montgomery, Rose Serrano**, Curatorial Asst., 1964.
- Rylander, Dorothy Jane**, Administrative Asst., 1953, 1958. B.A., Texas Tech, 1930; M.A., 1931.
- Sandy, Margaret Spoon**, Services Coordinator, 1960. B.A., Wisconsin, 1927; M.A., Illinois, 1934.
- Sullivan, Jerry Melton**, Research Asst., 1970. B.B.A., Texas Tech, 1964.

### Placement Service

- Jenkins, Jean Ayres, Dir., 1947, 1956. B.A., Texas Tech, 1935.  
Morrison, Floy Sample, Asst. Dir., 1965, 1966. B.S., Carnegie-Mellon, 1932.

### Planning and Analyses

- Barton, Richard Fleming, Dir. & Prof. of Management and Computer Science, 1967, 1968. B.S., Northwestern, 1948; Ph.D., California (Berkeley), 1961.  
Bicket, Edward Lawrence, Jr., Research Asst., 1969. B.B.A., Texas Tech, 1967.  
Bundock, Don W., Research Asst., 1969. B.S. in I.E., Texas Tech, 1969.  
Dixon, Hortense Williams, Research Asst., 1968, 1969. B.S., Prairie View, 1946; M.S., Minnesota, 1950.  
Hornbeck, Gary Allan, Research Asst., 1970. B.S. in I.E., Texas Tech, 1969.  
Hutcherson, Fran R., Administrative Asst., 1969. B.S., Abilene Christian, 1967.  
Yeager, Jimmy Don, Research Asst., 1969. B.A., Texas Tech, 1968.

### Residence Halls

- Moore, Guy Junior\*, Dir., 1963. B.S., Southern Illinois, 1957; M.S., 1963.

### Food Service

- Bates, Shirley Schulz, Dir., 1948, 1951. B.S., Southwest Texas State, 1940.  
Birkman, Margaret Ragsdale, Asst. Dir., 1948, 1956. B.S., Texas Tech, 1940.  
Cualmes, James, Mgr., 1969.  
Courtney, Nathalie, Mgr., 1966, 1967. B.S., Texas Tech, 1963.  
Elliott, Mary Elizabeth, Supervisor, 1950, 1964. B.S., Texas Tech, 1939; M.S., 1950.  
Holmes, Joe Blank, Mgr., Residence Hall Central Food Facilities, 1964. B.S., Texas (Austin), 1933.  
Lemond, Lois Pearl, Mgr., 1968.  
Lewis, Lillian Jo Bledsoe, Mgr., 1960. B.S., Texas Woman's, 1930.  
McCormick, Susan D., Mgr., 1969. B.S., Texas Tech, 1968.  
Mollhagen, Dolores Jean Kaufman, Mgr., 1967. B.S., Fort Hays Kansas State, 1962.  
Peeks, Stella Edna, Supervisor, 1955, 1965. B.S., Texas A & I, 1944; M.S., Texas Tech, 1949.  
Pierce, Florence Stone, Dietitian, 1962, 1967. B.S., Texas Tech, 1949.  
Ray, Mildred Novell, Mgr., 1965, 1967.  
Roberson, Virginia Simpson, Mgr., 1961, 1963.  
Roberts, Hazel Glossom, Mgr., 1960.  
Self, Jimmie Leda, Mgr., 1966, 1967.  
Umlang, Gertrude Elizabeth, Mgr., 1967. B.S., Texas (Austin), 1931.  
Watson, Lavada Marie, Administrative Asst., 1969.  
Westbrook, Clair Dean Ray, Mgr., 1959, 1964.

### Room Reservations

- Haynes, Billy Donn, Coordinator, 1960, 1969. B.A., Wayland Baptist, 1960.

### Supervisory Staff for Men

- Rhoads, George Alverton, Coordinator, 1966. B.S., Texas Tech, 1949.  
Chauncey, James Reavis, Supervisor, Bledsoe Hall, 1968. B.B.A., Texas Tech, 1965.  
Clark, Michael Alan, Asst. Supervisor, Weymouth Hall, 1969. B.B.A., St. Bonaventure, 1966.  
Hass, Billy Niel, Supervisor, Thompson Hall, 1969. B.S., Panhandle State, 1966.  
Lucas, Martin Virgil, Supervisor, Sneed Hall, 1967.  
McBeth, Kenneth L., Supervisor, Gaston Hall, 1969.  
Martin, James Arthur, Supervisor, Gordon Hall, 1969. B.A., Texas Tech, 1963; M.A., 1966.

- Paul, Vernon Leon, Supervisor, Murdough Hall, 1968. B.S., Texas Tech, 1968.  
Short, Bobby Leroy, Supervisor, Wells Hall, 1967.  
Smith, W. C., III, Supervisor, Weymouth Hall, 1967. B.S., Angelo State, 1967.  
Whittington, Tony Burnice, Supervisor, Carpenter Hall, 1969. B.B.A., Texas Tech, 1963.

### Supervisory Staff for Women

- Garner, Dorothy Taft, Coordinator, 1956, 1964. B.A., Oklahoma, 1928; M.A., 1933; M.Ed., 1956.  
Applegate, Margaret Patten, Counselor, Chitwood Hall, 1962, 1967.  
Baker, Carole Reed, Counselor, Weeks Hall, 1969. B.A., Texas Tech, 1969.  
Banks, Julia Ann, Asst. Counselor, Stangel Hall, 1969.  
Berry, Lucile Griffin, Counselor, Hulen Hall, 1964, 1965.  
Bleker, Martha Jo, Counselor, Clement Hall, 1969. B.S., Texas, 1968.  
Broadus, Mary Neville, Counselor, Stangel Hall, 1969. B.A., Texas Christian, 1940.  
Burden, Sarah Emily Yates, Counselor, Gates Hall, 1958, 1964.  
Farley, Lucille Lee, Asst. Counselor, 1967.  
Gilpin, Elen Louise, Counselor, Horn Hall, 1967. B.A., Baylor, 1939.  
Mansell, Shirley Lomax, Counselor, Knapp Hall, 1961. B.A., Goucher Coll., 1926.  
May, Alice Lawrence, Counselor, Coleman Hall, 1954, 1969.  
Pogue, Leta Ferrel, Asst. Counselor, 1967.  
Raitz, Lynn L., Counselor, Wall Hall, 1969. B.A., Texas Tech, 1969.  
Turner, Diana Lynn, Asst. Counselor, Coleman Hall, 1969. B.S., Texas Tech, 1969.  
Wise, Ruby-Mal Jackson, Asst. Counselor, 1965.

### Southwest Collection

- Dunn, Roy Sylvan, Dir. & Assoc. Prof. of Sociology, 1956, 1963. B.A., Texas (Austin), 1948; M.A., 1951.  
Blaisdell, Doris Ariane, Assoc. Archivist, 1960, 1963. B.A., American U., 1944; M.A., Wisconsin, 1948; Ph.D., 1953.  
Carpenter, Fred Alan, Field Representative, 1969.  
Gracy, David Bergen, II, Archivist, 1966. B.A., Texas (Austin), 1963; M.A., 1966.  
Skaggs, Jimmy Marion, Deputy Archivist & Part-time Instr. in History, 1965, 1968. B.S., Sul Ross State, 1962; M.A., Texas Tech, 1965.  
Whiteley, Thomas Saunders, Asst. Archivist, 1968. B.A., Baylor, 1935; M.A., Texas (Austin), 1940; M.L.S., Texas Woman's, 1958.

### Student Health Center

- Kallina, Frederick Paul, M.D., Dir. & Physician, 1948, 1959. B.S., Texas A & M, 1942; M.D., Baylor, 1945.  
Adair, Bertha Nell, R.N., Nurse, 1960, Seton Infirmary, 1921.  
Bankhead, Vertice Lee, L.V.N., Nurse, 1969.  
Childress, Hattie M., R.N., Relief Nurse, 1953, 1965. Schumpert Memorial Hospital, 1935.  
Cruce, Edith Margaret, R.N., Nurse, 1965. West Texas Hospital School of Nursing, 1944.  
Devaney, Gertrude Ann, L.V.N., Nurse, 1969.  
Gray, Barbara Ruth, R.N., Nurse, 1962. Mercy Hospital School of Nursing, 1943.  
Hand, Ora Robert, M.D., Physician, 1965. B.S., Wisconsin, 1928; M.D., Washington, 1930.  
Hefner, Nell, Medical Technologist, 1952. Sealy Hospital, 1935.  
Hensley, Margie Jessie, L.V.N., Nurse, 1968.  
Jacobs, Bertie Lou, L.V.N., Nurse, 1961.  
Kloiber, Ada Estelle, L.V.N., Nurse, 1949.



- Kuhnley, Edith A.**, R.N., Supervising Nurse, 1959, 1965. Northwest Texas Hospital, 1947.
- Lane, Mabel L.**, R.N., Nurse, 1968. U. of Texas School of Nursing, 1946.
- Lattimore, Corine Irons**, R.N., Nurse, 1968. Lubbock School of Nursing, 1932.
- McKee, Martha Ann**, R.N., Nurse, 1969. Methodist Hospital of Dallas, 1967.
- Norman, Iris Jane**, R.N., Supt. of Hospital, 1951. Lubbock School of Nursing, 1937.
- Round, Harry Foster**, M.D., Physician, 1969. B.S., Baylor, 1947; M.D., Southwestern U. of Texas, 1951.
- Terrell, Elizabeth Ann.**, R.N., Nurse, 1965. Shannon School of Nursing, 1965.
- Welch, Lorene**, L.V.N., Nurse, 1964.

### Student Life

- Jones, Lewis Norton**, Dean of Students, 1947, 1968. B.S., Texas Tech, 1938; M.A., 1939.
- Duvall, William Henry**, Asst. Dean of Students for Programs & Asst. Prof. of Education, 1967, 1968. B.A., Maryland, 1961; M.Ed., 1964; Ed.D., Indiana, 1967.
- Scott, George, Jr.**, Asst. Dean of Students for Administration, 1969. B.S., Langston U., 1949; M.Ed., Prairie View Coll., 1960.
- Akins, Dudley Stephenson**, Financial Aid Adviser, 1967.
- Burnett, Don Robert**, Dir., International Student Services, 1969. B.A., Washington, 1964; M.A., Stanford, 1965.
- Causey, Ruth Williams**, Women's Adviser, 1967, 1968. B.S., Texas Woman's 1944; M.Ed., Henderson State Coll., 1961.
- Crozier, Milvern Jasper**, Financial Aid Adviser, 1968. B.S., Southwest Texas State, 1939.
- Huber, Margaret M.**, Women's Adviser, 1969. B.S., Kansas State Teachers Coll., 1964; M.A., New Mexico, 1969.
- Janzen, Fred George**, Men's Adviser, 1969. B.S., Southwestern State Coll., 1959; M.Ed., Texas Tech, 1963.
- Mobberley, Carola Joan**, Dir., Student Activities & Panhellenic Adviser, 1968. B.A., Texas Tech, 1967.
- Stover, Thomas Paul**, Dir., Student Financial Aids, 1962, 1967. B.A., Ohio Wesleyan, 1958; M.S., Indiana, 1961.
- Volcansek, Max John, III**, Men's Adviser, 1968. B.A., Texas Tech, 1966; M.A., 1967.

### Tech Union

- Longley, Nelson Henry**, Dir., 1955, 1958. B.A., Southeastern Louisiana Coll., 1954.
- Moorhead, Tom Norton**, Asst. Dir., 1969. B.B.A., Texas Tech, 1941.
- Morse, Gertrude**, Food Service Mgr., 1953, 1962. B.S., Texas Tech, 1935.
- Pijan, Dorothy Brace**, Program Dir., 1963, 1964. B.M., Texas Tech, 1960; M.Ed., 1963.
- Whadford, Chesley Orval**, Night Mgr., 1969.

### Textile Research Center

- Bradford, John Ross**, Dir. & Dean of the College of Engineering, also Prof. of Chemical Engineering, 1943, 1968. B.S. in Ch.E., Texas Tech, 1942; M.S. in Ch.E., 1948; Ph.D., Case Inst. of Technology, 1953; Reg. Prof. Engr. (Ohio, Texas).
- Arthur, Harry Edward**, Assoc. Dir., 1960, 1969. B.S. in T.E., Texas Tech, 1949; Reg. Prof. Engr. (Texas).
- Cockshott, Ian Derek**, Postdoctoral Fellow, 1970. B.Sc. in Fibre Science, U. of Manchester, 1966; Ph.D., 1969.
- Johnson, Robert F.**, Dir., Chemical Processes Laboratory & Prof. of Textile Engineering, 1968. B.S., Kentucky, 1951; M.S., Georgia Inst. of Technology, 1958; Dr. sc. techn., Eidgenossische Technische Hochschule (Zurich), 1963.
- Kieke, Herbert Ernest**, Textile Technologist, 1965.

- Kilgore, George W.**, Textile Engineer & Instr. of Weaving, 1964. B.S. in T.E., Texas Tech, 1950; Reg. Prof. Engr. (Texas).
- King, Joseph Andrew**, Wool Technologist, 1968. B.S., Maryland, 1953; M.S., New Mexico State, 1962.
- Linn, Gene H.**, Asst. to the Dir., 1969. B.S., Abilene Christian, 1958.
- Loughlin, James Edward**, Mgr., Chemical Processes Pilot Plant, 1969. B.S. in Ch.E., Cooper Union Inst. of Technology, 1932.
- Manjrekar, Tulsidas Gunvant**, Postdoctoral Fellow, 1969. B.Sc. in Chem., U. of Bombay, 1961; M.Sc. in Chem., 1963; Ph.D., 1968.
- Mehta, Rajnikant Dasharathlal**, Research Assoc., 1969. B.Sc. in Chem., U. of Gujarat, 1952; M.Sc. in Chem., 1954; Ph.D., 1963.
- Mouchet, Robert Lindsey**, Research Assoc. & Supervisor, Mechanical Processes, 1968. Diploma, North Carolina Vocational Textile School, 1960.
- Sawhney, Amar Paul**, Postdoctoral Fellow, 1970. B. Tex. Tech., U. of Delhi (India), 1960; Dr. Sc., U. of Ghent (Belgium), 1969.
- Towery, Jack D.**, Dir., Physical Measurements Laboratories, 1968. B.S. in T.E., Texas Tech, 1938; F.T.I., Manchester, 1961; Reg. Prof. Engr. (Texas). C. Tex. Techno. (England).
- Wallace, Thomas Ray**, Asst. to the Dir. 1967. B.S. in Ed., North Texas State, 1955.
- Whitt, Reva E.**, Textile Technologist & Supervisor of Physical Measurements Laboratories, 1959, 1969.
- Wyatt, Bobby Gene**, Textile Analytical Chemist, 1969. B.S. in Chem., Texas (Austin), 1960.

### University Bulletins

- Woods, Paul Joseph**, Editor & Prof. of History, 1960, 1969. B.A., Illinois, 1938; M.A., 1940; Ph.D., 1941.
- Webber, Gale Newcomb**, Asst. Editor, 1967. B.S., Carnegie Inst. of Technology, 1962.

### University Counseling Center

- Kuntz, James Edward**, Dir. & Prof. of Psychology, 1951, 1959. B.S., Fort Hays Kansas State, 1937; M.S., 1938; Ph.D., Purdue, 1950.
- Clark, Nelda Alice**, Counseling Psychologist, 1967. B.A., Texas Tech, 1938; M.A., Denver, 1962.
- Kuntz, Marjorie Leah**, Psychometrist, 1958. B.A., McPherson, 1938.
- Berman, Monte**, Teaching Asst., 1970. B.A., Goddard Coll., 1968.
- Broadway, Clifford M.**, Graduate Asst., 1970. B.A., Memphis State, 1956; M.A., U. of Omaha, 1960.
- Carouthers, Charles**, Teaching Asst., 1967. B.A., Texas Tech, 1966.
- Crittenden, Randy**, Teaching Asst., 1970. B.A., Texas Tech, 1969.
- Deardorff, Charles Melvin**, Teaching Asst., 1967. B.A., Texas Tech, 1957; B.S., Oklahoma State, 1958.
- Hirsch, Steven**, Teaching Asst., 1970. B.A., Massachusetts, 1969.
- Jones, Randel**, Graduate Asst., 1970. B.S., North Texas State, 1964; M.S., 1965.
- Montgomery, Peter**, Graduate Asst., 1970. B.S., Springfield Coll., 1959; M.Ed., 1960.
- Tal, Ada**, Graduate Asst., 1970. B.A., Whittenberg U. (Ohio), 1968.

### Water Resources Center

- Wells, Dan Moody**, Dir. & Prof. of Civil Engineering, 1966, 1968. B.S., Texas Tech, 1951; M.S., Missouri (Columbia), 1954; Ph.D., Texas (Austin), 1966; Reg. Prof. Engr. (Texas).

### West Texas Water Institute

Miller, William D., Co-Chmn. & Assoc. Prof. of Geosciences, 1962, 1965. B.A., Texas Tech, 1957; M.S., 1959; Ph.D., Missouri, 1963.

Thomas, Gerald Waylett\*\*, Co-Chmn. & Dean of the College of Agricultural Sciences, 1958. B.S., Idaho, 1941; M.S., Texas A & M, 1951; Ph.D., 1954.

### Western Information Network Association

Bradford, John Ross, Exec. Dir. & Dean of the College of Engineering, 1943, 1968. B.S. in Ch.E., Texas Tech, 1942; M.S. in Ch.E., 1948; Ph.D., Case Inst. of Technology, 1953; Reg. Prof. Engr. (Ohio, Texas).

Whipple, Robert D., Assoc. Dir., 1967, 1968. B.S. in E.E., Texas (Austin), 1949; B.B.A., 1952; Reg. Prof. Engr. (Texas).

King, Lillian Jo, Administrative Asst., 1963, 1968.

## College of Agricultural Sciences

### Dean & Staff

Thomas, Gerald Waylett\*\*, Dean & Prof. of Range and Wildlife Management, also Co-Chmn., West Texas Water Inst., 1958. B.S., Idaho, 1941; M.S., Texas A & M, 1951; Ph.D., 1954.

Bennett, James Wayland, Assoc. Dean & Prof. of Agricultural Economics, 1948, 1963. B.S., Texas Tech, 1948; M.S., Louisiana State, 1951; Ph.D., 1955.

Orri, Samuel Everett, Asst. Dean & Assoc. Prof. of Animal Science, 1961, 1968. B.S., Sam Houston State, 1959; M.S., Missouri, 1961; Ph.D., Texas A & M, 1963.

Ramsel, Carl Lesta Davis, Administrative Asst., 1965, 1967. B.A., Texas Wesleyan, 1942.

### Department of Agricultural Economics

Williams, Willard Forest, Chmn. & Horn Prof., 1963, 1968. B.S., Oregon State, 1947; M.S., California (Berkeley), 1948; Ph.D., Purdue, 1952.

Bennett, James Wayland, Prof. & Assoc. Dean of the College of Agricultural Sciences, 1948, 1963. B.S., Texas Tech, 1948; M.S., Louisiana State, 1951; Ph.D., 1955.

Campbell, George W., Jr., Visiting Assoc. Prof., 1969. B.S., California (Davis), 1948; M.S., 1951; Ph.D., Purdue, 1954.

Footo, Richard Jay, Prof. & Prof. of Statistics, 1968, 1969. B.S., Michigan State, 1935; M.S., Iowa State, 1937.

Fowler, Marquis Lyndon, Prof., 1966. B.S.A., Arkansas, 1951; Ph.D., California (Berkeley), 1961.

Graves, James Wilton, Assoc. Prof., 1961, 1967. B.S., Cornell, 1952; M.S., Texas A & M, 1958; Ph.D., Michigan State, 1964.

Grubb, Herbert Warren, Assoc. Prof. & Assoc. Prof. of Statistics, 1964, 1969. B.S., Berea, 1958; M.S., Oklahoma State, 1960; Ph.D., North Carolina State, 1964.

Kennedy, Rex Page, Asst. Prof., 1966. B.S., Texas Tech, 1956; M.S., Texas A & M, 1961.

Lee, Hong Yong, Asst. Prof., 1963, 1969. B.S., Central Missouri State, 1959; M.S., Oklahoma State, 1962; Ph.D., 1967.

Leonard, Archie Leroy, Assoc. Prof., 1947. B.S., Oklahoma State, 1931; M.S., 1934.

Moorman, David Garner, Asst. Prof., 1967. B.S., Texas Tech, 1961; M.S., 1963, Ph.D., Texas A&M, 1970.

Osborn, James Ezra, Assoc. Prof. & Assoc. Prof. of Statistics, 1965, 1969. B.S., Oklahoma State, 1959; Ph.D., 1964.

Owens, Thomas Richard, Assoc. Prof., 1965. B.S., Pennsylvania State, 1948; M.S., 1956; Ph.D., Oregon State, 1962.

Roy, Sujit Kumar, Asst. Prof. & Asst. Prof. of Statistics, 1968, 1969. B.A., Visva Bharati U. (India), 1958; M.A., 1960; M.S.A., Toronto, 1964; Ph.D., Pennsylvania State, 1969.

### Research Assistants

Bloodworth, Finley Garland, 1969. B.S., Texas Tech, 1968.

Craven, John Arvil, 1970. B.S., Texas Tech, 1969.

Glass, Louis Singer, 1968. B.S., Texas Tech, 1968.

Haston, Jimmie Dee, 1968. B.S., Texas Tech, 1956.

Hinsley, James Alvin, 1970. B.S., Texas Tech, 1968.

Justice, James Edward, 1968. B.S., Texas Tech, 1967.

McCray, William Chester, 1969. B.S., Texas Tech, 1969.

Merrick, Edward Benton, 1968. B.S., Texas Tech, 1962.

Pesek, Ray Allen, 1968. B.S., Southwest Texas State, 1968.

Pruitt, David Ward, 1968. B.S., Texas A & M, 1968.

Reed, Ronnie Dean, 1969. B.S., Texas Tech, 1969.

Snodgrass, Jesse Carter, 1968. B.S., Texas Tech, 1961.

Webb, K. Dale, 1969. B.S., Texas Tech, 1969.

### Department of Agricultural Education

Leach, Thomas Luther, Chmn. & Prof., 1937, 1961. B.S., Texas Tech, 1934; M.S., 1939.

Eggenberger, Ulrich Lewis, Assoc. Prof. & Part-time Assoc. Prof. of Agricultural Engineering, 1961, 1964. B.S., Kansas State, 1952; M.S., 1956; Ph.D., Iowa State, 1964.

Hargrave, Levi Marlin, Prof., 1946, 1964. B.S., Texas Tech, 1935; M.S., 1942.

Thomas, Gerald Waylett\*\*, Prof. & Dean of the College of Agricultural Sciences, also Prof. of Range and Wildlife Management, 1958. B.S., Idaho, 1941; M.S., Texas A & M, 1951; Ph.D., 1954.

### Department of Agricultural Engineering

Ulrich, Willie Lee, Chmn. & Prof., also Dir., Grain Drying and Storage Inst. & Member, Texas Air Control Board, 1961. B.S., Texas A & M, 1943; M.S., 1947; Ph.D., Harvard, 1951; Reg. Prof. Engr. (Texas).

Brashers, Alan Dale, Part-time Asst. Prof., 1967. B.S., Texas A & M, 1961; M.S., 1963; Reg. Prof. Engr. (Texas).

Carpenter, Thomas Grady, Assoc. Prof., 1970. B.S., Tennessee, 1961; M.S., Iowa State, 1963; Ph.D., Mississippi State, 1969.

Dvoracek, Marvin John, Assoc. Prof., 1962, 1967. B.S., Texas A & M, 1953; B.S., 1959; M.S., California (Davis), 1962; Reg. Prof. Engr. (Texas).

Eggenberger, Ulrich Lewis, Part-time Assoc. Prof. & Assoc. Prof. of Agricultural Education, 1961, 1964. B.S., Kansas State, 1952; M.S., 1956; Ph.D., Iowa State, 1964.

- Foerster, Eugene P.**, Assoc. Prof., 1969. B.S., Texas A & M, 1959; M.S., Texas Tech, 1965; Ph.D., Arizona (Tucson), 1970.
- Grub, Walter**, Assoc. Prof., 1966. B.S., Rutgers, 1949; M.S., Cornell, 1953.
- Keeton, Leonard**, Instr., 1969. B.S., Texas Tech, 1967; M.S., Missouri (Columbia), 1968.
- Newell, Joseph Clarence**, Asst. Prof., 1967. B.S., Clemson, 1941; M.S., Arkansas, 1951; Reg. Prof. Engr. (Texas).
- Williams, Ira Lawson**, Prof., 1952, 1961. B.S., Texas A & M, 1930; M.S., Iowa State, 1931; Reg. Prof. Engr. (Texas).

#### *Research Assistants*

- Dennis, Steve Austin**, 1969. B.S. in Ag. Engr., Texas Tech, 1969.
- Martin, James D.**, 1969. B.S., Texas Tech, 1966.
- Peterson, Samuel Hargreaves**, 1969. B.S., Texas Tech, 1969.
- Spraggins, Don Leslie**, 1969. B.S., Texas Tech, 1967.
- Wilke, Larry Edmund**, 1969. B.S., Texas Tech, 1969.

#### **Department of Agronomy**

- Dregne, Harold Ernest**, Chmn. & Prof., 1969. B.S., Wisconsin State, 1938; M.S., Wisconsin, 1940; Ph.D., Oregon State, 1942.
- Allen, Bonnie L.**, Prof., 1959, 1965. B.S., Texas Tech, 1948; M.S., Michigan State, 1951; Ph.D., 1960.
- Ayers, Cecil Irvy**, Prof., 1942, 1960. B.S., Texas Tech, 1936; M.S., 1944; Reg. Plant Breeder (Texas).
- Bennett, William Frederick**, Prof., 1968, 1969. B.S., Oklahoma State, 1950; M.S., Iowa State, 1952; Ph.D., 1958.
- Coleman, Eugene Alfred**, Assoc. Prof., 1964, 1967. B.S., Texas Tech, 1960, M.S., Purdue, 1962; Ph.D., 1964.
- Downes, John Dixon**, Prof., 1970. B.S., West Virginia, 1942; M.S., 1951; Ph.D., Michigan State, 1955.
- Elle, George O.**, Prof., 1938, 1951. B.S., Oregon State, 1938; M.S., Texas Tech, 1941; Ph.D., Cornell, 1951.
- Harvey, Clark**, Prof., 1954, 1961. B.S., West Texas State, 1939; B.S., Texas A & M, 1940; M.S., Iowa State, 1948; Ph.D., 1950.
- Jaynes, Chester Cartwright**, Assoc. Prof., 1951, 1964. B.S., Texas Tech, 1949; M.S., 1957.
- Krieg, Daniel R.**, Asst. Prof., 1970. B.S., Texas A & M, 1965; Ph.D., 1970.
- Meyer, Raymond Erwin**, Assoc. Prof., 1965. B.S., Kansas State, 1959; Ph.D., Oklahoma State, 1963.

#### *Teaching Assistant*

- Swinburn, Max C.**, 1969. B.S., Texas Tech, 1967.

#### **Department of Animal Science**

- Zinn, Dale Wendel**, Chmn. & Prof., 1961, 1967. B.S., West Virginia, 1952; M.S., 1956; Ph.D., Missouri, 1967.
- Albin, Robert Custer**, Assoc. Prof., 1964, 1967. B.S., Texas Tech, 1961; M.S., 1962; Ph.D., Nebraska, 1965.
- Baumgardner, John Henry**, Prof., 1945, 1961. B.S., Texas Tech, 1939; M.S., 1940.
- Curl, Samuel Everett**, Assoc. Prof. & Asst. Dean of the College of Agricultural Sciences, 1961, 1965. B.S., Sam Houston State, 1959; M.S., Missouri, 1961; Ph.D., Texas A & M, 1963.
- Durham, Ralph Marion**, Prof., 1959. B.S., Colorado State U., 1948; M.S., Wisconsin, 1949; Ph.D., 1951.
- Ellis, George F., Jr.**, Adjunct Prof., 1968. B.S., New Mexico State, 1955; Ph.D., Texas A & M, 1963.
- Gaskins, Charles Thorne, Jr.**, Asst. Prof., 1970. B.S., Texas Tech, 1964; M.S., 1966.

- Hansen, Keith Roger**, Asst. Animal Husbandman, 1968. B.S., New Mexico State, 1966; M.S., Texas Tech, 1968.

- Harbaugh, Fred George**, Prof. & Veterinarian, 1927, 1941. B.S., Iowa State, 1927; D.V.M., 1927.

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- Hudson, Frank Alden**, Assoc. Prof., 1960, 1962. B.S., Arizona State, 1952; M.S., New Mexico State, 1953; Ph.D., Oregon State, 1957.

- Klett, Raymond Hollis**, Visiting Assoc. Prof. & Supt., Texas Tech Research Center, 1969. B.S., Texas A & M, 1958; M.S., 1963; Ph.D., Oregon State, 1966.

- Lind, Keith Duane**, Asst. Prof., 1969. B.S., Minnesota, 1964; M.S., Kansas State, 1968; Ph.D., 1969.

- O'Brien, Coleman Art**, Assoc. Prof., 1947, 1967. B.S., Texas A & M, 1944; M.S., 1945; Ph.D., 1964.

- Ramsey, Clovis Boyd**, Assoc. Prof., 1968. B.S., Tennessee, 1956; M.S., Kentucky, 1957; Ph.D., 1960.

- Sherrod, Lloyd Bruce**, Visiting Assoc. Prof., 1967. B.S., South Dakota State, 1958; M.S., Arkansas, 1960; Ph.D., Oklahoma State, 1964.

- Tribble, Leland Floyd**, Prof., 1967. B.S., Missouri, 1949; M.S., 1950; Ph.D., 1956.

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- Willingham, Juddie Johnson**, Chmn. & Prof., 1948, 1949. B.S., Texas A & M, 1931; M.S., Iowa State, 1937; Ph.D., 1942.

- Miller, Ronald Max**, Asst. Prof., 1960, 1967. B.S., Texas Tech, 1958; M.S., Michigan State, 1960.

- Peebles, Milton Lester**, Prof., 1951, 1967. B.S., Texas Tech, 1949; M.S. in Agri., 1954; Ph.D., Ohio State, 1960.

- Selman, Robert Lee**, Asst. Prof., 1968. B.S., Texas Tech, 1963; M.S., 1964.

#### **Department of Park Administration, Horticulture, and Entomology**

- Urbanovsky, Elo Joe**, Chmn. & Horn Prof., also University Landscape Architect, 1949, 1967. B.S., Texas A & M, 1930.

- Ashdown, Donald**, Prof., 1952, 1956. B.S., Utah State, 1942; Ph.D., Cornell, 1948.

- Chevalier, Bill Aubrey**, Instr., 1964. B.S.L.A., Louisiana State, 1964.

- Connor, Seymour Vaughan**, Prof. of History, 1953, 1956. B.A., Texas (Austin), 1948; M.A., 1949; Ph.D., 1952.

- Doell, Charles E.**, Adjunct Prof., 1965, 1968. B.S., Minnesota, 1916; M.S., 1917; Diploma, Alexander Hamilton, 1922.

- Gosdin, John Mark**, Instr., 1969. B.S., Texas Tech, 1964; M.E., 1969.

- Houston, L. B.**, Adjunct Prof., 1968. B.S., Southern Methodist, 1930.

- Huddleston, Ellis Wright**, Assoc. Prof., 1960, 1965. B.S., Texas Tech, 1956; M.S., Cornell, 1958; Ph.D., 1960.

- Kitchen, James William**, Assoc. Prof. & Dir., Care and Maintenance of Grounds, 1964, 1967. B.S., Texas Tech, 1951; M.S., 1952; Ph.D., Texas A & M, 1964.

- Musiak, Thomas Alec**, Asst. Prof., 1965, 1968. B.S., Massachusetts, 1961; B.L.A., 1965; M.L.A., 1968.

- Reed, Robert Rentoul**, Asst. Prof., 1957, 1962. B.S., Pennsylvania State, 1954.

- Taylor, Pat Dwayne**, Instr., 1969. B.S., Texas Tech, 1967; M.S., 1969.

- Templer, Otis Worth**, Asst. Prof. of Geosciences, 1968. B.S., Texas A & M, 1954; LL.B., Texas (Austin), 1959; M.A., Southern Methodist, 1964; Ph.D., California (Los Angeles), 1969.

- Tereshkovich, George**, Assoc. Prof., 1968. B.S., Louisiana Polytechnic Inst., 1952;

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- Ueckert, Darrell Neal**, Asst. Prof., 1969. B.S., Texas Tech, 1966; M.S., Colorado State, 1968; Ph.D., 1969.
- Van Nierop, Emmanuel Theodoros\*\*\***, Assoc. Prof., 1968. Lic., Netherlands Tropical Agricultural Coll., 1948; B.S., Toronto, 1953; M.S., State Coll. of Forestry (New York), 1956; M.Sc., Syracuse, 1956; Ph.D., Cornell, 1963.
- Ward, Charles Richard**, Asst. Prof., 1967. B.S., Texas Tech, 1962; M.S., 1964; Ph.D., Cornell, 1968.
- Wirth, Conrad**, Adjunct Prof., 1968. B.S., Massachusetts, 1923.
- Zukauckas, Edward William, Jr.**, Assoc. Prof. & Greenhouse Mgr., 1952, 1961. B.S., Rutgers, 1950; M.S., 1952.

### Department of Range and Wildlife Management

- Schuster, Joseph Lawrence**, Chmn. & Prof., 1964, 1969. B.S., Texas A & M, 1954; M.S., Colorado State U., 1959; Ph.D., Texas A & M, 1962.
- Bolen, Eric George**, Assoc. Prof., 1966, 1969. B.S., Maine, 1959; M.S., Utah State, 1962; Ph.D., 1967.
- Box, Thadys Wayne**, Consulting Prof., 1962, 1969. B.S., Southwest Texas State, 1956; M.S., Texas A & M, 1957; Ph.D., 1959.
- Cottam, Clarence**, Adjunct Prof., 1967. A.B., Brigham Young, 1927; M.S., American U., 1928; Ph.D., George Washington, 1936.
- Dahl, Billie Eugene**, Assoc. Prof., 1967. B.S., Oklahoma State, 1951; M.S., Utah State, 1953; Ph.D., Idaho, 1966.
- Darrow, Robert Arthur**, Consulting Prof., 1968. B.S., New York State Coll., 1932; M.S., Arizona, 1935; Ph.D., Chicago, 1937.
- Glazener, William Caleb**, Adjunct Prof., 1967. B.S., Texas Coll. of Arts and Industries, 1929; M.S., Texas A & M, 1943.
- Gonzalez, Martin H.**, Consulting Prof., 1967. B.S. (Equiv.), Instituto Tecnológico (Monterrey, Mexico), 1954; M.S., Texas A & M, 1957; Ph.D., Utah State, 1963.

- Herndon, Edward Beverly**, Research Assoc., 1969. B.S., Texas Tech, 1964; M.S., 1968.
- Hunter, John Ray**, Assoc. Prof., 1958, 1967. B.S., Midwestern, 1949; M.Ed., Texas Tech, 1958.
- Klebenow, Donald Allen**, Asst. Prof., 1968. B.S., Montana, 1960; M.S., 1962; Ph.D., Idaho, 1968.
- Pettit, Russell Dean**, Asst. Prof., 1969. B.S., Fort Hays Kansas State, 1963; M.S., Texas Tech, 1965; Ph.D., Oregon State, 1968.
- Sosebee, Ronald Eugene**, Asst. Prof., 1969. B.S., Abilene Christian, 1964; M.S., New Mexico State, 1966; Ph.D., Utah State, 1969.
- Thomas, Gerald Waylett\*\***, Prof. & Dean of the College of Agricultural Sciences, 1958. B.S., Idaho, 1941; M.S., Texas A & M, 1951; Ph.D., 1954.
- Waldrup, William J.**, Adjunct Prof., 1968. B.S., Texas A & M, 1949; Ph.D., 1962.
- Woodard, Donald Woodson**, Research Assoc., 1968. B.S., Concordia, 1958; M.S., Texas Tech, 1963.
- Wright, Henry Albert**, Assoc. Prof., 1967, 1969. B.S., California (Davis), 1957; M.S., Utah State, 1962; Ph.D., 1964.

### Research Assistants

- Baker, Roger Lynn**, 1969. B.S., Kansas State U., 1969.
- Bell, Michael William**, 1970. B.S., New Mexico State, 1970.
- Britton, Carlton M.**, 1969. B.S., Texas Tech, 1968.
- Darr, Gene Wallace**, 1969. B.S., Texas Tech, 1969.
- Fortson, David Ben**, 1969. B.S., Sul Ross State, 1969.
- Heirman, Alan Leo**, 1969. B.S., Abilene Christian, 1969.
- Karr, Bob Lewis**, 1969. B.A., McMurry, 1964.
- Southiere, Edward C.**, 1970. B.S., Vermont, 1969.
- Stelzer, Billy Frank**, 1969. B.S., Sul Ross State, 1969.
- Tharp, John Ellis**, 1969. B.S., Texas Tech, 1969.

## College of Arts and Sciences

### Dean and Staff

- Kenamer, Lorrin Garfield, Jr.**, Dean & Prof. of Geography, 1967. A.B., Eastern Kentucky State, 1947; M.S., Tennessee, 1949; Ph.D., George Peabody Coll. for Teachers, 1952.
- Johnson, William R.**, Assoc. Dean & Assoc. Prof. of History, 1964, 1969. B.S. Houston, 1958; M.A., 1959; Ph.D., Oklahoma, 1963.
- Little, Ivan Lee**, Assoc. Dean & Prof. of Philosophy, 1946, 1967. B.A., Texas Tech, 1938; M.A., Nebraska, 1940; Ph.D., 1953.
- Durham, Kathryn Stallings**, Administrative Asst., 1942, 1957. B.A., Texas Tech, 1934.
- Daniels, Paula Brownd**, Administrative Asst., 1958, 1968.

### Department of Art

- Lockhart, Billy Clarence**, Chmn. & Prof., 1955, 1960. B.S., West Texas State, 1950; M.Ed., Pennsylvania State, 1952; Ed.D., 1955.
- Alesch, Eugene Raymond**, Assoc. Prof., 1969. B.F.A., New Mexico, 1953; M.A., 1954; Ph.D., Ohio, 1968.
- Davis, Donald Jack**, Prof., 1965, 1969. B.A., Baylor, 1959; M.A., 1961; Ph.D., Minnesota, 1966.
- Durland, Donald L.**, Assoc. Prof., 1969. B.F.A., Miami, 1956; M.A., Bradley, 1961.

- Dyer, Eula May White**, Asst. Prof., 1966. B.A.Ed., East Central State (Oklahoma), 1948; M.A., Texas Woman's, 1964.
- Eaton, Robert Allen**, Instr., 1968. B.F.A., Texas (Austin), 1965; M.F.A., Pratt Inst., 1968.
- Evans, Dick**, Asst. Prof., 1966, 1969. B.F.A., Utah, 1964; M.F.A., 1966.
- Fainter, Robert Alexander**, Instr., 1968. B.F.A., Texas (Austin), 1964; M.F.A., 1967.
- Gibbons, Hugh James**, Asst. Prof., 1963, 1966. B.A., Pennsylvania State, 1959; M.A., 1961.
- Glenn, Edna Smith**, Instr., 1968. B.A., Central Methodist Coll. (Missouri), 1937.
- Greer, Hiram Varner**, Asst. Prof., 1963, 1966. B.A., Texas Tech, 1955.
- Gulld, William W.**, Asst. Prof., 1969. B.A., Oakland U., 1966; M.A., State U. of New York (Binghamton), 1968.
- Hanna, James Walter**, Instr., 1968. B.A., Austin Coll., 1960.
- Hanna, Paul Dean, Jr.**, Assoc. Prof., 1960, 1968. B.A., Austin Coll., 1951; M.F.A., Texas Christian, 1965.
- Harland, Jaclyn Flynn**, Instr., 1963. B.S., Texas Tech, 1961.
- Hastie, Reld Richards**, Visiting Prof., 1969. B.S., State Teachers Coll. (Pennsylvania), 1936; M.A., West Virginia (Morgantown), 1940; Ph.D., Pittsburgh, 1953.
- Hellberg, Ray Wayne**, Assoc. Prof., 1962, 1967. B.A., Brigham Young, 1955; M.A., 1962; Ph.D., Pennsylvania State, 1970.

- Henton, Richard Wayne**, Assoc. Prof., 1967, 1969. B.S., Oklahoma State, 1960; M.S., 1961; Ph.D., Minnesota, 1968.
- Houghton, Edna Nawanna**, Assoc. Prof., 1932, 1957. B.S. in A.E., Texas Tech, 1930; B.A., Southern California, 1954; M.A., 1964.
- Howard Peggy Faye Basom**, Asst. Prof., 1966. B.S., Texas Woman's, 1938; M.A., 1963.
- Howze, James Dean**, Prof., 1958, 1968. B.A., Austin Coll., 1951; M.S., Michigan, 1958.
- Kincaid, Clarence Everitt, Jr.**, Prof., 1960, 1963. B.S., West Texas State, 1949; M.Ed., 1958; Ed.D., Pennsylvania State, 1960.
- Kreneck, Lynwood Alois**, Asst. Prof., 1965, 1968. B.F.A., Texas (Austin), 1958; M.F.A., 1965.
- Lockard, Troy Allen**, Assoc. Prof., 1937, 1963. B.S., Texas Woman's, 1932; M.A., 1940.
- Morrow, John Terrence**, Asst. Prof., 1968. B.F.A., Texas (Austin), 1962; M.S., Indiana, 1967.
- Parkinson, Roderick**, Assoc. Prof., 1948, 1967. B.S. in Ed., Texas Tech, 1948; M.Ed., 1950.
- Pollard, Juanita Tittle**, Assoc. Prof., 1966, 1968. B.A., Abilene Christian, 1931; M.A., Texas Woman's, 1952.
- Queen, John William**, Assoc. Prof., 1960, 1967. B.S., Houston, 1956; M.F.A., Kansas, 1962.
- Read, Donna Rae**, Asst. Prof., 1966. B.S., Iowa State, 1960; M.S., Tennessee, 1962.
- Roseland, Paul Luther**, Prof., 1968. A.B., Minnesota, 1941; M.F.A., Southern California, 1960.
- Sacco, George Lee**, Instr., 1968. B.S., Kent State, 1966; M.A., 1968.
- Stephen, Francis B.**, Assoc. Prof., 1967. B.F.A., Oklahoma, 1950; M.F.A., 1951.
- Street, Betty Ann**, Asst. Prof., 1967. B.S., Tennessee, 1958; M.S., 1959.

### *Teaching Assistants*

- Brown, Morris Alvin**, 1969. B. of Arch., Texas Tech, 1969.
- Gottschalk, Anna**, 1970. B.S., Texas Tech, 1969.
- Skildum, Connie Beth**, 1969. B.S. Art Education, Minnesota, 1968.
- Thornton, Michael**, 1970. B.A., East Texas State, 1969.

### **Department of Biblical Literature**

- McCoy, Lowell Dean**, Chmn. & Instr., 1965. B.S., Abilene Christian, 1959; M.S., 1962; Under auspices of the Churches of Christ.
- Coleman, Don**, Instr., 1968. B.A., Westminster, 1959; B.D., Yale, 1963; under auspices of the United Bible Chair of the Catholic, Episcopal, Lutheran, Presbyterian, United Church of Christ, and Disciples of Christ churches.
- Dollins, Claude David**, Instr., 1969. B.S., Hardin-Simmons, 1963; M.R.E., Southwestern Baptist Theological Seminary, 1966; under auspices of the Baptist General Convention of Texas.
- Macy, Ralph Edward**, Instr., 1960. B.S., Oklahoma, 1946; B.D., Episcopal Theological, 1950; under auspices of the United Bible Chair of the Catholic, Episcopal, Lutheran, Presbyterian, United Church of Christ, and Disciples of Christ churches.
- Freisinger, Arthur Albert**, Instr., 1967. B.A., Concordia, 1955; B.D., 1958; M.A., Oklahoma, 1967; under auspices of the United Bible Chair of the Catholic, Episcopal, Lutheran, United Church of Christ, Presbyterian, and Disciples of Christ churches.
- Sorley, Horace Eugene**, Instr., 1968. B.A., Texas Tech, 1950; B.D., Perkins, 1953; S.T.M., 1966; under auspices of the Northwest Texas Conference of the Methodist Church.

- Walker, Robert C., Jr.**, Instr., 1969. B.B.A., Southwestern, 1957; B.D., Perkins, 1960; under auspices of the Northwest Texas Conference of the Methodist Church.
- Zongker, Calvin E.**, Instr., 1969. B.A., Oklahoma State, 1950; B.D., Southern Baptist Theological Seminary, 1954; Th.M., 1955; under auspices of the Baptist General Convention of Texas.

### **Department of Biology**

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- Allen, Archie Cornelious**, Assoc. Prof., 1963, 1967. B.A., North Carolina, 1955; M.A., 1958; Ph.D., Pittsburgh, 1961.
- Baker, Robert James**, Asst. Prof., 1967. B.S., Arkansas A & M, 1963; M.S., Oklahoma State, 1965; Ph.D., Arizona, 1967.
- Berlin, Jerry Dean**, Assoc. Prof., 1968. B.S., Missouri, 1960; M.A., 1961; Ph.D., Iowa State, 1964.
- Berry, Dale Lawrence**, Part-time Instr., 1967, 1969. B.A., San Jose State, 1965; M.S., Texas Tech, 1969.
- Burns, John Mitchell**, Asst. Prof., 1969. B.S., New Mexico State, 1963; M.S., 1966; Ph.D., Indiana, 1969.
- Capehart, John Ray**, Part-time Instr., 1969. B.S., East Texas State, 1968; M.S., 1939.
- Casto, Stanley Dale**, Graduate Fellow, 1968, 1969. B.S., Texas Coll. of Arts & Industries, 1963; M.S., 1965.
- Cook, Bart, III**, Part-time Instr., 1967. B.A., Kansas, 1965.
- Coulter, Murray Whitfield**, Assoc. Prof., 1964, 1967. B.A., Emory, 1954; M.S., Arizona, 1957; Ph.D., California (Los Angeles), 1963.
- Elliot, Arthur McAuley**, Assoc. Prof., 1961, 1966. B.S., Minnesota, 1953; M.S., 1960; Ph.D., 1961.
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- Garner, Herschel Whitaker**, Part-time Instr., 1963, 1966. B.S., Stephen F. Austin State, 1962; M.S., Texas Tech, 1965.
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- Gorden, Robert Wayne**, Asst. Prof., 1967. B.S., Manchester Coll., 1957; M.Ed., Georgia, 1962; Ph.D., 1967.
- Greenblatt, Gerald Art**, Asst. Prof., 1966. B.A., Los Angeles State, 1955; Ph.D., California (Davis), 1965.
- Judd, Frank Wayne**, Part-time Instr., 1965, 1969. B.S., Midwestern, 1965; M.S., Texas Tech, 1968.
- Kuhnley, Lyle Carlton**, Assoc. Prof., 1959, 1965. B.A., Minnesota, 1949; M.A., Texas (Austin), 1955; Ph.D., 1961.
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- Mecham, John Stephen**, Prof., 1965, 1969. B.S., Texas (Austin), 1950; M.S., Florida, 1952; Ph.D., Texas (Austin), 1955.
- Mitchell, Robert Wetzel**, Assoc. Prof., 1965, 1969. B.S., Texas Tech, 1954; M.S., 1955; Ph.D., Texas (Austin), 1965.
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- Olney, Janelle Burleson**, Part-time Instr., 1969. B.A., Wyoming, 1966; M.S., 1969.
- Packard, Robert Lewis**, Prof., 1962, 1967. B.S., Nebraska, 1951; M.A., Kansas, 1955; Ph.D., 1960.
- Proctor, Vernon Willard**, Prof., 1956, 1963. A.B., Missouri, 1950; A.M., 1951; Ph.D., 1955.



- Ramsey, James Carroll**, Part-time Instr., 1967, 1969. B.S., Texas Tech, 1967; M.S., 1969.
- Rose, Francis Lewis**, Assoc. Prof., 1966, 1968. B.S., Georgia, 1960; M.S., 1962; Ph.D., Tulane, 1965.
- Rowell, Chester Morrison, Jr.**, Assoc. Prof., 1957, 1967. B.A., Texas (Austin), 1947; M.S., Texas A & M, 1949; Ph.D., Oklahoma State, 1967.
- Rylander, Michael Kent**, Asst. Prof., 1965. B.A., North Texas State, 1956; M.S., 1962; Ph.D., Tulane, 1965.
- Strandtmann, Russell William**, Prof., 1948. B.S., Southwest Texas State, 1935; M.S., Texas A & M, 1937; Ph.D., Ohio State, 1944.
- Thayer, Donald Wayne**, Asst. Prof., 1969. B.S., Kansas State, 1962; M.S., 1963; Ph.D., Colorado State U., 1966.
- Tilton, Polly Cook**, Asst. Prof., 1947, 1967. B.S., Texas Tech, 1947; M.S., 1951.
- Wade, Virgil Edwin**, Part-time Instr., 1969. B.S., McMurray, 1959; M.S., Texas Tech, 1962.
- Warner, Jerry Wayne**, Part-time Instr., 1969. B.S., Northeast Louisiana State Coll., 1965; M.S., 1969.
- Wiley, Robert William**, Part-time Instr., 1967. B.S., Central Missouri State, 1963; M.S., Fort Hays Kansas State, 1967.
- Womochel, Daniel Robert**, Part-time Instr., 1964, 1969. B.S., Michigan State, 1962; M.S., Texas Tech, 1968.

### Teaching Assistants

- Bleier, William Joseph**, 1969. B.A., Texas (Austin), 1969.
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- Chapman, Brian Richard**, 1967. B.S., Texas A & I, 1967.
- Cooke, Jerry William**, 1969. A.B., Grinnell Coll., 1959.
- Davis, Brent Lee**, 1969. B.S., Texas Tech, 1969.
- Elliott, William Rawleigh**, 1969. B.A., Texas (Austin), 1969.
- Healy, John Patrick**, 1968. B.S., Texas Tech, 1968.
- Hill, Lucy B.**, 1968. B.S., Texas Tech, 1968.
- Howell, Freddie Gene**, 1968. B.S., Texas A & M, 1964.
- Reichman, Omer James**, 1968. B.S., Texas Tech, 1968.
- Tipton, Virginia Martin**, 1968. B.S., Trinity, 1965.
- Tucker, Gary Robert**, 1969. B.S., Abilene Christian, 1967.
- Vollett, John Jay**, 1969. B.S., Texas Tech, 1969.
- Wiley, Suzanne Fowler**, 1969. B.A., Texas Tech, 1968.
- Draper, Arthur Lincoln**, Assoc. Prof., 1959, 1961. B.A., Rice, 1948; M.A., 1949; Ph.D., 1951.
- Guerrant, William Barnett**, Prof., 1968. B.A., Austin Coll., 1946; Ph.D., North Carolina, 1949.
- Herndon, William Cecil**, Prof., 1966, 1969. B.S., Texas (El Paso), 1954; Ph.D., Rice, 1959.
- Hsu, Joan Chung-Ying Chen**, Part-time Instr. & Welch Foundation Scholar, 1965, 1969. B.S., Chen Kung U. (Taiwan), 1965.
- Lee, Samuel Hunt**, Prof., 1951, 1961. B.S., Texas (Austin), 1939; Ph.D., Ohio State, 1944.
- Marcoux, Lynn Scott**, Asst. Prof., 1969. B.S., Kansas, 1962; Ph.D., 1967.
- Marx, John N.**, Asst. Prof., 1967. B.S., St. Benedict's Coll., 1962; Ph.D., Kansas, 1965.
- McPherson, Clinton Marsud**, Asst. Prof., 1956, 1960. B.S., Texas Tech, 1947; M.Ed., 1952; Ed.D., 1959.
- Mitchell, Roy Ernest**, Asst. Prof., 1966. B.S., Texas A & M, 1958; Ph.D., Purdue, 1964.
- Moore, Ana Maria Lorenzelli**, Part-time Instr. & Welch Foundation Scholar, 1967, 1969. B.S., U. of La Plata (Argentina), 1964; M.S., U. of Brazil, 1966.
- O'Brien Thomas Joseph**, Asst. Prof., 1969. B.S., Coll. of Saint Thomas, 1963; Ph.D., Wisconsin, 1968.
- Olney, Harvey Omar, II**, Part-time Instr., 1968. B.S., Gordon Coll., 1966; M.S., Wyoming, 1968.
- Ramsey, Herman Douglas**, Part-time Instr., 1967. B.S., Eastern New Mexico, 1965; M.S., 1967.
- Redington, Richard Lee**, Assoc. Prof., 1967, 1969. B.A., Minnesota, 1955; Ph.D., Washington, 1961.
- Shoppee, Charles William**, Welch Prof., 1970. B.Sc., U. of London (England), 1924; Ph.D., 1926; D.Sc., 1931; M.A., D.Phil., U. of Basel (Switzerland), 1941; Fellow of the Australian Academy; Fellow of the Royal Society.
- Silber, Ernesto**, Part-time Instr., & P.R.F. Research Fellow, 1967, 1969. B.S., U. of La Plata (Argentina), 1964; M.S., 1967.
- Silber, Juana Josefa Chessa de**, Part-time Instr. & Research Asst., 1967, 1969. B.S., U. of La Plata (Argentina), 1964; M.S., 1967.
- Song, Pill-Soon**, Prof., 1965, 1969. B.S., Seoul National U. (Korea), 1958; M.S., 1960; Ph.D., California (Davis), 1964.
- Stuart, Margret Russell**, Assoc. Prof., 1946, 1959. B.A., Texas Tech, 1940; M.A., 1949.
- Thomas, William James**, Part-time Instr., 1968. B.A., Eastern New Mexico, 1966; M.S., 1968.
- Wilde, Richard Edward, Jr.**, Assoc. Prof., 1963, 1967. B.S., California (Los Angeles), 1956; Ph.D., Washington, 1961.
- Zeck, Otto Frank, Jr.**, Part-time Instr. & N.A.S.A. Trainee, 1968, 1969. B.S., Valparaiso U., 1965; M.S., Southern Illinois, 1968.

### Department of Chemistry

- Shine, Henry Joseph**, Chmn. & Horn Prof., 1954, 1969. B.Sc., U. of London (England), 1944; Ph.D., 1947; A.R.I.C.
- Rekers, Robert George**, Asst. Chmn. & Assoc. Prof., 1955, 1969. B.S., Rochester, 1942; Ph.D., Colorado, 1951.
- Adamcik, Joe Alfred**, Assoc. Prof., 1957, 1961. B.S. in Chem., Texas (Austin), 1951; M.A., 1954; Ph.D., Illinois, 1958.
- Anderson, John Arthur**, Assoc. Prof., 1961, 1966. B.S., Colorado State U., 1952; M.S., 1954; Ph.D., Oregon State, 1962.
- Carlyle, David Wesley**, Asst. Prof., 1969. B.S., Missouri, 1960; Ph.D., Iowa State, 1968.
- Delaney, Bertha H.**, Instr., 1967. B.S., Kent State, 1946.
- Dennis, Joe**, Prof., 1938, 1950. B.A., Austin Coll., 1933; M.A., Texas (Austin), 1937; Ph.D., 1942; D.Sc. (Hon.), Austin Coll., 1964.

### Teaching and Research Assistants

- Bajwa, Raghuir Singh**, 1968. B.S., Government Agricultural Coll., 1951; M.S., Punjab Agricultural U., 1965.
- Cheng, Jilin Duey**, 1969. B.S., Taiwan Provincial Chung-Hsing U., 1965; M.S., Louisiana Polytechnic Inst., 1969.
- Choi, Sung Nak**, 1969. B.S., Seoul National U. (Korea), 1964.
- Datta, Sobhadraranath**, 1969. B.S., U. of Calcutta, 1957; B.S., U. of London, 1967.
- Felty, Joe Ray**, 1968. B.S., Texas Tech, 1968.
- Gordon, William Hendon, III**, 1969. B.A., Rice, 1969.
- Halbert, Laurin Thomas**, 1969. B.S., Texas Tech, 1969.

- Harris, Joseph Harvey, 1966, 1969, B.S., Texas Tech, 1966; M.S., 1968.  
 Hindash, Abbas Asad, 1969, B.S., U. of Albuquerque, 1968.  
 Hipp, Terry Michael, 1969, B.A., Howard Payne, 1969.  
 Lundberg, Robert Dwight, 1969, B.S., Texas Tech, 1969.  
 Maeker, Walton Eddie, 1969, B.S., Texas Tech, 1969.  
 McGaughey, Stephen Merick, 1969, B.A., McMurry, 1968.  
 Moore, Thomas Andrew, 1968, B.A., Texas Tech, 1968.  
 Norman, Lewis R., 1969, B.S., Panhandle State Coll., 1969.  
 O'Brien, William Edward, 1969, B.S., St. Edward's U., 1969.  
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 Rojo, Raul, 1969, B.S., St. Procopius, 1969.  
 Sun, Ming, 1968, B.A., Colorado, 1967.

### Department of

#### Classical and Romance Languages

- Andrews, Norwood H. Jr., Chmn. & Prof., 1970, B.A., Oberlin, 1957; M.A., Oregon, 1959; Ph.D., Wisconsin, 1964.  
 Alegria, Alonso, Visiting Asst. Prof., 1969, B.A., Yale, 1964; M.F.A., 1967.  
 Alexander, Beatrice Witte, Asst. Prof., 1945, 1961, B.A., Texas Woman's, 1942; M.A., Texas (Austin), 1946.  
 Armstrong, Kara San Dunn, Part-time Instr., 1961, 1969, B.A., Texas Tech, 1953; M.A., 1963.  
 Ballew, Laura, Instr., 1964, B.A., Texas Tech, 1964.  
 Beraud, Jean Michel Andre, Instr., 1969, B.A., Abilene Christian, 1968; M.A., Texas (Austin), 1969.  
 Bodoh, John James, Asst. Prof., 1966, B.A., St. Paul Seminary, 1953; M.A., Wisconsin, 1958; Ph.D., 1966.  
 Bubresko, Peter Drago, Asst. Prof., 1964, B.A., U. of Belgrade (Yugoslavia), 1933; M.A., 1935.  
 Bumpass, Faye LaVerne, Horn Prof. & Horn Prof. of Linguistics, 1943, 1969, B.A., Texas Tech, 1932; M.A., 1934; D.Lit., San Marcos U. (Lima, Peru), 1947.  
 Christiansen, Peder George, Assoc. Prof. & Dir., Honors Program, 1963, 1969, B.A., Carroll Coll., 1956; M.A., Wisconsin, 1957; Ph.D., 1963.  
 Finco, Aldo, Assoc. Prof., 1968, B.A., Boston, 1955; M.A., Middlebury, 1963; D.M.L., 1967.  
 Hamilton, Thomas Earle, Prof., 1940, 1955, B.A., Southern Methodist, 1927; M.A., 1929; Ph.D., Texas (Austin), 1940.  
 Holland, James Edward, Instr. & Instr. in Linguistics, 1967, 1969, A.B., William Jewell Coll., 1963; M.A., Washington, 1968.  
 Hopkins, Patricia Mary, Asst. Prof., 1969, B.A., St. Joseph Coll., 1962; Ph.D., Missouri (Columbia), 1969.  
 Jirgensons, Leonid Aurelijs, Asst. Prof., 1961, B.A. (equiv.), U. of Hamburg (Germany), 1948; M.A., Minnesota, 1961.  
 Klock, Sheldon Charles, Jr., Asst. Prof., 1963, B.A., Pan American Coll., 1960; M.A., Tulane, 1963.  
 Maxwell, Henry James, Prof., 1963, 1967, B.A., Nebraska, 1940; M.A., Wisconsin, 1941; Ph.D., 1955.  
 Oberhelman, Harley Dean, Prof. & Chmn., Latin American Area Studies, 1958, 1970, B.S., Kansas, 1950; M.A., 1952; Ph.D., 1958.  
 Patterson, Rosemary, Instr., 1966, 1967, B.A., Texas Tech, 1963; M.A., 1967.  
 Patterson, William Taylor, Assoc. Prof. & Assoc. Prof. of Linguistics, 1961, 1969, B.A., Kansas, 1954; M.Ed., Pennsylvania State, 1961; Ph.D., Stanford, 1967.

- Schellinger, Mirielle, Part-time Instr., 1969, Licence, U. of Paris (Nanterre), 1969.  
 Schoner, Alta Ada Cates, Part-time Instr., 1966, 1969, B.A., Texas Tech, 1964; M.A., 1966.  
 Stratton, Lorum H., Visiting Asst. Prof., 1969, B.A., Brigham Young, 1963; M.A., Arizona, 1967.  
 Tucker, Scotti Mae, Prof., 1945, 1964, B.A., Texas (Austin), 1924; M.A., 1925; Ph.D., 1950.  
 Wheldon, Gil McQuire, Visiting Asst. Prof. & Asst. Prof. of Linguistics, 1969, B.A., (Honours), U. of London, 1954.

### Teaching Assistants

- Bergquist, Mildred Francille, 1968, B.A., Texas Tech, 1968.  
 Burns, Bruce Alexander, 1969, B.A., Texas Tech, 1969.  
 Castleman, Judith Means, 1969, B.A., Texas Tech, 1966.  
 Clarke, Carol Jean, 1968, B.A., Howard Payne Coll., 1968.  
 Curbo, John Timothy, 1969, B.A., Texas Wesleyan, 1966.  
 Hazlewood, Sherrell Lynn, 1969, B.A., Texas (Austin), 1958.  
 Malouf, Estela Pena, 1968, B.A., Mary Hardin-Baylor, 1968.  
 McClung, Kathryn Lynn, 1969, B.A., Concord Coll., 1969.  
 Mortary, Ashnadel Amin Hilmy, 1968, B.A., Hunter Coll. (New York), 1968.  
 Murnaghan, Helen Lang Callaway, 1968, B.S., Hardin Simmons, 1966.  
 Pistone, Elias Sidney, 1968, B.A., Texas Tech, 1968.  
 Sanz, Matilde Beatriz, 1968, Maestra Normal Nacional, Escuela Normal Mista "Juan Bautista Alberdi" (Tucuman, Argentina), 1950.  
 Scott, Edmund Tolen, 1969, B.A., Western New Mexico, 1966.  
 Smith, Janice Elizabeth Merrick, 1969, B.A., Texas Tech, 1969.  
 Tavenner, Anna Elaine Casner, 1969, B.A., Texas Tech, 1947.  
 Walker, Cynthia, 1969, B.A., Texas Tech, 1969.

### Department of English

- Gillis, William, Chmn. & Prof., 1969, B.A., Northeastern, 1949; A.M., Boston U., 1950; Ph.D., Edinburgh U., 1956.  
 Aker, Meredith Eugene, Instr., 1962, 1965, B.A., Tulsa, 1960; M.A., 1962.  
 Allen, James George, Prof., 1927, 1950, B.A., Southern Methodist, 1924; M.A., Harvard, 1928.  
 Archer, Jane Elizabeth, Instr., 1969, B.A., Texas (Austin), 1967; M.A., 1967.  
 Aycock, Wendell Marshall, Asst. Prof., 1969, B.A., Texas Tech, 1962; M.A., 1965; Ph.D., South Carolina, 1969.  
 Baggerly, Jo Ann, Part-time Instr., 1969, B.A., New Mexico, 1966; M.A., 1968.  
 Berry, Joe Wilkes, Jr., Assoc. Prof., 1964, 1968, B.A., Abilene Christian, 1960; M.A., Rice, 1962; Ph.D., 1964.  
 Brewer, Mary Louise Breedlove, Assoc. Prof., 1941, 1969, B.A., Oklahoma Coll. for Women, 1928; M.A., Illinois, 1929; Ph.D., Texas (Austin), 1941.  
 Brian, Beverly Dianne, Instr., 1961, B.A., Baylor, 1958; M.A., Duke, 1961; Ph.D., 1968.  
 Bridges, Phyllis Jane, Instr., 1967, 1968, B.A., West Texas State, 1963; M.A., 1966.  
 Burgamy, Nona Marie, Instr., 1965, 1968, B.A., Texas Tech, 1964; M.A., 1966.  
 Cairncross, Andrew Scott, Visiting Prof., 1965, M.A., Glasgow U. (Scotland), 1922; D. Litt., 1932.  
 Camp, Truman Wildes, Prof., 1935, 1949, B.A., Yale, 1926; Ph.D., 1935.

- Carlock, Mary Sue, Assoc. Prof., 1952, 1962. B.A., Southern Methodist, 1930; M.A., Texas (Austin), 1935; Ph.D., Columbia, 1958.
- Cash, Joe Lynn, Instr., 1968; 1969. B.A., Abilene Christian Coll., 1962; M.A., Texas Tech, 1967.
- Cole, David Lawrence, Part-time Instr., 1969. B.A., Quinipiac Coll., 1967; M.A., Wichita State, 1969.
- Collmer, Robert George, Prof., 1987. B.A., Baylor, 1948; M.A., 1949; Ph.D., Pennsylvania, 1953.
- Cooper, James Glennon, Part-time Instr., 1969. B.A., Oklahoma, 1954; M.A., Eastern New Mexico, 1969.
- Crider, John Richard, Assoc. Prof., 1966. B.A., Baylor, 1953; M.A., 1954; Ph.D., Rice, 1960.
- Culp, James William, Prof., 1967. B.A., Abilene Christian, 1949; M.A., Vanderbilt, 1950; Ph.D., 1956.
- Davis, Dale Waverly, Asst. Prof., 1968. B.A., Central State Coll., 1961; M.A., Oklahoma, 1964; Ph.D., 1968.
- Davis, Kenneth Waldron, Prof., 1956, 1968. B.A., Texas Tech, 1954; M.A., Vanderbilt, 1956; Ph.D., 1963.
- Denton, Lynnard Wayne, Instr., 1968. B.A., Abilene Christian, 1965; M.A., Eastern New Mexico, 1966.
- Dudt, Charmazel, Part-time Instr., 1966. B.A., Allahabad U. (India), 1959; M.A., 1961.
- Eddleman, Floyd Eugene, Assoc. Prof., 1958, 1965. B.S.E., State Coll. of Arkansas, 1951; M.A., Arkansas, 1955; Ph.D., 1961.
- Foster, James Maurice, Asst. Prof. & Asst. Prof. of Linguistics, also Chmn., Interdepartmental Committee on Linguistics, 1966, 1970. B.S., Illinois, 1962; A.M., 1963; Ph.D., 1966.
- Galloway, Ruth Evelyn, Instr., 1967. B.A., Nebraska State Teachers, 1948; M.A., West Texas State, 1965.
- George, Mary Elizabeth, Instr., 1968. B.A., Baylor, 1943; M.A., George Peabody, 1947.
- Gibson, Elizabeth Anne, Part-time Instr., 1967, 1969. B.A., Texas Christian, 1965; M.A., Texas Tech, 1969.
- Gillis, Everett Alden, Prof., 1949, 1956. B.A., Texas Christian, 1936; M.A., 1939; Ph.D., Texas (Austin), 1948.
- Green, Lola Beth, Assoc. Prof. & Assoc. Prof. of Linguistics, 1949, 1969. B.A., Texas Tech, 1935; M.A., 1942; Ph.D., Texas (Austin), 1955.
- Grimes, Geoffrey Allan, Instr., 1967, 1969. B.A., Austin Coll., 1966; M.A., Texas Tech, 1969.
- Harris, Mac Sherman, Instr., 1966, 1969. B.A., North Texas State, 1966; M.A., Texas Tech, 1968.
- Huber, Dwight White, Part-time Instr., 1966. B.A., West Texas State, 1966; M.A., Texas Tech, 1968.
- Hughes, Charles Willis, Instr., 1966, 1969. B.A., Texas (Austin), 1957; M.A., Texas Tech, 1968.
- Jackson, Ruth Donald, Asst. Prof., 1946, 1959. B.A., Texas Tech, 1942; M.A., Oklahoma, 1946.
- Kormali, Sema Gunisik, Part-time Instr., 1968. B.A., U. of Ankara (Turkey), 1965; M.A., Hacettepe U., 1966.
- Lackey, Horace Grady, Jr., Instr., 1963, 1966. B.A., Hardin-Simmons, 1948; M.A., Texas Tech, 1966.
- Langford, Thomas Alexander, Asst. Prof. & Asst. Dean of the Graduate School, 1965, 1968. B.A., California (Riverside), 1956; M.A., Texas Tech, 1963; Ph.D., Texas Christian, 1967.
- Levinisky, Ruth, Asst. Prof., 1970. B.A., California State Coll., 1958; M.A., 1961; Ph.D., Southern California, 1969.
- Lewis, Quannah Belle, Asst. Prof., 1946, 1959. B.F.A., Oklahoma, 1931; M.A., Texas Tech, 1940.
- Lightfoot, John Ewell, Part-time Instr., 1969. B.A., Baylor, 1966; M.A., 1967.
- Livingston, Travis Leon, Instr., 1967. B.A., Howard Payne, 1955; M.A., Hardin-Simmons, 1961.
- Long, Bobby Duane, Part-time Instr., 1969. B.A., Oklahoma, 1958; M.A., West Texas State, 1968.
- Marceux, Dell Roseanne, Part-time Instr., 1970. B.A., Kansas, 1962; M.A., 1965.
- Mazer, Charles Litten, Instr., 1967, 1969. B.A., Texas Tech, 1967; M.A., 1968.
- McCullen, Jeri Tanner, Instr., 1966. B.A., East Texas State, 1961; M.A., 1963; Ph.D., Texas Tech, 1968.
- McCullen, Joseph Thomas, Jr., Prof., 1949, 1956. B.A., North Carolina, 1937; M.A., 1939; Ph.D., 1948.
- Meathenia, Jack, Instr., 1966. B.S., West Texas State, 1957; M.A., 1959.
- Miles, Marie Agnes, Asst. Prof., 1946, 1955. B.A., West Texas State, 1930; M.A., Texas (Austin), 1937.
- Mogan, Joseph John, Jr., Assoc. Prof. & Assoc. Prof. of Linguistics, 1966, 1969. B.A., S.T.B., St. Mary's Seminary & U., 1948; M.A., Notre Dame, 1954; Ph.D., Louisiana State, 1961.
- Moorhead, Michael, Part-time Instr., 1969. B.A., Texas Tech, 1965; M.A., 1967.
- Nail, Kline Allen, Prof. & Chmn., Freshman English, 1944, 1959. B.A., Texas Tech, 1937; M.A., 1939; Ph.D., Texas (Austin), 1952.
- Oden, Richard Lee, Asst. Prof., 1968. B.A., Texas (Austin), 1954; M.A., 1958; Ph.D., Tulane, 1968.
- Rushing, James Arthur, Instr., 1952. B.S. in Journ., Southern Methodist, 1941; M.A., 1951.
- Schantz, Lucille Davis, Part-time Instr., 1967, 1969. B.A., West Texas State, 1945; M.A., Texas Tech, 1969.
- Schrader, Carl George, Jr., Instr., 1967. B.A., Baylor, 1951; B.D., Southwestern Baptist Theological Seminary, 1955; M.A., Texas Christian, 1961.
- Smith, Ardath Byrd, Part-time Instr., 1969. B.A., Texas Tech, 1935; M.A., 1948.
- Stephenson, William Alva, Instr., 1967. B.A., Pan American Coll., 1963; M.A., Texas Tech, 1965.
- Terrell, Dahlia Jewel, Asst. Prof., 1956, 1966. B.A., Texas Tech, 1940; M.Ed., 1948; Ph.D., Texas (Austin), 1966.
- Theall, Donald Richard, Instr., 1965, 1966. B.A., Southwestern Louisiana, 1962; M.A., Texas Tech, 1965.
- Thompson, Evelyn Joyce, Part-time Instr., 1967, 1969. B.A., Texas Tech, 1967; M.A., 1969.
- Thrash, Lois Glenn, Instr., 1965, 1968. B.A., Lamar State Coll. of Technology, 1962; M.A., Texas Tech, 1966.
- Tucker, Margaret Fountain, Part-time Visiting Asst. Prof., 1968. B.A., Washington, 1931; M.A., New Mexico, 1963.
- Wages, Jack Douglas, Asst. Prof., 1968. A.B., North Texas State, 1960; M.A., Texas (Austin), 1963; Ph.D., Tennessee, 1968.
- Walker, Warren Stanley, Prof., 1964. B.A., State U. of New York (Albany), 1947; M.A., 1948; Ph.D., Cornell, 1951.
- Walton, George William, Part-time Instr., 1968. B.A., Abilene Christian, 1963; M.A., Arkansas, 1964.
- Wellborn, Grace Pleasant, Asst. Prof., 1947, 1959. B.A., Hardin-Simmons, 1928; M.A., 1934; B.S., Howard Payne, 1947.
- Womack, Judy Lu, Instr., 1969. B.A., North Texas State, 1960; M.A., 1963.

## Teaching Assistants

- Armitage, Shelley Sue, 1969. B.A., Texas Tech, 1969.
- Carey, Bruce Lownds, 1969. B.A., Luther Coll., 1969.

- Copeland, Judy Caldwell**, 1969. B.A., Texas Tech, 1969.
- Cunningham, Larry Dean**, 1969. B.A., Eastern Montana Coll., 1969.
- Cunningham, Priscilla Lee**, 1969. B.A., Eastern Montana Coll., 1969.
- Denham, Richard L.**, 1970. B.A., Austin Coll., 1968.
- Freitas, William J.**, 1970. B.A., Fresno State Coll., 1942.
- Henry, Patricia Jean**, 1969. B.A., North Texas State, 1954.
- Johnson, Suzanne**, 1969. B.A., Southern Methodist, 1962.
- Kaplan, Loretta Loggie**, 1970. B.A., West Texas State, 1961.
- Malone, Carol Ann**, 1969. B.S., Wisconsin State Coll., 1966.
- Masterbrook, Sharon Walker**, 1969. B.A., Texas Tech, 1969.
- Mazer, Barbara S.**, 1968. B.B.A., Texas Tech, 1967.
- McMath, Whitney Vickers**, 1968. B.A., Texas Woman's, 1957.
- Munn, Jewell Ann**, 1970. B.A., Baylor, 1968.
- Nelson, Jean B.**, 1969. B.A., Nebraska Wesleyan U., 1967.
- Owen, Thomas Clinton**, 1969. B.A., Texas Tech, 1969.
- Peterson, Cheryl R.**, 1969. B.A., Hope Coll., 1966.
- Russell, Mary Persons**, 1966. B.A., Southern Methodist, 1961.
- Shl, Miriam Elmore**, 1970. B.A., Texas Tech, 1939.
- Shipley, Martha Sue**, 1969. B.A., Texas Tech, 1969.
- Stafford, Gwendolyn Connelley**, 1969. B.A., Texas Tech, 1968.
- Stokes, Carmen Jacielle**, 1969. B.S. in Ed., Texas Tech, 1968.
- Summers, Ramona June**, 1967. B.A., Pan American Coll., 1960.
- Uphaw, Leon Reagan**, 1970. B.A., Texas Tech, 1969.
- Walker, Carol Cavness**, 1969. B.A., Southwestern, 1957.
- Watkins, Barbara Ann**, 1970. B.S., Texas Tech, 1969.
- Wheeler, Lonnie Howard, Jr.**, 1967. B.A., Texas Tech, 1962.
- Williams, Donald Mace**, 1969. B.A., Texas Tech, 1969.
- Womochel, LaDonna May**, 1969. B.A., Texas Tech, 1968.

### Department of Geosciences

- Mattox, Richard Benjamin**, Chmn. & Prof., 1954, 1964. B.A., Miami, 1948; M.S., 1949; Ph.D., Iowa, 1954.
- Arper, William Burnside**, Prof., 1953, 1960. B.S. in Geol., Oklahoma, 1940; M.S., 1942; Ph.D., Kansas, 1953.
- Brand, John Paul**, Prof., 1948, 1957. B.A., Miami, 1942; M.A., 1947; Ph.D., Texas (Austin), 1954.
- Cebull, Stanley Edward**, Asst. Prof., 1967. A.B., California (Berkeley), 1956; M.A., 1958; Ph.D., Washington, 1967.
- Conroy, William Brown**, Prof., 1969. B.A., Notre Dame, 1953; M.A., Syracuse, 1959; Ph.D., 1963.
- Conselman, Frank Buckley**, Prof. & Executive Dir., ICASALS, 1969. Sc.B., New York U., 1930; Sc.M., 1931; Ph.D., Missouri, 1934; C.P.G.
- Craig, James Roland**, Asst. Prof., 1967. B.A., Pennsylvania, 1962; M.S., Lehigh, 1964; Ph.D., 1965.
- Davidson, Claud Monroe**, Asst. Prof., 1969. B.A., North Texas State, 1960; M.A., Texas, 1968.
- Haragan, Donald Robert**, Asst. Prof., 1969. B.S., Texas, 1959; M.S., Texas A & M, 1960; Ph.D., Texas, 1969.
- Harris, Rae Lawrence, Jr.**, Prof., 1957, 1968. B.S., Oregon State, 1950; Ph.D., Columbia, 1957.

- Jacka, Alonzo David**, Prof. & Dir., Inst. for Evaporite Studies, 1959, 1970. B.S., Beloit, 1953; M.S., Wisconsin, 1957; Ph.D., Rice, 1960.
- Kenamer, Lorrin Garfield, Jr.**, Prof. & Dean of the College of Arts and Sciences, 1967. A.B., Eastern Kentucky State, 1947; M.S., Tennessee, 1949; Ph.D., George Peabody Coll. for Teachers, 1952.
- Kullerud, Gunnar**, Adjunct Prof., 1967. M.Sc., Norway, 1946; Ph.D., 1948; D.Sc. (Hon.), Oslo, 1954.
- Lees, William Rhodes**, Part-time Instr., 1969. B.S., Texas Tech, 1967; M.S., 1969.
- Miller, William Donald**, Assoc. Prof., 1962, 1965. B.A., Texas Tech, 1957; M.S., 1959; Ph.D., Missouri, 1963.
- Murray, Grover Elmer**, Prof. & President, 1966. B.S., North Carolina, 1937; M.S., Louisiana State, 1939; Ph.D., 1942.
- Normand, David Ernest**, Part-time Instr., 1969. B.S., Texas Christian, 1966; M.S., Texas Tech, 1968.
- Oman, Charles Lee**, Part-time Instr., 1966. B.S., American U., 1961; M.S., 1966.
- Reeves, Corwin C., Jr.**, Asst. Prof., 1957, 1962. B.S., Oklahoma, 1955; M.S., 1957; C.P.G. International.
- Shurbet, Deskin Hunt, Jr.**, Prof. & Dir., Seismological Observatory, 1956, 1961. B.S., Texas (Austin), 1950; M.S., 1951.
- Templer, Otis Worth**, Asst. Prof., 1968. B.S. Texas A & M, 1954; LL.B., Texas (Austin), 1959; M.A., Southern Methodist, 1964; Ph.D., California (Los Angeles), 1969.
- Wade, Franklin Alton**, Horn Prof. & Deputy Dir. for Natural Sciences, ICASALS, 1954, 1967; B.S., Kenyon Coll., 1926; M.S., 1926; Ph.D., Johns Hopkins, 1937; D.Sc., (Hon.), Kenyon Coll., 1963.
- Whistler, David Paul**, Asst. Prof., 1969. B.A., California (Riverside), 1963; M.A., 1965; Ph.D., California (Berkeley), 1969.
- Wilbanks, John Randall**, Visiting Asst. Prof., 1969. B.S., New Mexico Inst. of Mining and Technology, 1960; M.S., Texas Tech, 1966; Ph.D., 1969.
- Yeats, Vestal Llarly**, Asst. Prof., 1960, 1966. B.S., Texas (Austin), 1958; M.S., Texas Tech, 1960.

### Teaching Assistants

- Bauer, Larry Paul**, 1969. B.S., Texas Tech, 1966.
- Cronin, Thomas Crawford**, 1969. B.S., Southern Methodist, 1967.
- D'Lugosz, Joseph Jason**, 1969. B.S., Eastern New Mexico, 1969.
- Dollar, Billy Duell**, 1969. B.S., Texas Tech, 1969.
- Keller, George Randy, Jr.**, 1968. B.S., Texas Tech, 1968; M.S., 1969.
- Martino, David Spicer**, 1969. B.S., Texas Tech, 1969.
- Reeves, James Ray**, 1968. B.S., Texas Tech, 1968.
- Wiginton, Randal Lynn**, 1968. B.A., Hardin-Simmons, 1965.
- Zinz, Barry Lynn**, 1968. B.S., Texas Tech, 1968.

### Department of

#### Germanic and Slavonic Languages

- Hammer, Carl, Jr.**, Chmn. & Horn Prof., 1964, 1967. B.A., Catawba Coll., 1934; M.A., Vanderbilt, 1936; Ph.D., Illinois, 1939.
- Alexander, Theodor Walter**, Prof. & Assoc. Chmn., 1947, 1968. B.S., Texas Tech, 1946; M.S., 1947.
- Eigsti, James Leroy**, Asst. Prof., 1969. B.A., Goshen Coll., 1962; Ph.D., Tulane, 1970.
- Freitas, Margaret Elisabeth**, Asst. Prof., 1969. B.A., Southern Illinois, 1963; M.A., Vanderbilt, 1968; Ph.D., 1968.
- Hull, Alexander Pope, Jr.**, Assoc. Prof. & Assoc. Prof. of Linguistics, also Dir.,

- Language Laboratory, 1956, 1969. B.S., Virginia, 1944; Ph.D., 1955.
- Jardine, Louis Thomas**, Asst. Prof., 1963. B.A., Yale, 1950; M.A., California (Berkeley), 1954.
- Koh, Jean Ste**, Part-time Instr., 1968. B.S., U. of Shanghai (China), 1937; M.Ed., Pittsburgh, 1956.
- Zyla, Wolodymyr Taras**, Assoc. Prof. & Assoc. Prof. of Linguistics, also Chmn., Interdepartmental Committee on Comparative Literature, 1963, 1969. B.S., U. of Manitoba (Canada), 1959; M.A., 1962; Dr. Phil., Free Ukrainian U. (Munich, Germany), 1967.

### Teaching Assistants

- Dunn, Edward Stewart**, 1968. B.A., Texas Tech, 1968.
- Gay, Barbara Jean**, 1968. B.A., Stephen F. Austin, 1968.
- Gordon, Judy Dow**, 1969. B.A., Texas Tech, 1969.
- Jirgensons, Valda Lidijs**, 1963. B.A., Texas Tech, 1966.
- Nadeau, Donna Beth**, 1968. B.A., David Lipscomb Coll., 1968.
- Okerson, Gerald Gayland**, 1969. B.A., Texas Tech, 1969.
- Wekerle, Marie Bettyzon**, 1968. B.A., Texas Tech, 1968.
- Wekerle, Robert Rainer**, 1969. B.A., Texas Tech, 1969.
- Wood, Deva Lynn**, 1968. B.A., Texas Tech, 1969.

### Department of Government

- Holland, Lynwood M.**, Chmn. & Prof., 1967. A.B., Emory, 1932; A.M., 1933; Ph.D., Illinois, 1945.
- Bagley, Walton Medlen**, Part-time Instr., 1969. B.S., West Texas State, 1965; M.A., 1966.
- Baird, Frank Lorenzo**, Assoc. Prof., 1968. B.A., New Mexico, 1948; M.A., 1951; Ph.D., Texas, 1964.
- Barton, Weldon Vernon**, Assoc. Prof., 1967, 1969. B.A., Southwest Texas State, 1962; M.A., Florida State, 1963; Ph.D., 1965.
- Blevins, Leon Wilford**, Instr., 1967. B.A., Wayland Baptist, 1961; M.A., Texas (El Paso), 1967.
- Bowman, James Warren**, Part-time Instr., 1956. B.A., Texas Tech, 1949; LL.B., Texas (Austin), 1953.
- Burnett, John Howard, Jr.**, Asst. Prof., 1966. A.B., West Virginia Wesleyan, 1958; M.A., Emory, 1960; Ph.D., 1966.
- Davis, James William**, Prof., 1938, 1944. B.A., Texas A. & M., 1928; M.A., Texas (Austin), 1931; Ph.D., 1940.
- Edwards, Gregory Allen**, Instr., 1968. B.A., Colorado State, 1966; M.A., 1969.
- Farrell, Bernard Patrick**, Part-time Instr., 1969. B.S., Westchester State (Pennsylvania), 1964; M.A., New Mexico Highlands, 1969.
- Gilbert, Jerry Don**, Part-time Instr., 1968. B.S., Texas Tech, 1965; M.A., 1968.
- Griffith, Horace Ernest**, Part-time Instr., 1952. B.A., Texas Tech, 1935; LL.B., Georgetown, 1939.
- Hamilton, John A., Jr.**, Part-time Instr., 1969. B.A., Frostburg State, 1965; M.A., Delaware, 1968.
- Henderson, Gordon Grant**, Prof., 1968. B.A., Columbia, 1953; M.A., 1954; Ph.D., 1962.
- Henderson, James Stephen**, Asst. Prof., 1968. B.A., Maine, 1965; M.A., Emory, 1967; Ph.D., 1968.
- Jones, Ralph Gray**, Prof., 1965. B.A., Louisiana State, 1935; M.A., 1938; Ph.D., U. of Cambridge (England), 1949.
- Kennedy, Sabe McClain**, Prof. & V. Pres. for Academic Affairs, 1946, 1966. B.A., Texas Tech, 1943; M.A., 1946; Ph.D., Colorado, 1952.
- Kyroe, Martin Theodore, Jr.**, Assoc. Prof.,

- 1963, 1965. B.A., Ohio Wesleyan, 1950; M.A., Washington, 1957; Ph.D., 1962.
- Law, Jack**, Part-time Instr., 1969. B.A., Florida Southern, 1950; M.A., Southern Mississippi, 1957.
- Mack Raymond Delmont**, Assoc. Prof., 1946, 1965. B.A., Texas Christian, 1945; M.A., Texas (Austin), 1949.
- Marsh, Fred Leon**, Part-time Instr., 1969. B.A., North Texas State, 1960; M.A., 1964.
- Mayer, Lawrence Clark**, Asst. Prof., 1969. A.B., Florida, 1958; M.A., California (Berkeley), 1963; Ph.D., Texas (Austin), 1969.
- McDonald, Glenn Douglas**, Part-time Visiting Assoc. Prof., 1966. B.S., Southern Methodist, 1947; M.A., 1948; Ph.D., Texas (Austin), 1955.
- Oden, William Eugene**, Prof., 1948, 1965. B.A., Oklahoma, 1946; M.A., 1949; Ph.D., Indiana, 1957.
- Pearson, Neale Jr.**, Asst. Prof., 1969. B.A., Maryville, 1952; M.A., Georgetown, 1964; Ph.D., Florida, 1967.
- Pettus, Beryl Erwin**, Part-time Instr., 1968. A.B., Oklahoma, 1947; M.A., Illinois, 1952.
- Phelps, Ferneez**, Part-time Instr., 1968. B.A., Texas (Austin), 1944; LL.B., 1944; M.A., Eastern New Mexico, 1968.
- Smith, Jerry Lynn**, Part-time Instr., 1967, 1968. B.S., West Texas State, 1962; M.A., 1966.
- Smith, Roland Edgar**, Asst. Prof., 1968. A.B., Pacific U., 1950; M.A., Oregon, 1960.
- Tamkoc, Metin**, Prof., 1964, 1966. LL.B., U. of Istanbul (Turkey), 1950; M.A., Maryland, 1955; Ph.D., Georgetown, 1960.
- Tucker, William Pierce**, Prof., 1967. B.A., U. of Puget Sound, 1930; M.A., Washington, 1931; Ph.D., Minnesota, 1945.
- Wells, Raymond Byers**, Part-time Instr., 1966, 1968. B.A., Mississippi State, 1963; M.A., 1965.
- Wright, Ruth Cowart**, Asst. Prof., 1957, 1968. B.A., Texas Tech, 1948; M.A., 1949; Ph.D., American U., 1968.
- Youngblood, Betty Jane**, Asst. Prof., 1969. B.A., Oakland, 1965; M.A., Minnesota, 1966.

### Teaching Assistants

- Barnhill, John Lynn**, 1969. B.A., Texas Tech, 1969.
- Hunt, Glen Dale**, 1969. B.A., Texas Tech, 1969.
- Johnson, Alice Marie**, 1968. B.S., West Texas State, 1968.
- Matthews, Mary L.**, 1969. B.A., Abilene Christian, 1969.
- Nathans, Philip, III**, 1969. B.A., Texas Tech, 1969.
- Roberson, Phillip S.**, 1969. B.A., Harding Coll., 1969.
- Slagle, James M.**, 1969. B.S. in Ed., Texas Tech, 1969.

### Department of Health, Physical Education, & Recreation for Men

- Kirellis, Ramon Walter**, Chmn. & Prof., 1950. B.S., Illinois, 1941; M.S., 1944; P.E.D., Indiana, 1950.
- Buchanan, Henry Edsel**, Assoc. Prof. & Dir., Intramural Program for Men, 1956, 1970. B.S., Michigan, 1952; M.A., 1953.
- Burkhardt, John Edward**, Asst. Prof., 1968. B.A., Simpson Coll., 1961; M.A., Iowa, 1964; Ph.D., 1969.
- Cobb, John William, Jr.**, Prof., 1958, 1966. B.S., U. of Corpus Christi, 1951; M.Ed., Texas Tech, 1954; P.E.D., Indiana, 1958.
- Coleman, Alfred Eugene**, Asst. Prof., 1969. B.S., Lamar Inst. of Technology, 1965; M.Ed., Oklahoma, 1966; Ed.D., Texas (Austin), 1969.
- Coppedge Norman Gerald**, Instr., 1965, 1967. B.S., New Mexico Western, 1960; M.Ed., Texas Tech, 1967.



Holsberry, Willard Maurice, Asst. Prof. & Asst. Dir., Intramural Program for Men, 1963, 1964. B.A., Eastern New Mexico, 1962; M.S., 1965.

Mason, Danny Raymond, Asst. Prof., 1969. B.S., Lamar State Coll. of Technology, 1961; M.Ed., Texas A & M, 1962.

McNally, James Faber, Asst. Prof. & Swimming Coach, 1952, 1964. B.S., Oklahoma, 1952; M.Ed., Texas Tech, 1957.

Philbrick, George Rex, Prof. & Tennis Coach, 1947, 1961. B.S., Texas Tech, 1939; M.Ed. in P.E., Texas (Austin), 1950.

Robison, Polk Fancher, Part-time Assoc. Prof. & Athletic Administrator of Finance and Development, 1942, 1970. B.A., Texas Tech, 1934.

Segrest, Herman Brazill, Prof., 1963, 1965. B.S., North Texas State, 1937; M.S., 1946; M.Ed., Texas A & M, 1955; Ed.D., Baylor, 1962.

Segrist, Kal Hill, Jr., Instr. & Head Baseball Coach, 1964, 1967. B.S., North Texas State, 1962; M.Ed., Texas Tech, 1965.

Sparks, Don Lewis, Part-time Instr. & Athletic Department Trainer, 1958, 1964. B.S., Texas Wesleyan, 1952.

Strickland, Edward Dale, Asst. Prof., 1965, 1967. B.S., Texas Tech, 1963; M.Ed., 1965.

### *Teaching Assistants*

Carter, Billy Edward, 1969. B.S. in P.E., Texas Tech, 1969.

Elliott, James C., 1969. B.S. in P.E., Texas Tech, 1969.

Rogers, Larry Delmer, 1969. B.S. Ed., Abilene Christian, 1965; M.Ed., Texas Tech, 1968.

### **Department of Health, Physical Education, & Recreation for Women**

Wilson, Margaret Eileen, Chmn. & Prof., 1965, 1967. B.S.E., Arkansas, 1944; M.S., 1949; Ph.D., State U. of Iowa, 1960.

Aker, Suzanne Deverse Scruggs, Asst. Prof., 1962, 1965. B.A., Tulsa, 1961.

Arterburn, Joyce A. Davis, Instr., 1959, 1967. B.S. in Ed., Texas Tech, 1954; M.Ed., 1966.

Cobb, Mary Ann Murphy, Asst. Prof., 1959, 1961. B.S.E., Henderson State Teachers Coll., 1951; M.Ed., Texas Tech, 1954.

Dabney, Mary Burwell, Prof., 1952. B.S., William and Mary, 1932; M.A., Columbia, 1942; Ed.D., 1951.

Horton, Doris Ann, Prof., 1967. B.S.E., Arkansas, 1953; M.A., Iowa, 1959; Ph.D., 1965.

Hoyle, Dorothy Beatrice, Prof., 1951, 1966. B.S., Texas Woman's, 1940; M.A., 1949; Ph.D., 1966.

Kerr, Janet Amanda, Asst. Prof., 1968. B.A., U. of Colorado, 1967.

Mchaney, Rita Jeannine, Asst. Prof. & Dir., Intramural Program for Women, 1966. B.S., Arkansas State, 1965; M.S., 1966.

Miller, Ann Crocker, Asst. Prof., 1962, 1967. B.S., North Texas State, 1955; M.Ed., Texas Tech, 1966.

Morrow, Ellen Ruth, Instr., 1967. B.S., Southwest Texas State, 1958; M.A., Chico State, 1967.

O'Connor, Colleen Mary, Assoc. Prof., 1964. B.S., Texas (Austin), 1960; M.Ed., 1963; Ed.D., 1968.

Owens, Mary Lydia Seymour, Prof., 1966, 1968. B.A., New York State, 1946; M.A., Syracuse, 1950.

Tevis, Betty Ann Wertheimer, Asst. Prof., 1966. B.A., B.S., Texas Woman's, 1950; M.A., 1951.

Williams, Peggy Jean, Assoc. Prof., 1962, 1967. B.S., East Texas State, 1950; M.Ed., 1953.

### *Teaching Assistants*

Howell, Elizabeth Anne, 1969. B.S. in P.E., Texas Tech, 1969.

Hunter, Nancy E., 1968. B.S., Oregon State, 1963.

Kitzmiller, Laura Lee, 1969. B.A., Houston Baptist Coll., 1969.

Lawley, Marcie Rodman, 1969. B.S. in P.E., U. of Chattanooga, 1967.

### **Department of History**

Vigness, David Martell, Chmn. & Prof., 1955, 1961. B.A., Texas (Austin), 1943; M.A., 1948; Ph.D., 1951.

Abbott, Frank Winchester, Part-time Instr., 1963, 1969. B.S. in Ed., Texas (Austin), 1965; M.A., Texas Tech, 1969.

Barr, Chester Alwyn, Assoc. Prof., 1969. B.A., Texas (Austin), 1959; M.A., 1961; Ph.D., 1966.

Blaisdell, Lowell Lawrence, Prof., 1957, 1963. B.A., Elmhurst Coll., 1941; M.A., Rochester, 1944; Ph.D., Wisconsin, 1949.

Carlson, Paul Howard, Part-time Instr., 1968. B.A., Dakota Wesleyan, 1962; M.S., Manhattan State, 1967.

Collins, Jacquelin, Assoc. Prof., 1962, 1966. B.A., Rice, 1956; M.A., 1959; Ph.D., Illinois, 1964.

Connor, Seymour Vaughan, Prof., 1953, 1956. B.A., Texas (Austin), 1948; M.A., 1949; Ph.D., 1952.

Corcoran, John Robert, Part-time Instr., 1969. B.A., Arkansas State, 1968; M.A., 1969.

Cumiford, William Lloyd, Part-time Instr., 1969. B.A., Chapman Coll., 1963; M.A., California State Coll. (Fullerton), 1969.

Durham, James Ray, Part-time Instr., 1968. B.A., Arkansas State Coll., 1962; M.A., Arkansas State U., 1968.

Elam, Earl Henry, Part-time Instr., 1967. B.A., Midwestern, 1961; M.A., Texas Tech, 1967.

Gibson, Jack Wayne, Part-time Instr., 1967, 1969. B.A., Texas Tech, 1967.

Goss, Charles Wayne, Part-time Instr., 1969. B.A., East Central State, 1964; M.A., Oklahoma State, 1967.

Graves, Lawrence Lester, Prof. & Interim Dean of the Graduate School, 1955, 1967. B.A., Missouri, 1942; M.A., Rochester, 1947; Ph.D., Wisconsin, 1954.

Harper, James William, Asst. Prof., 1967. B.A., Marshall, 1963; M.A., 1964; Ph.D., Virginia, 1968.

Hayes, Robert Ames, Asst. Prof., 1968. B.A., New Mexico, 1955; Ph.D., 1969.

Hull, George Roswell, Instr., 1960, 1965. B.S., Moorhead State, 1939; M.B.A., Chicago, 1949; M.A., Texas Tech, 1963.

Jebsen, Harry A. Jr., Asst. Prof., 1969. B.A., Wartburg Coll., 1965; M.A., Cincinnati, 1966.

Johnson, William Rudolph, Assoc. Prof. & Assoc. Dean of the College of Arts & Sciences, 1964, 1969. B.S., Houston, 1958; M.A., 1959; Ph.D., Oklahoma, 1963.

Kelly, John Garrett, Part-time Instr., 1967. B.A., Texas Tech, 1966.

Knopp, Anthony Keith, Part-time Instr., 1968. B.A., Coll. of St. Thomas (St. Paul), 1963; M.A. in Teaching, 1963; M.A., Minnesota, 1966.

Krenek, Harry Lynn, Part-time Instr., 1969. B.S., Howard Payne, 1963; M.A., Southwest Texas State, 1967.

Kueth, Allan James, Asst. Prof., 1967. B.A., Iowa, 1962; M.A., Florida, 1963; Ph.D., 1967.

Lack, Paul D., Part-time Instr., 1968, 1969. B.A., McMurry, 1966; M.A., Texas Tech, 1969.

Langston, Edward Lonnie, Part-time Instr., 1967. B.A., Texas Tech, 1960; M.A., 1967.

Libourel, Jan Michael, Asst. Prof., 1969. A.B., California (Los Angeles), 1963;

- B.A., (Oxon.), Oxford, 1965; Ph.D., California (Los Angeles), 1968.
- Manning, Thomas Green**, Prof., 1956, 1961. B.A., Yale, 1936; Ph.D., 1941.
- Milligan, James C.**, Part-time Instr., 1969. B.S., Southeastern, 1965; M.S., Arkansas State, 1966.
- Muckelroy, Duncan Glenn**, Part-time Instr., 1967. B.A., Texas (Austin), 1964; M.A., 1966.
- Musslewhite, Lynn Ray**, Part-time Instr., 1967, 1969. B.A., Abilene Christian, 1961; M.A., Texas Tech, 1969.
- Nelson, Otto Millard**, Asst. Prof., 1965. B.S., Oregon, 1956; M.A., 1961; Ph.D., Ohio State, 1968.
- Newcomb, Benjamin Havelock**, Asst. Prof., 1964. B.A., Haverford Coll., 1960; M.A., Pennsylvania, 1961; Ph.D., 1964.
- Reese, James Verdo**, Assoc. Prof., 1962, 1966. B.A., Rice, 1957; M.A., Texas (Austin), 1961; Ph.D., 1964.
- Robbert, George Stiegler**, Assoc. Prof., 1962, 1966. B.A., Concordia Seminary, 1945; B.D., 1948; S.T.M., 1949; M.A., Cincinnati, 1952; Ph.D., Indiana, 1954.
- Robbert, Louise Buenger**, Asst. Prof., 1962, 1964. B.A., Carlton Coll., 1947; M.A., Cincinnati, 1948; B.Ed., 1949; Ph.D., Wisconsin, 1955.
- Sapper, Nell Gary**, Part-time Instr., 1967. B.A., U. of Denver, 1963; M.A., Eastern New Mexico, 1965.
- Skaggs, Jimmy Marion**, Part-time Instr. & Deputy Archivist, Southwest Collection, 1965, 1968. B.S., Sul Ross State, 1962; M.A., Texas Tech, 1965.
- Skeen, Douglas S.**, Part-time Instr., 1969. B.A., Wayland Baptist, 1954; M.A., Southwest Texas State, 1963.
- Soffar, Allan Jarrell**, Part-time Instr., 1968. B.A., Texas (Austin), 1963; M.A., Houston, 1967.
- Stotts, George Robert**, Part-time Instr., 1969. B.A., Southwestern Assemblies of God Coll., 1956; B.A., Texas (Austin), 1957; M.A., 1958.
- Traylor, Idris Rhea, Jr.**, Assoc. Prof. & Deputy Dir., ICASALS, 1960, 1967. B.A., Texas (Austin), 1957; M.A., 1959; Ph.D., Duke, 1965.
- Vernon, John Robert**, Part-time Instr., 1969. B.A., Midwestern, 1967; M.A., Colorado State U., 1968.
- Wallace, Ernest**, Horn Prof., 1936, 1967. B.S., East Texas State, 1932; M.A., Texas Tech, 1935; Ph.D., Texas (Austin), 1942.
- Watson, Thomas Davis**, Part-time Instr., 1969. B.A., New Mexico State, 1951; M.A., U. of Southwestern Louisiana, 1969.
- Woods, Paul Joseph**, Prof. & Editor of University Bulletins, 1960, 1969. B.A., Illinois, 1938; M.A., 1940; Ph.D., 1941.
- Zeigler, Robert Edward**, Part-time Instr., 1967. B.S., Sam Houston State, 1963; M.A., 1965.

### Teaching Assistants

- Boyd, Newell Dalton**, 1968. B.A., Southern Methodist, 1965.
- Casey, Charles Don**, 1969. B.S., Texas (Arlington), 1964.
- Clark, Anthony**, 1969. B.A., Southwest Texas State, 1958.
- Hopson, Don Garland**, 1969. B.A., Texas Tech, 1966.
- Jones, Barry Wayne**, 1969. B.S., Eastern New Mexico, 1968.

### Department of Journalism

- Ross, Billy Irvan**, Chmn. & Prof., 1964, 1970. B.J., Missouri, 1948; M.A., Eastern New Mexico, 1952; Ph.D., Southern Illinois, 1964.
- Childress, Jim Haddison**, Part-time Instr., 1970. B.P.A., Brooks Inst. of Photography, 1963.

- Dean, William Frank**, Part-time Instr. & Dir. Student Publications, 1967. B.B.A., Texas Tech, 1961; M.Ed., 1965.
- Laine, Tanner**, Part-time Instr., 1966. B.A., Texas Tech, 1939.
- Morgan, Harmon Loyd**, Asst. Prof., 1968. B.J., Missouri, 1950; M.A., Oklahoma, 1963.
- Rooker, Robert Alan**, Assoc. Prof., 1963. B.A., Texas Tech, 1958; M.A., 1960.
- Sellmeyer, Ralph Louis**, Assoc. Prof., 1960, 1966. B.J., Missouri, 1950; M.A., Missouri (Kansas City), 1961.

### Library Science

- Boze, Nancy Smith**, Asst. Prof. & Asst. Prof. of Secondary Education, 1958, 1969. B.S., East Texas State, 1940; M.A., 1948; Ed.D., Texas Tech, 1966.
- Davidson, Raymond Leon**, Prof. & Prof. of Education, 1949, 1969. B.A., Clarendon Coll., 1927; M.A., Texas Tech, 1935; Ed.D., Texas (Austin), 1951.
- McDonald, Donald**, Prof. & Prof. of Elementary Education, also Assoc. Dean of the College of Education, 1948, 1969. B.S., North Texas State, 1940; M.S., 1944; Ed.D., Texas (Austin), 1954.

### Linguistics

- Bumpass, Faye LaVerne**, Horn Prof. & Horn Prof. of Classical and Romance Languages, 1943, 1969. B.A., Texas Tech, 1932; M.A., 1934; D.Lit., San Marcos U. (Lima, Peru), 1947.
- Foster, James Maurice**, Asst. Prof. & Asst. Prof. of English, also Chmn., Interdepartmental Committee on Linguistics, 1966, 1970. B.S., Illinois, 1962; A.M., 1963; Ph.D., 1966.
- Green, Lola Beth**, Assoc. Prof. & Assoc. Prof. of English, 1949, 1969. B.A., Texas Tech, 1935; M.A., 1942; Ph.D., Texas (Austin), 1955.
- Holland, James Edward**, Instr. & Instr. in Classical and Romance Languages, 1967, 1969. A.B., William Jewell Coll., 1963; M.A., Washington, 1966.
- Hull, Alexander Pope, Jr.**, Assoc. Prof. & Assoc. Prof. of Germanic and Slavonic Languages, also Dir., Language Laboratory, 1956, 1969. B.S., Virginia, 1944; Ph.D., 1955.
- Kozlowski, Edwin L.**, Instr. & Instr. in Sociology and Anthropology, 1968, 1969. A.B., Mexico City Coll., 1960.
- Mogan, Joseph John, Jr.**, Assoc. Prof. & Assoc. Prof. of English, 1966, 1969. B.A., S.T.B., St. Mary's Seminary & U., 1948; M.A., Notre Dame, 1954; Ph.D., Louisiana State, 1961.
- Patterson, William Taylor**, Assoc. Prof. & Assoc. Prof. of Classical and Romance Languages, 1961, 1969. B.A., Kansas, 1954; M.Ed., Pennsylvania State, 1961; Ph.D., Stanford, 1967.
- Whieldon, Gil McQuire**, Asst. Prof. & Asst. Prof. of Classical and Romance Languages, 1969. B.A. (Honours), U. of London, 1954.
- Zyla, Wolodymyr Taras**, Assoc. Prof. & Assoc. Prof. of Germanic and Slavonic Languages, also Chmn., Interdepartmental Committee on Comparative Literature, 1963, 1969. B.S., U. of Manitoba (Canada), 1959; M.A., 1962; Dr.Phil., Free Ukrainian U. (Munich, Germany), 1967.

### Department of Mathematics

- Odell, Patrick Lowry**, Chmn. & Prof., also Prof. of Statistics, 1966, 1969. B.S., Texas (Austin), 1952; M.S., Oklahoma State, 1958; Ph.D., 1962.
- Adams, Jasper Emmett, Jr.**, Part-time Instr., 1968. B.S., Stephen F. Austin State, 1964; M.S., 1965.

- Ahlers, Carl Wilkerson, Instr., 1968. B.S., Texas (Austin), 1964; M.A., 1966.
- Amir-Moez, Ali Reza, Prof., 1965. B.A., U. of Teheran (Iran), 1942; M.A., California (Los Angeles), 1951; Ph.D., 1955.
- Anderson, Dwane Elmer, Asst. Prof. & Asst. Prof. of Statistics, 1968, 1969. B.S., California (Santa Barbara), 1957; M.P.H., North Carolina, 1964; Ph.D., Southern Methodist, 1968.
- Anderson, Ronald Myles, Assoc. Prof., 1965, 1966. B.A., Luther Coll., 1957; M.S., Iowa State, 1959; Ph.D., 1962.
- Atchison, Thomas Andrew, Assoc. Prof., 1967. B.A., Texas (Austin), 1959; M.A., 1960; Ph.D., 1963.
- Ault, John Willard, Assoc. Prof., 1965. B.S., Bowling Green State, 1932; M.A., Ohio State, 1935.
- Baldwin, George Lewis, Assoc. Prof., 1966. B.S., Eastern New Mexico, 1948; M.A., 1952; Ph.D., Oklahoma, 1961.
- Basu, Jyot Prakash, Part-time Instr., 1970. B.S., Presidency Coll. (India), 1955; M.S., U. Coll. of Science (India), 1958.
- Bennett, Harold R., Asst. Prof., 1968. B.S., Idaho State, 1963; M.A., Arizona State, 1965; Ph.D., 1968.
- Boudria, Bobby Fred, Part-time Instr., 1969. B.S., Stephen F. Austin, 1962; M.S., 1966.
- Bouillon, Thomas L. Asst. Prof. & Asst. Prof. of Statistics, 1967, 1969. B.S., Louisiana State, 1961; M.S., Southwestern Louisiana, 1963; Ph.D., Texas (Austin), 1966.
- Carpenter, Ila Mae, Instr., 1956. B.S., East Texas State, 1942; M.S., Texas Tech, 1952.
- Coberly, William Arthur, Part-time Instr., 1966, 1968. B.A., Texas Tech, 1965.
- Conatser, Charles Wiley, Instr., 1969. B.A., Texas A & M, 1961; M.S., 1963.
- Cooper, Richard Alex, Part-time Instr., 1968. B.A., Baylor, 1963; M.A., Texas (Austin), 1966.
- Doerr, James Clement, Part-time Instr., 1969. B.S., Texas (Arlington), 1966; M.S., North Texas State, 1969.
- Donnell, William Anthony, Part-time Instr., 1968. B.A., North Texas State, 1963; M.A., 1966.
- Drummond, John Coleman, Jr., Part-time Instr., 1968. B.S., Notre Dame, 1966; M.S., 1968.
- Ford, Wayne Timothy, Assoc. Prof., 1967. B.A., Oklahoma City U., 1952; M.A., Oklahoma, 1953; Ph.D., Rice, 1964.
- Gray, Henry Luther, Prof. & Prof. of Statistics, 1967, 1969. B.S., Texas Tech, 1959; M.S., 1961; Ph.D., Texas (Austin), 1966.
- Hall, Michael Henry, Asst. Prof., 1967. B.S., Massachusetts Inst. of Technology, 1962; M.S., Arizona, 1963; Ph.D., 1966.
- Hallum, Cecil Ralph, Part-time Instr., 1968. B.S., Texas Tech, 1966; M.S., 1969.
- Hazlewood, Emmett Allen, Prof., 1939, 1948. B.S., West Texas State, 1928; M.A., Cornell, 1931; Ph.D., 1936.
- Heineman, Ellis Richard, Prof., 1928, 1947. B.A., Wisconsin, 1925; M.A., 1926.
- Hildebrand, Shelby Keith, Assoc. Prof., 1963, 1965. B.A., North Texas State, 1952; M.A., 1957; Ph.D., Iowa State, 1962.
- Hunt, Louis Roberts, Asst. Prof., 1969. B.S., Baylor, 1964.
- Innis, George Seth, Assoc. Prof. & Assoc. Prof. of Computer Science, also Dir., Computer Center, 1967, 1969. B.A., Texas (Austin), 1958; M.A., 1961; Ph.D., 1962.
- Kennedy, Sarah Ann Nix, Instr., 1958, 1961. B.S., Texas Tech, 1957; M.S., 1959.
- Keyton, Nancy Estelle, Part-time Instr., 1968. B.A., Texas Tech, 1965; M.S., 1968.
- Komkov, Vadim, Prof., 1969. M.S., Poland (State Board of Tech. Stu.), 1948; Ph.D., Utah, 1964.
- Lewis, Truman Orville, Assoc. Prof. & Assoc. Prof. of Statistics, 1966, 1969. B.S., Texas Tech, 1956; M.S., 1960; Ph.D., Texas (Austin), 1966.
- Lockhart, Lyons Herff, Jr., Part-time Instr., 1968. B.S., Texas Tech, 1961; M.S., 1965.
- Long, Ralph E., Part-time Instr., 1968. B.S., Oklahoma State, 1964; M.A., Illinois, 1968.
- Mathis, Mary Nell, Part-time Instr., 1968. B.S., Mary Baldwin Coll., 1961; M.S., Texas Tech, 1965.
- McMath, John Seals, Part-time Instr., 1968. B.A., Texas A & M, 1966; M.S., Texas Tech, 1968.
- Miller, John David, Assoc. Prof., 1968. B.S., Eastern Illinois State, 1956; M.S., Iowa State, 1958; Ph.D., Indiana, 1963.
- Milnes, Harold Willis, Prof. & Prof. of Computer Science, 1966, 1969. M.A., Wayne State, 1952; Ph.D., 1955.
- Mitra, Arunkumar, Asst. Prof., 1967. B.S., St. Xavier's Coll., Calcutta U. (India), 1955; M.S., 1957; Ph.D., Universitat Marburg (Germany), 1963.
- Moment, Charles Gairdner, Part-time Instr., 1968. A.B., Princeton, 1959; M.S., Purdue, 1961.
- Moreland, Robert A., Asst. Prof., 1969. B.S., Texas Tech, 1953; M.S., 1954.
- Morton, Elwyn Wade, Asst. Prof., 1955, 1962. B.S., West Texas State, 1949; M.A., Texas (Austin), 1955.
- Newman, Thomas Gerald, Asst. Prof., 1967. B.A., Howard Payne, 1962; M.A., Texas (Austin), 1964; Ph.D., 1967.
- Parker, Robert Marshall, Assoc. Prof., 1946, 1957. B.A., Texas Tech, 1930; M.A., 1933.
- Perry, Charles Rufas, Jr., Part-time Instr., 1969. B.S., Texas Tech, 1967; M.S., 1969.
- Poole, George Douglas, Part-time Instr., 1968. B.S.E., Kansas State Teachers Coll., 1964; M.S., Colorado State U., 1966.
- Pore, Michael David, Part-time Instr., 1969. B.A., Texas (Austin), 1965; M.S., Texas Tech, 1969.
- Power, Ruby Stewart, Instr., 1956, 1957. B.S. in T.E., Texas Tech, 1944; M.S., 1957.
- Pye, Wallace C., Part-time Instr., 1968. B.S., Louisiana State, 1964; M.S., 1968.
- Rhoades, Dale Robert, Part-time Instr., 1968. B.A., Texas Tech, 1967.
- Rhoads, Samuel Edward, Part-time Instr., 1968. B.A., Western State Coll., 1962; M.S., Wyoming, 1965.
- Rigby, Fred Durnford, Prof. & Prof. of Statistics and Computer Science, also Assoc. V. Pres., for Academic Affairs, 1940, 1969. B.A., Reed Coll., 1935; M.S., State U. of Iowa, 1938; Ph.D., Kentucky, 1940.
- Riggs, Charles Lathan, Prof., 1953, 1960. B.A., Texas Christian, 1944; M.A., Michigan, 1945; Ph.D., Kentucky, 1949.
- Rizzuto, Gaspard Thomas, Part-time Instr., 1969. B.S., Loyola U. of the South, 1963; M.S., Louisiana State, 1965.
- Roberts, Virginia Bowman, Asst. Prof., 1945, 1957. B.A., Texas Tech, 1943; M.A., 1945.
- Sartain, Robert Lee, Part-time Instr., 1968. B.S., Wayland Baptist, 1961; M.S., Iowa, 1964.
- Shoemaker, David Dee, Part-time Instr., 1968. B.S., Texas Tech, 1959; M.S., 1962.
- Shurbet, Gerald Lynn, Asst. Prof., 1956, 1960. B.A., Texas (Austin), 1949; M.S., Texas Tech, 1957.
- Slauson, Frederick C. T., Jr., Instr., 1968. B.S., Texas Tech, 1960; M.S., 1962.
- Smith, Burnett T., Asst. Prof., 1948, 1959. B.S., Texas Tech, 1942; M.Ed., 1948.
- Smith, Stephen W., Asst. Prof., 1969. B.S., Harding Coll., 1963; M.S., Arkansas, 1965; Ph.D., Florida State, 1969.
- Smyrl, Shannon, Part-time Instr., 1968. B.S., Texas Tech, 1965; M.S., 1967.

- Strandtmann, Mary Ruth Chance, Asst. Prof., 1951, 1959. B.A., Southwest Texas State, 1936; M.A., Texas Tech, 1952.
- Streit, Roland Francis, Part-time Instr., 1968. B.S., East Texas State, 1965; M.S., 1966.
- Tarwater, Jan Dalton, Asst. Prof., 1968. B.S., Texas Tech, 1959; M.A., New Mexico, 1961; Ph.D., 1965.
- Thompson, Paul Edward, Assoc. Chmn. & Asst. Prof., 1963, 1968. B.S., New Mexico, 1960; M.S., 1963; Ed.D., Texas Tech, 1968.
- Thrash, Joe Barham, Part-time Instr., 1968. B.S., Lamar State Coll. of Technology, 1963; M.S., 1964.
- Tidmore, Freddie Eugene, Asst. Prof., 1967. B.S., Hardin-Simmons, 1962; M.S., Oklahoma State, 1963; Ph.D., 1967.
- Tipton, Alan Ray, Part-time Instr., 1968. B.A., Lamar State Coll. of Technology, 1963.
- Topper, Michael Anthony, Instr., 1969. B.A., Mt. St. Mary's Coll., 1962; M.A., Maryland, 1965.
- Tsai, Wu-Shyong, Part-time Instr., 1969. B.S., Taiwan Chung-Hsing, 1966; M.S., Tennessee, 1969.
- Wald, Charles Carter, Asst. Prof., 1967. B.S., New Mexico Inst. of Mining & Technology, 1961; M.S., Louisiana State, 1964; Ph.D., 1967.
- Wald, Margaret Cowser, Part-time Instr., 1968. B.S., Louisiana State, 1961; M.S., 1963.
- Walling, Derald Dee, Assoc. Prof., 1966. B.S., Iowa State Coll., 1958; M.S., Iowa State U., 1961; Ph.D., 1963.
- Watkins, Terry A., Part-time Instr., 1968. B.S., West Texas State, 1961; M.S., Illinois Inst. of Technology, 1964.
- White, John Thomas, Assoc. Prof., 1965. B.A., Texas (Austin), 1952; M.A., 1953; Ph.D., 1962.
- Whitely, Mary Milam, Part-time Instr., 1968. B.A., Texas (Austin), 1963; M.A., Texas Tech, 1966.
- Williams, Everette Don, Part-time Instr., 1968. B.S., Southwestern U. (Georgetown), 1962.
- Williams, Marshall, Part-time Instr., 1968. B.A., Rice, 1963; M.S., Texas Tech, 1965.
- Woodward, Horace Eugene, Jr., Assoc. Prof., 1937, 1956. B.A., Texas Tech, 1936; M.A., 1937.

### Teaching Assistants

- Aldredge, John C., 1969. B.S., Texas Tech, 1969.
- Armstrong, Walter Patrick, 1968. B.B.A., Texas (Austin), 1959.
- Burns, Raymond Lloyd, 1969. B.S., Texas Tech, 1969.
- Bush, Nancy Chloe, 1968. B.S., Texas Tech, 1964.
- Conner, Frankie Weldon, 1969. B.S., Texas Tech, 1969.
- Dunlevy, James Owen, 1969. B.A., Coll. of Steubenville, 1962; M.A., Arizona State, 1964.
- Dunlevy, Phyllis Ann, 1969. A.B., Fairmont State Coll., 1968.
- Holubec, Billy A., 1970. B.S., Texas Tech, 1969.
- Jeter, Glynn Jane, 1969. B.S., Sul Ross, 1968.
- Kim, Jang-Tae, 1968. B.S., Seoul National U., 1957.
- Miller, Mary Anne, 1969. B.A., Texas Tech, 1967.
- Payne, Lester Leon, 1969. B.S., Texas (San Angelo), 1968.
- Payne, Mary Patricia, 1968. B.A., Texas Tech, 1968.
- Rathbun, Michael Louis, 1967. B.S., Texas Tech, 1967.
- Smith, Jane Harris, 1969. B.A., Baylor, 1969.
- Speir, Garry Dwight, 1968. B.S., Texas Tech, 1968.

- Tippett, James Milton, 1969. B.S., Texas Tech, 1969.
- Walker, Billy Kenneth, 1969. B.S., West Texas State, 1968.
- Whitmore, Roy Walter, 1969. B.S., Texas Tech, 1969.
- Williams, Keith Kim, 1969. B.A., Texas Tech, 1969.
- Woodward, Wayne Anthony, 1969. B.A., Texas Tech, 1969.

### Department of Music

- Hemmler, Gene Leclair, Chmn. & Prof., 1949. B.M., Southern Methodist, 1937; M.A., Teachers Coll., Columbia, 1946; Ed.D., 1949.
- Barber, Gail Marie Guseman, Part-time Asst. Prof., 1966. B.M., Eastman School of Music, 1959.
- Barber, James Joseph, Prof., 1966. B.M., Eastman School of Music, 1958; M.M., 1959; A.M.D., 1964.
- Bernard, Robert Prentiss, Asst. Prof., 1968. B.A., U. of Pacific, 1950; M.M., Southern California, 1963.
- Brittin, Anthony Norman, Asst. Prof., 1963. B.M.E., Florida State, 1959; M.M., Manhattan School of Music, 1963.
- Catugno, Louis Robert, Asst. Prof., 1961. 1965. B.M., Yale, 1953; M.M., 1954.
- Cherry, Dona Lee, Part-time Instr., 1967. B.M., Texas (Austin), 1964; M.M., 1967.
- Cutter, Paul Frederick, Assoc. Prof., 1968. B.A., California (Los Angeles), 1960; M.A., Harvard, 1962; M.F.A., Princeton, 1964; Ph.D., 1969.
- Deahl, Robert Waldo, Prof. & Administrative Assoc., 1958, 1967. B.M., Oberlin, 1950; M.M., 1952.
- Ellsworth, Paul Raymond, Prof., 1954, 1967. B.A., Hillsdale Coll., 1950; M.A., Teachers Coll., Columbia, 1956.
- Farrell, John Owen, Instr., 1966, 1968. B.M., Texas Tech, 1966; M.M.E., 1967.
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- Gettel, Georgette Elizabeth, Asst. Prof., 1963, 1967. B.M., Northwestern, 1956; M.M., Indiana, 1966.
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- Montgomery, Evelyn Ina, Assoc. Prof., 1964. B.S., Kansas State Teachers Coll., 1936; M.S., 1942; Ph.D., Indiana, 1965.
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- Needles, Belverd Earl, Jr.**, Asst. Prof., 1968. B.B.A., Texas Tech, 1964; M.B.A., 1965; Ph.D., Illinois, 1969; C.P.A.
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- Penafiel, Lorenzo Villa-Real**, Instr., 1967, 1969. B.S.C., Far Eastern U., 1948; M.B.A., Texas Tech, 1961; C.P.A.
- Phelan, Marilyn Elizabeth**, Part-time Instr., 1966, 1968. B.B.A., Texas Tech, 1959; M.B.A., 1967; C.P.A.
- Roberts, Arthur Theophile**, Prof., 1955, 1963. B.S. in B.A., Boston Coll., 1950; M.B.A., Boston U., 1951; Ph.D., Louisiana State, 1955; C.P.A.
- Taylor, Haskell Grant**, Prof., 1937, 1948. B.B.A., Texas Tech, 1936; M.A., 1937; C.P.A.
- Thorn, Ronald George**, Part-time Instr., 1969. B.B.A., Texas Tech, 1963; M.B.A., 1969.
- Welch, Irvin**, Part-time Instr., 1970. B.B.A., Texas Tech, 1949; C.P.A.
- Wells, James Roy**, Prof., 1951, 1969. B.A., Baylor, 1928; B.B.A., 1928; M.B.A., Colorado, 1931.
- Whittington, William Elmer**, Prof., 1947, 1964. B.B.A., Texas (Austin), 1939; M.B.A., 1947; Ph.D., Illinois, 1957.
- Williams, Doyle Zane**, Assoc. Prof., 1965, 1967. B.S., Northwestern State Coll. of Louisiana, 1960; M.S., Louisiana State, 1962; Ph.D., 1965; C.P.A. (Louisiana, Texas).

### Teaching Assistants

- Bonner, Norman Earl**, 1970. B.B.A., Texas Tech, 1969.
- Dozier, Donald Dee**, 1970. B.B.A., Texas Tech, 1969.
- Gholson, Frederick Michael**, 1970. B.B.A., Texas Tech, 1970.
- Godfrey, Robert Ross**, 1969. B.B.A., Texas Tech, 1969.
- Irvin, Karl Edward**, 1970. B.B.A., Texas Tech, 1969.
- Killman, Michael James**, 1969. B.B.A., Texas Tech, 1969.
- McDonald, George Donald**, 1969. B.B.A., Texas Tech, 1968.
- Tipton, Carl Roy**, 1970. B.B.A., Texas Tech, 1969.
- Tomlinson, Max Clinton**, 1970. B.S., New Mexico Military Inst., 1966.
- Verner, Bartley Ray**, 1969. B.B.A., Texas Tech, 1969.

### Department of Business Education and Secretarial Administration

- Pasewark, William Robert**, Chmn. & Prof., 1956, 1957. B.S., New York, 1949; M.A., 1950; Ph.D., 1956.
- Balsley, Irol Whitmore**, Prof., 1965. A.B., Wayne State, 1933; M.S., Tennessee, 1940; Ed.D., Indiana, 1952.
- Bulls, Derrell Wayne**, Part-time Instr., 1969. B.B.A., North Texas State, 1957; M.B.E., 1959.
- Burkhead, A. Marie**, Part-time Instr., 1969. B.A., Union U., 1960; M.B.A., Texas (Austin), 1961.
- Fagan, Larry Neil**, Instr. & Instr. in Accounting, 1968, 1969. B.B.A., Texas Tech, 1967; M.B.A., 1968.
- Gilliam, John Charles**, Prof. & Assoc. Dean of the College of Business Administration, also Deputy Dir. for Business Sciences, ICASALS, 1962, 1970. B.A., Western State Coll. of Colorado, 1951; M.B.Ed., Colorado, 1952; Ph.D., Iowa, 1959.

- Grainger, Don Lucas**, Part-time Instr., 1969. B.S. in Business Administration, Central Missouri State Coll., 1961; M.A., 1965.
- Hall, John Doyle**, Part-time Instr., 1968. B.S., Eastern Illinois, 1960; M.S., 1962.
- Johnson, Ronald Dee**, Assoc. Prof., 1966. B.A., Washington, 1954; M.B.A., Indiana, 1958; D.B.A., 1966.
- Kilchenstein, Ernestine Dolores**, Asst. Prof., 1959, 1965. B.B.A., Texas Tech, 1957; M.B.A., 1960.
- Liddell, Sister Mary**, Part-time Instr., 1969. B.S., Caldwell Coll., 1953; M.B.A., Seton Hall, 1957.
- Quicksall, Ettie Claire**, Asst. Prof., 1945, 1964. B.A., Baylor, 1926; M.A., 1928.
- Spickelmier, Don Omer**, Part-time Instr., 1968. B.A., Western State Coll. (Colorado), 1963; M.A., 1965.
- Watt, James Taggart**, Assoc. Prof., 1960, 1965. B.S., Cincinnati, 1950; M.A., Ohio State, 1960; Ph.D., 1965.
- Teaching Assistants*
- Finley, M. Allene**, 1969. B.B.A., Texas Tech, 1946.
- Ingraham, Rhoda Margaret**, 1970. B.B.A., Texas Tech, 1969.
- Wheeler, Billie J.**, 1969. B.S., Houston, 1968.

### Department of Economics

- Rouse, Robert Lyle**, Chmn. & Prof., also Prof., Dept. of Finance, 1950, 1968. B.A., Coe Coll., 1943; M.A., Iowa, 1949; Ph.D., 1950.
- Anderson, Hugh Allen**, Assoc. Prof., 1939, 1947. B.A., Hardin-Simmons, 1928; M.A., 1929.
- Bonnington, Robert Lester**, Assoc. Prof., 1968. B.A., Indiana, 1957; Ph.D., Iowa, 1968; C.P.A.
- Clark, Erlinda**, Part-time Instr., 1967. B.S., Far Eastern U., 1961; M.B.A., De Paul, 1962.
- Clover, Vernon Thomas**, Prof., 1947, 1953. B.S., Fort Hays Kansas State, 1934; M.S., 1935; Ph.D., Colorado, 1937.
- Duncan, John Belton**, Asst. Prof., 1967, 1968. B.A., Austin Coll., 1959.
- Ford, William F.**, Assoc. Prof., 1969. B.A., Texas (Austin), 1961; M.A., Michigan, 1962; Ph.D., 1966.
- Gott, Edna Maynard**, Part-time Instr., 1954, 1966. B.A., Texas (Austin), 1942; M.A., Texas Tech, 1954.
- Harding, John Elzie**, Asst. Prof., 1937, 1961. B.A., Howard Payne, 1927; B.F.A., 1927; M.A., Texas Tech, 1937.
- Hill, Lewis Edgar**, Prof., 1967. B.A., Texas (Austin), 1947; M.A., 1948; Ph.D., 1957.
- James, John McAllen**, Part-time Instr., 1968. B.A., Texas Tech, 1967; M.A., 1968.
- Johnson, William Clint**, Part-time Instr., 1969. B.A., Rice, 1964; M.A., Texas, 1966.
- Lombardo, Thomas Julian**, Instr., 1966, 1968. B.A., Texas Tech, 1966; M.A., 1968.
- Marshall, Richard H.**, Part-time Instr., 1968. B.A., East Texas State, 1967; M.A., Texas Tech, 1968.
- Taylor, Theodore James**, Asst. Prof., 1966. B.A., Wichita State, 1961; M.A., Kansas, 1964.
- Thompson, John Miles**, Instr., 1966. B.B.A., McMurry Coll., 1965; M.B.A., Texas Tech, 1966.
- Troub, Roger Monroe**, Asst. Prof., 1967. B.B.A., Oklahoma, 1962; M.A., 1967; Ph.D., 1968.
- Walker, Harry Stuart**, Assoc. Prof., 1953, 1969. B.A., Denver, 1948; M.B.A., 1950.
- Wittman, John, Jr.**, Assoc. Prof., 1960, 1965. B.S. in B.C., Southern State Coll. (Arkansas), 1957; M.B.A., Arkansas, 1959; Ph.D., 1965.

### Teaching Assistants

- Brown, Susan Leigh**, 1969. B.S., Mississippi State Coll. for Women, 1969.
- Hiekema Hendrik Jochum**, 1969. B.A., Oregon, 1969.
- Ireland, Marvin Edwin**, 1969. B.S., Midwestern, 1969.
- Meals, Dennis**, 1969. B.B.A., Texas Tech, 1969.
- Payne, Michael Fleming**, 1969. B.S., Midwestern, 1969.
- Rice, Patricia**, 1968. B.A., Mary Hardin-Baylor, 1968.
- Wynn, Larry Franklin**, 1969. B.B.A., Texas Tech, 1969.

### Department of Finance

- Bowlin, Oswald Doniece**, Chmn. & Prof., 1965, 1969. B.A., Texas A & M, 1951; M.S., 1954; Ph.D., Illinois, 1959.
- Abel, Burl Monroe**, Assoc. Prof., 1955. B.S., Oklahoma, 1929; M.B.A., 1931; C.L.U.
- Berry, George William**, Prof., 1960, 1963. B.B.A., Texas (Austin), 1956; M.B.A., 1957; Ph.D., 1961.
- Clements, Judson Irvine**, Asst. Prof., 1969. B.B.A., Texas, 1934; J.D., 1939; Licensed Attorney (Texas, Philippines).
- Dale, Charles Edwin**, Prof., 1955, 1965. B.A., Texas Tech, 1948; J.D., Baylor, 1950.
- Dukes, William Parks**, Assoc. Prof., 1968. B.S., Maryland, 1953; M.B.A., Michigan, 1958; Ph.D., Cornell, 1968.
- Gosting, Donald L.**, Part-time Instr., 1969. B.B.A., Texas Tech, 1967.
- Hance, Kent Ronald**, Asst. Prof., 1968. B.B.A., Texas Tech, 1965; J.D., Texas (Austin), 1968.
- Harris, Don Lamar**, Part-time Instr., 1965. B.B.A., Texas Tech, 1954.
- Hood, Jerry Michael**, Instr., 1969. B.S., Louisiana Polytechnic Inst., 1965; M.B.A., Texas Tech, 1966.
- Irvin, Russell Briggs**, Part-time Instr. & Consultant, 1951, 1952. B.A., Hardin-Simmons, 1929; M.A., Texas (Austin), 1933; LL.B., 1938.
- Kagle, Arthur Renn**, Instr., 1968. B.B.A., Eastern New Mexico, 1967; M.B.A., 1968.
- Martin, John David**, Instr., 1969. B.S., Louisiana Inst. of Technology, 1967; M.A., 1969.
- Rogers, Marvin A.**, Part-time Instr., 1969. B.A., Baylor, 1954; LL.B., Texas (Austin), 1966.
- Rouse, Robert Lyle**, Prof. & Chmn. & Prof. of Economics, 1950, 1958. B.A., Soe Coll., 1943; M.A., Iowa, 1949; Ph.D., 1950.
- Schuetzberg, Jerome Herman**, Asst. Prof., 1968. B.S., Texas Tech, 1962; J.D., Texas (Austin), 1965.
- Shuman, Harold Dean**, Part-time Instr., 1959. B.A., Washburn U. of Topeka, 1954; LL.B., 1954.
- Terrell, Lewis Preston**, Part-time Instr., 1966. B.A., Texas Tech, 1949; M.Ed., 1952; J.D., Texas (Austin), 1966.
- Wade, Charles Ernest**, Assoc. Prof., 1964, 1966. B.B.A., Texas (Arlington), 1961; M.B.A., North Texas State, 1962; Ph.D., Oklahoma, 1966.

### Teaching Assistants

- Adams, William Bain**, 1969. B.B.A., Texas Tech, 1969.
- Bain, Kenneth William**, 1970. B.B.A., Baylor, 1966.
- Dilworth, Ruth Haston**, 1968. B.B.A., West Texas State, 1968.
- Gober, Jerald Robert**, 1970. B.B.A., Texas Tech, 1969.
- Knust, Gary Bernhard**, 1970. B.B.A., Texas Tech, 1969.
- Mitchell, Newell Dean**, 1969. B.B.A., Texas Tech, 1969.
- Sanders, John Michael**, 1969. B.B.A., Abilene Christian, 1966.
- Shaw, William George**, 1969. B.B.A., Texas A & M, 1964.

Watt, Clifford B., 1969. B.B.A., Texas Tech, 1967.

### Department of Management

- Luchsinger, Vincent Peter, Chmn. & Prof., 1961, 1968. B.A., Loras Coll., 1949; M.A., Texas Tech, 1959; Ph.D., 1962.
- Armstrong, Robert S., Asst. Prof., 1968. B.S., Texas Tech, 1961; M.B.A., 1964.
- Barton, Richard Fleming, Prof. & Prof. of Computer Science, also Dir. of Planning and Analyses, 1967, 1969. B.S., Northwestern, 1948; Ph.D., California (Berkeley), 1961.
- Cain, William Gaston, Jr., Prof., 1955, 1963. B.S.C., Iowa, 1942; M.A., 1946; Ph.D., 1952.
- Carvey, Davis Weston, Part-time Instr., 1969. B.B.A., Pacific Lutheran U., 1965; M.B.A., 1968.
- Donnelly, John Thomas, Asst. Prof., 1969. B.B.A., Iowa, 1963; M.A., 1966.
- Ewing, Stephen, Part-time Instr., 1969. B.Sc., Howard Payne, 1965; M.B.A., Baylor, 1967.
- Kerber, Robert Jean, Part-time Instr., 1969. B.S.B.A., Michigan Coll. of Mining & Technology, 1960; M.S.B.A., Northern Illinois, 1964.
- Lokey, Kenneth Ray, Part-time Instr., 1969. B.S. in E.E., Texas Tech, 1963; M.B.A., 1967; M.S., Southern Methodist, 1969.
- Lutz, Richard C., Part-time Instr., 1969. B.S., Southern Illinois, 1958; M.S., 1961.
- Moghrabi, Kamel M., Part-time Instr., 1969. B.Sc., Marquette, 1961; M.B.A., Bradley, 1963; Ph.D., Texas A & M, 1966.
- Ponthieu, Louis David, Asst. Prof. & Dir. of Graduate Studies for Business Administration, 1967, 1970. B.B.A., North Texas State, 1962; M.B.A., 1963; Ph.D., Arkansas, 1968.
- Price, Forrest Weldon, Asst. Prof., 1967. B.S., Tulsa, 1949; M.B.A., Washington, 1953.
- Rogers, John Norman, Part-time Instr., 1966, 1967. B.S., Utica Coll. of Syracuse U., 1959; M.B.A., Texas Tech, 1957.
- Ross, Avis Marie Riedinger, Part-time Instr., 1965. B.S., Houston, 1960.
- Sardana, Lal, Visiting Assoc. Prof., 1969. B.S., U. of Agra (India), 1948; M.S., Southern Methodist, 1957; M.B.A., California (Los Angeles), 1966; Ph.D., 1969.
- Steele, Jack D., Prof. & Dean of the Coll. of Business Administration, 1970. B.S., Missouri Valley Coll., 1948; M.B.A., Kansas, 1951; Ph.D., Harvard School of Business, 1956.
- Whitehead, Carlton James, Assoc. Prof., 1965. B.S., Southeastern Louisiana, 1958; M.B.A., Louisiana State, 1962; Ph.D., 1964.
- Wilterding, Jim Arnold, Instr., 1967, 1969. B.A., Seattle, 1962; M.B.A., Oregon, 1965.

### Teaching and Research Assistants

- Alford, Christopher Parker, 1970. B.B.A., Texas Tech, 1969.
- Golden, Gary, 1970. B.B.A., Texas Tech, 1969.
- Halbert, Bill Don, 1970. B.B.A., Texas Tech, 1969.
- Inman, Ralph, 1969. B.B.A., Texas Tech, 1969.
- Ireland, Robert Duane, 1970. B.B.A., Texas Tech, 1969.
- Jones, Belva LaJone, 1969. B.S., McNeese State Coll., 1969.

- Michaud, LeRoy William, 1970. B.A., Union Coll. (New York), 1964.
- Rackets, Stephen Charles, 1969. B.B.A., Texas Tech, 1969.
- Van den Heuvel, Willem J., 1969. B.A., Oregon, 1969.

### Department of Marketing

- Amason, Robert Daniel, Chmn. & Prof., 1963, 1970. B.B.A., Texas A & M, 1951; M.B.A., 1958; Ph.D., Arkansas, 1963.
- Balsley, Howard Lloyd, Prof. & Prof. of Statistics, 1965, 1969. A.B., Indiana, 1946; M.A., 1947; Ph.D., 1950.
- Biggs, Jeff Michael, Instr., 1967, 1968. B.B.A., Texas (Austin), 1966; M.B.A., Texas Tech, 1967.
- Blackwell, Lotus B., Assoc. Prof., 1969. B.A., Hardin-Simmons, 1947; M.A., 1949.
- Clark, Jonn Bruce, Part-time Instr., 1967. A.B., Hamilton Coll., 1957; A.S.A., Bentley Coll. of Accounting and Finance, 1963; M.B.A., Babson Inst., 1963.
- Dube, Leon F., Part-time Instr., 1969. B.B.A., Texas A&I, 1968; M.B.A., Texas
- Harrison, Robert E., Assoc. Prof., 1969. B.S., Northwestern Louisiana, 1958; M.B.A., Arkansas, 1959; Ph.D., 1966.
- Howell, Douglas Dinnison, Part-time Instr., 1968. B.B.A., Southern Methodist, 1948; M.B.A., Texas (Austin), 1951; M.S., Eastern New Mexico, 1962.
- Luchsinger, Laura Louise, Assoc. Prof., 1954, 1960. B.S. in B.A., Arkansas, 1949; M.B.A., Texas Tech, 1955; D.B.A., 1968.
- McCullough, Charles David, Part-time Instr., 1969. B.B.A., Texas Tech, 1964; M.B.A., 1966.
- Miller, Joe Max, Part-time Instr., 1969. B.B.A., Texas Tech, 1966; M.B.A., 1967.
- Patterson, Larry T., Part-time Instr., 1969. B.B.A., Texas Tech, 1964; M.B.A., 1969.
- Reddick, Marshall Eugene, Part-time Instr., 1967, 1968. B.S., Colorado State U., 1965; M.S., 1967.
- Rosenblatt, Seymour Bernard, Assoc. Prof., 1968. B.S., New York, 1949; M.B.A., Kent State, 1963; D.B.A., Georgia State, 1969.
- Ryan, John Allen, Prof., 1957. B.S., Southern California, 1946; M.B.A., Texas (Austin), 1948; Ph.D., 1957.
- Van Auker, Stuart, Asst. Prof., 1969. B.B.A., North Texas State, 1964; M.B.A., Southern Methodist, 1966.
- Vitaska, Charles Roland, Instr., 1967. B.S., Southern Illinois, 1963; M.S., 1965.
- Wilkins, James Hal, Instr., 1966, 1968. B.A., Texas Tech, 1966; M.B.A., 1967.

### Teaching Assistants

- Bridges, Larry Craig, 1969. B.B.A., Texas Tech, 1968.
- Jensen, Kenneth Lynn, 1969. B.B.A., Texas, 1966.
- Johnson, Vern F., 1969. B.S., Nebraska, 1967.
- Moore, David, 1969. B.B.A., Texas Tech, 1969.
- Mueller, Andreas Alexander, 1970. Doctor of Economics, St. Gall Graduate School of Economics, Business, and Public Administration (Switzerland), 1969.
- Sprattler, Gunter E., 1969. Bachelor's, U. of Stockholm, 1967.

## College of Education

### Dean & Staff

- Lee, Gordon Canfield, Dean & Prof. of Education, 1969. B.A., California, 1937; M.A., Columbia, 1938; Ph.D., 1948.

- Biggers, Julian Lawson, Jr., Asst. Dean & Assoc. Prof. of Education, 1966, 1967. B.S., East Texas State, 1950; M.Ed., Texas (Austin), 1956; Ph.D., 1966.



**McDonald, Donald**, Assoc. Dean & Prof. of Elementary Education and Library Science, 1948, 1969. B.S., North Texas State, 1940; M.S., 1944; Ed.D., Texas (Austin), 1954.

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### Department of Education

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**Caskey, Owen LaVerne**, Prof. & V. Pres. for Student Affairs, 1947, 1968. B.S., Texas Tech, 1947; M.Ed., 1948; Ed.D., Colorado, 1952.

**Casasa, Louis Eli**, Part-time Instr. & Part-time Asst. Dir. Mexican-American Counselor Education Project, 1969. B.A., New Mexico Highlands, 1960; M.A., New Mexico, 1966.

**Cowan, Bessie Spain**, Asst. Prof., 1961, 1963. B.S., Abilene Christian, 1936; M.Ed., Texas (Austin), 1957.

**Davidson, Raymond Leon**, Prof. & Prof. of Library Science, 1949, 1969. B.A., Clarendon Coll., 1927; M.A., Texas Tech, 1935; Ed.D., Texas (Austin), 1951.

**Ellis, Elmer Carlos**, Prof., 1969. B.S., Texas A & M, 1941; M.S., 1948; Ph.D., Texas, 1956.

**Freeman, Kenneth Howard**, Prof. & Dir., Junior College Center for Professional Development, 1969. B.S., Northeast Missouri, 1938; M.Ed., Missouri, 1941; Ed.D., 1947.

**Gammill, James Rankin**, Assoc. Prof., 1952, 1963. B.S. in Ed., Texas Tech, 1935; M.Ed., 1939; Ed.D., 1956.

**Gold, Robert D.**, Asst. Prof. & Assoc. Dir. Mexican American Counselor Education Project, 1969. B.A. Ed., Arizona State, 1964; M.A.C.E., 1967; Ed.D., 1969.

**Hodges, Jimmy Ross**, Part-time Instr., 1969. B.S., McMurry, 1954; M.Ed., Texas, 1962.

**Kirk, Dwight Louis**, Prof., 1966. B.S., Livingston State Teachers Coll., 1945; M.A., Alabama, 1946; Ed.D., Texas (Austin), 1953.

**Lee, Gordon Canfield**, Prof. & Dean of the College of Education, 1969. B.A., California, 1937; M.A., Columbia, 1938; Ph.D., 1948.

**McDaniel, Jay Russell**, Instr., 1969. B.S., Pennsylvania State, 1950; M.Ed., Abilene Christian, 1960.

**Reid, Maryanne**, Asst. Prof. & Dir., Foreign Student Admission, 1966, 1967. B.S., Northwestern, 1952; M.A., California (Los Angeles), 1955; Ed.D., Texas Tech, 1967.

**Strain, John Paul**, Assoc. Prof., 1968. B.A., Phillips U., 1950; B.D., 1953; M.A., Vanderbilt, 1955; Ed.D., George Peabody Coll., 1956; Ph.D., 1961.

**Teague, Fred Arlo**, Assoc. Prof., 1970. B.S., Central State Coll. (Oklahoma), 1959; M.Ed., Oklahoma, 1963; Ed.D., 1966.

**Wallace, Morris Sheppard**, Prof., 1955. B.A., North Texas State, 1934; M.A., 1938; Ed.D., Teachers Coll., Columbia, 1948.

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**Williams, Nat**, Lecturer, 1970. B.A., Hardin-Simmons, 1924; M.A., Texas (Austin), 1942.

**Willingham, Welborn Kiefer**, Assoc. Prof., 1961, 1968. B.A., Texas Tech, 1949; M.Ed., Texas (Austin), 1956; Ph.D., Texas Tech, 1964.

### Department of Elementary Education

**Evans, Laura Katherine**, Chmn. & Prof., 1951, 1969. B.S., Eastern Kentucky State, 1940; M.A., George Peabody Coll. for Teachers, 1946; Ed.D., Maryland, 1965.

**Ahlert, Shirley M.**, Asst. Prof., 1967. B.A., Southern Methodist, 1958; M.Ed., North Texas State, 1965; Ed.D., 1968.

**Ainsworth, Charles Leonard**, Assoc. Prof., 1967. B.A., Texas Tech, 1953; M.Ed., 1958; Ed.D., 1963.

**Ballenger, Marcus Taylor**, Part-time Instr., 1968, 1969. B.S., North Texas State, 1960; M.Ed., Texas Tech, 1963.

**Barnett, Glenn E.**, Prof. & Executive V. Pres., 1968. B.S. in Ed., Teachers Coll. (Kansas City), 1937; M.Ed., Missouri, 1939; Ed.D., 1943.

**Bremer, Neville Hasso**, Prof., 1965, 1968. B.A., West Texas State, 1940; M.A., Colorado State Coll., 1946; Ed.D., Houston, 1956.

**Cairncross, Elba B.**, Asst. Prof., 1970. B.A., Howard Payne Coll., 1938; M.Ed., Texas Tech, 1951; Ed.D., 1968.

**Crowder, Alex Belcher, Jr.**, Assoc. Prof., 1965, 1969. B.S., Hardin-Simmons, 1950; M.Ed., 1951; Ed.D., North Texas State, 1965.

**Everton, Billy Cotton**, Assoc. Prof., 1958, 1967. B.S., Texas Woman's, 1940; M.A., 1942; M.Ed., Texas Tech, 1954; Ed.D., 1963.

**Filgo, Dorothy Jane**, Asst. Prof., 1960, 1962. B.A., Baylor, 1942; M.A., Colorado State Coll., 1950.

**Feerster, Leona Mitchell**, Asst. Prof., 1969. B.S. in Ed., Northwestern, 1955; M.Ed., Texas Tech, 1964; Ed.D., Arizona, 1968.

**Livingston, Thomas Brooks**, Prof. & Deputy Dir. for Education, ICASALS, 1949, 1958. B.S., North Texas State, 1939; M.S., 1941; Ed.D., Stanford, 1952.

**McDonald, Donald**, Prof. & Assoc. Dean of the College of Education, also Prof. of Library Science, 1948, 1969. B.S., North Texas State, 1940; M.S., 1944; Ed.D., Texas (Austin), 1954.

**Mecham, George Peyton**, Prof., 1951, 1957. B.S., North Texas State, 1928; M.A., Teachers Coll., Columbia, 1933; Ph.D., George Peabody Coll., 1940.

**Pillow, Fannie Ernestine**, Asst. Prof., 1965. B.S., West Texas State, 1942; M.Ed., Texas Tech, 1952.

**Range, Dale G.**, Instr., 1969. B.S., Western Michigan, 1964; M.Ed., Trinity, 1967.

**Rooze, Gene Edward**, Assoc. Prof., 1969. B.S., Purdue, 1960; M.A., Northwestern, 1965; Ph.D., Southern Illinois, 1968.

**Simmons, Barbara Joe**, Visiting Asst. Prof., 1969. B.S., Texas Woman's, 1958; M.Ed., Texas Tech, 1968.

**Woodson, Eleanor M.**, Asst. Prof., 1969. B.S., Oregon State, 1948; M.S., Texas Tech, 1961; Ed.D., 1969.

### Department of Secondary Education

**Webb, Holmes Andrew**, Chmn. & Prof., 1960, 1967. B.A., Texas Tech, 1930; M.A., 1935; Ed.D., Southern California, 1953.

**Askins, Billy Earl**, Asst. Prof., 1967. B.S., East Texas State, 1953; M.Ed., Midwestern, 1959; Ed.D., North Texas State, 1967.

**Beckner, Weldon Earnest**, Assoc. Prof., 1965, 1968. B.S., Wayland Baptist, 1955;

- M.Ed., Texas Tech, 1959; Ed.D., Colorado, 1966.
- Bettencourt, Mildred Lucile**, Asst. Prof., 1950, 1959. B.A., Texas (Austin), 1929; M.Ed., Texas Tech, 1951.
- Boze, Nancy Smith**, Assoc. Prof. & Assoc. Prof. of Library Science, 1958, 1970. B.S., East Texas State, 1940; M.A., 1948; Ed.D., Texas Tech, 1966.
- Cornett, Joe D.**, Asst. Prof., 1968. B.A., Northwestern State Coll., 1960; M.Ed., 1963; Ed.D., Arkansas, 1965.
- Deethardt, John Fred, Jr.**, Asst. Prof. & Asst. Prof. of Speech, 1968. B.A., Indiana, 1961; M.A., Northwestern, 1964; Ph.D., 1967.
- Duvall, William Henry**, Asst. Prof. & Asst. Dean of Students for Programs, 1967, 1968. B.A., Maryland, 1961; M.Ed., 1964; Ed.D., Indiana, 1967.
- Henderson, David**, Part-time Instr., 1968. B.A., West Texas State, 1965; M.Ed., 1968.
- Kimmel, Panze Butler**, Assoc. Prof., 1964, 1970. B.S. in Ed., Texas Tech, 1947; M.M., Texas (Austin), 1949; Ed.D., Texas Tech, 1964.
- Klingstedt, Joe Lars**, Part-time Instr., 1969. B.A., Mus. Ed., Oklahoma, 1962; M.A., Texas Tech, 1968.
- McCulloch, Max Preston**, Part-time Instr., 1970. B.S., West Texas State, 1959; M.A., 1964.
- McDaniel, Jay R.**, Instr., 1968. B.S., Pennsylvania State, 1950; M.Ed., Abilene Christian, 1960.
- Nagle, Levi Marshall, Jr.**, Prof., 1959, 1965. B.A., Florida, 1947; M.Ed., 1949; Ed.D., 1952.
- Rebstock, Charles Wesley**, Assoc. Prof., 1966, 1970. B.S., Mankato State, 1947; M.S. in Ed., 1957; Ph.D., Minnesota, 1967.
- Skook, Gerald Duane**, Asst. Prof., 1969. B.S., Nebraska, 1958; M.A., Northern Iowa, 1963; Ed.D., Nebraska, 1969.
- Stokes, Vernon Dee**, Part-time Instr., 1969. B.A., Ed., Wayland Baptist, 1959; M.A., Ed., Texas Tech, 1966.

## Department of Special Education

- Mattson, Bruce Douglas**, Chmn. & Prof., 1965, 1967. B.S., Mankato State, 1949; M.S., 1956; Ed.D., Colorado State Coll., 1962.
- Bradford, Rosalind Sommers**, Part-time Instr., 1969. B.A., Brooklyn Coll., 1944; M.A., Columbia, 1945.
- Burks, Joe Wayne**, Part-time Instr., 1968. B.A., Harding Coll., 1964; M.Ed., 1960.
- Bush, Wilma Jo**, Part-time Instr., 1970. B.S. North Texas State, 1936; M.Ed., West Texas State, 1954.
- Costello, Patrice Margaret**, Assoc. Prof., 1967. B.S., College Misericordia, 1951; M.A., Teachers Coll., Columbia, 1952; Ed.D., Colorado State Coll., 1963.
- Dunn, Jack, Jr.**, Adjunct Prof., 1969. B.A., Nebraska, 1947; M.D., Texas Medical School (Galveston), 1948.
- Fudell, Stanley Edwin**, Assoc. Prof., 1967. B.S., New York, 1943; M.A., Southwest Texas State, 1949; Ed.D., Texas (Austin), 1963.
- Jones, Charles Ray**, Prof., 1966, 1969. B.S., North Texas State, 1938; M.S., 1940; Ed.D., Texas Tech, 1966.
- Lewis, Royce C., Jr.**, Adjunct Prof., 1969. B.A., Texas (Austin), 1943; M.D., Tulane School of Medicine, 1946.
- Little, James Alvin**, Part-time Instr., 1969. B.S., New Mexico Western, 1957; M.A., San Fernando Valley State, 1961.
- Shane, Don Graves**, Asst. Prof., 1969. B.A., Oklahoma Baptist, 1956; M.T., Central State Coll., 1963; Ph.D., North Carolina, 1969.
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## College of Engineering

### Dean & Staff

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- Phillips, Lee James, Jr.**, Asst. to the Dean & Security Officer, 1966, 1967. B.S. in E.E., Texas A & M, 1953; Reg. Prof. Engr. (Texas).
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- Lewis, David Barry**, Instr., 1968. B.F.A., Cleveland Inst. of Art, 1968.
- Lockard, Robert Ivan**, Prof., 1935, 1953. B.S. in Arch., Kansas State, 1930; M.S. in Arch., 1932; Reg. Arch. (Texas).
- McCutchan, Gordon Cartwright**, Prof., 1962, 1967. B.Arch., Texas A & M, 1943; M.Arch., Massachusetts Inst. of Technology, 1950; Reg. Arch. (Texas); N.C.A.R.B. Certificate.
- Morse, Eugenia**, Prof., 1959, 1968. B.A., Rice, 1942; B.S. in Arch., 1944; Reg. Arch. (Louisiana, Texas).

### Department of Architecture

- Barrick, Nolan Ellmore**, Chmn. & Prof., 1953, 1965. B.A., Rice, 1935; B.S. in Arch., 1936; M.A., 1937; Reg. Arch. (Texas).
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- Roberts, Jack Francis**, Part-time Instr., 1957. B.S. in M.E., Texas (Austin), 1947; Reg. Prof. Engr. (Colorado, Kansas, Louisiana, New Jersey, New Mexico, Oklahoma, Texas).
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- Sasser, Elizabeth Skidmore**, Prof., 1949, 1963. B.F.A., Ohio State, 1943; M.A., 1944; Ph.D., 1946.
- Skorepa, Joseph Lavern**, Assoc. Prof., 1962, 1968. B.S. in Arch., Houston, 1949; B.Arch., 1950.
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- Stewart, William Addison**, Prof., 1965. B.A., Florida, 1958; Reg. Arch. (Florida).
- Thompson, Arthur Dudley**, Assoc. Prof., 1959, 1967. B.Arch., Texas Tech, 1954; M.S. in Urban Planning, Columbia, 1963.
- Thompson, Virginia Mahaley**, Instr., 1961, 1964. B. of Adv. Art & Design, Texas Tech, 1959.
- Verker, Edward Lee, Sr.**, Assoc. Prof., 1966. B.S. in Arch., Illinois, 1948; M.Arch., 1966; Reg. Arch. (Florida, Illinois, Iowa, Minnesota, Wisconsin, Texas); N.C.A.R.B. B. Certificate.
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- Cannon, Stephen L.**, Part-time Instr., 1969. B.S., Texas Tech, 1967; M.S., 1969.
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- Heichelheim, Hubert Reed**, Assoc. Prof., 1961, 1967. B.S., Notre Dame, 1953; M.S., 1956; Ph.D., Texas (Austin), 1962.
- Oberg, Aaron Gustaf**, Prof., 1936, 1949. B.S., Colorado, 1929; M.S., 1933; Ph.D., 1935.
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### Teaching and Research Assistants

- Agrawal, Bijaya Krishna Das**, 1969. B.Sc. (Chem. Eng.), Banaras Hindu U. (India), 1959; M.S. (Chem. Eng.), Wisconsin (Madison), 1961.
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- Johnson, Tiffn E.**, 1970. B.S., Texas Tech, 1967.
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- Spore, Richard Lawrence**, 1969. B.S. in Ch.E., Texas Tech, 1966.
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### Department of Civil Engineering

- Kiesling, Ernst Willie**, Chmn. & Prof., 1956, 1969. B.S., Texas Tech, 1955; M.S., Michigan State, 1959; Ph.D., 1966; Reg. Prof. Engr. (Texas).
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- Decker, Charles Garfield**, Prof., 1938, 1956. B.S., Michigan, 1932; M.S., 1933.
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- Keho, Cliff Hutchinson**, Assoc. Prof., 1957. B.S., Swarthmore, 1947; M.S., Harvard, 1948; Reg. Prof. Engr. (Texas).
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- Whetstone, George Arthur**, Prof., 1946. B.S., Washington, 1933; M.S., 1937; Ph.D., 1940.
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- Jain, Ravinder Kumar**, 1969. B.S., Sacramento State Coll., 1961; M.S.C.E., 1968; Reg. Prof. Engr. (California).
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- Minor, Robert Richard**, 1969. B.S.C.E., Texas A & M, 1966.
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### Department of Electrical Engineering

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- Craig, John Paul**, Assoc. Prof., 1957, 1965. B.S. in E.E., Texas Tech, 1950; Ph.D., Texas (Austin), 1965; Reg. Prof. Engr. (Texas).
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- Hagler, Marion Otho**, Asst. Prof., 1967. B.A., Rice, 1962; B.S. in E.E., 1963; M.S. in E.E., Texas (Austin), 1964; Ph.D., 1967.
- Houston, Charles Ernest**, Prof., 1932, 1957. B.S. in E.E., Texas Tech, 1931; M.A., 1932; Reg. Prof. Engr. (Texas).
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- Kuhler, Ronald James**, Research Assoc., 1966. B.S. in E.E., Texas Tech, 1964; M.S.E.E., Stanford, 1966.
- Lancaster, Darrell Boyd, Jr.**, Part-time Instr., 1965, 1968. B.S. in E.E., Texas Tech, 1965; M.S. in E.E., 1967.
- Lankford, Hor Clive, Jr.**, Instr., 1962. B.S. in E.E., Texas Tech, 1953.
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- Phillips, Lee James, Jr.**, Asst. Prof., 1966. B.S. in E.E., Texas A & M, 1953.
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- Stenis, Tom Basil**, Assoc. Prof., 1947, 1956. B.S., Texas (Austin), 1943; M.S., 1947; Reg. Prof. Engr. (Texas).

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### Teaching and Research Assistants

- Benson, Carl Amandus**, 1969. B.S. in E.E., Texas Tech, 1969.
- Bradshaw, David Arthur**, 1969. B.S. in E.E., Texas Tech, 1969.
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- Chandrasanan, Chiyarath Velayudhan**, 1968. B.A., St. Thomas Coll. (Trichur), 1952; B.Sc. (Engr.), Engineering Coll. (Trivandrum), 1956; M.E. (H.V.), Indian Inst. of Science (Bangalore), 1963.
- Chen, Hsien-Chih**, 1968. B.S.E.E., National Taiwan U., 1966.
- Conner, William Alexander**, 1969. B.S. in E.E., Texas Tech, 1967.
- Curby, Rockford Clayton**, 1969. B.S. in E.E., Texas Tech, 1969.
- Molen, George Marshall**, 1969. B.S. in E.E., Texas Tech, 1968.
- Nunnally, William Charles**, 1969. B.S. in E.E., Texas Tech, 1969.
- Parten, Clifford Ray**, 1968. B.A., Texas Tech, 1963; B.S., Houston, 1966.
- Porter, William Allen**, 1968. B.S. in E.E., Texas Tech, 1968; M.S. in E.E., 1969.
- Rahe, John James**, 1969. B.S. in E.E., Texas Tech, 1969.
- Smith, Kenneth Wayne**, 1968. B.S. in E.E., Texas Tech, 1968.
- Starch, Michael William**, 1969. B.S. in E.E., Texas Tech, 1969.
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### Department of Engineering Analysis & Design

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- Donovan, John J.**, Adjunct Prof., 1969, Ph.D., Yale, 1966.
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- Burford, Charles Louis**, Assoc. Prof. & Assoc. Prof. of Computer Science, 1957, 1969. B.S., Texas Tech, 1954; M.S., Oklahoma State, 1962; Ph.D., 1966; Reg. Prof. Engr. (Oklahoma, Texas).
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- Prasad, Janniah Srikanth**, Part-time Instr., 1969. B.S. (Mech.), Mysore U. (India), 1960; M.S. (Foundry), Indian Inst. of Science (India), 1961; M.S. (Metallurgy), Purdue, 1964.
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- Ramsey, Jerry Dwain**, Assoc. Prof., 1965, 1969. B.S., Texas A & M, 1955; M.S., 1960; Ph.D., Texas Tech, 1967; Reg. Prof. Engr. (New Mexico).
- Sandel, William De Ray**, Assoc. Prof., 1966. B.S. in I.E., Industrial Engineering Coll. (Chicago), 1938.
- Smith, Milton Louis**, Asst. Prof. & Asst. Prof. of Computer Science, 1968, 1969. B.S., Texas Tech, 1961; M.S., 1966; Ph.D., 1968.
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### *Teaching and Research Assistants*

- Castorena, Jesus Guillermo**, 1969. Ing. Mecanico Electricista, U.A. De S.L.P. (Mexico), 1968.
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- Dorneman, Eugene Thomas**, 1969. B.S., LeTourneau Coll., 1969.
- El-Nawawi, Mohamed Ali**, 1969. B. M.E., Cairo U. (Egypt), 1964; M.Sc., Al-Azhar U. (Egypt), 1969.
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- Kamat, Satish Janardan**, 1968. B.E. (Mech.) U. of Bombay (India), 1965; M.S. in I.E., Illinois Inst. of Technology, 1968.

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- Porter, John Granteer**, 1969. B.S. in I.E., Texas Tech, 1969.
- Rajaraman, Manjeri K.**, 1968. B.E. (Hons.), U. of Madras (India), 1966; M.Tech., Indian Inst. of Technology (Delhi), 1968.
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- Powers, Louis John**, Chmn. & Prof., 1942, 1952. B.S. in M.E., Texas Tech, 1939; M.S., Texas (Austin), 1950; Reg. Prof. Engr. (Texas).
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- Headrick, James Buford**, Instr., 1969. B.S. in M.E., Texas Tech, 1965; M.S. in M.E., 1967.
- Helmers, Donald Jacob**, Prof., 1948, 1965. B.S. in M.E., Texas Tech, 1948; M.S., Michigan, 1950; Ph.D., Texas A & M, 1965; Reg. Prof. Engr. (Texas).
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- Newell, Robert Lee, Acting Chmn. & Assoc. Dean of the College of Engineering, also

- Prof. of Mechanical Engineering, 1941, 1968. B.S. in M.E., Texas Tech, 1940; M.S. in M.E., Georgia Inst. of Technology, 1949; Reg. Prof. Engr. (Texas).
- Johnson, Robert F., Prof., & Dir., Chemical Processes Laboratory, 1968. B.S., Kentucky, 1951; M.S., Georgia Inst. of Technology, 1958; Dr.Sc.Tech., Eidgenossische Technische Hochschule (Zurich), 1963.
- Kilgore, George W., Instr. of Weaving & Textile Engineering, 1964, 1968. B.S. in T.E., Texas Tech, 1950; Reg. Prof. Engr. (Texas).
- Parsons, L. E., Prof. & Prof. of Clothing & Textiles, 1942, 1961. B.S., Texas Tech, 1936; Reg. Prof. Engr. (Texas).
- Power, Billy Keith, Asst. Prof., 1951, 1959. B.S. in T.E., Texas Tech, 1947; M.S., Massachusetts Inst. of Technology, 1950.

## College of Home Economics

### Dean & Staff

- Tinsley, Willa Vaughn, Dean & Prof. of Home Economics, 1953. B.S., Texas Woman's, 1928; M.S., Colorado State U., 1936; Ph.D., Minnesota, 1947.
- Sitton, Margaret Ann Wilson, Asst. Dean & Prof. of Home Economics Education, 1962, 1969. B.S., North Texas State, 1949; M.Ed., Southwest Texas State, 1953; Ed.D., Texas Tech, 1965.
- Williamson, Billie Frances, Asst. Dean & Prof. of Home Economics Education, 1956, 1968. B.S., Texas Woman's, 1934; M.A., 1936.
- Tolbert, Wanda Lou Atinip, Secretary, 1962.

### Department of Clothing & Textiles

- Walker, Norma E. Peden, Chmn. & Assoc. Prof., 1968, 1969. B.S., Indiana State, 1958; M.S., Pennsylvania State, 1961; Ph.D., 1968.
- Caddell, Doris Kay Wildman, Instr., 1965, 1967. B.S. in Ed., Southwestern State Coll. (Okla.), 1965; M.S., Texas Tech, 1966.
- Dorsey, Johnny Larue, Asst. Prof., 1962, 1966. B.S., Texas Woman's, 1939; M.S., Texas Tech, 1963.
- Flickle, Mary Jo Campbell, Asst. Prof., 1966, 1968. B.S., Mississippi State Coll. for Women, 1965; M.S., Ohio State, 1966.
- Gerlach, Mary Agnes, Assoc. Prof., 1955, 1967. B.S., Nebraska, 1937; M.A., 1951.
- Haynie, Laura Lathrop, Instr., 1968. B.S., Texas Tech, 1964; M.S., 1968.
- Kocher, Leona Ann, Instr., 1967. B.S., Illinois, 1962; M.S., 1964.
- Lockhoof, Nancy Ford, Instr., 1969. B.S., Texas Tech, 1968; M.S., 1969.
- Marques, Josephine Eve, Assoc. Prof., 1967. B.S., Texas Woman's, 1952; M.A., 1957.
- Parsons, L. E., Prof. & Prof. of Textile Engineering, 1942, 1961. B.S., Texas Tech, 1936; Reg. Prof. Engr. (Texas).
- Roch, Delilah Manire, Assoc. Prof., 1967. B.S., Texas Tech, 1939; M.S., 1948; Ph.D., Texas Woman's, 1969.
- Shelton, Ruth Klein, Assoc. Prof., 1969. B.A., Cornell, 1960; M.S., Texas Woman's, 1961; Ph.D., 1963.
- Timmons, Myra Bownds, Asst. Prof., 1961, 1968. B.S., Texas Tech, 1950; M.S., 1966.
- Williams, Maynette Derr, Prof. & Prof. of Home Economics Education, 1966, 1969. B.S., Texas Tech, 1958; M.S., 1961; Ph.D., Ohio State, 1966.

### Teaching Assistant

- Westerfield, Lynette, 1969. B.S. in H.E. Ed., North Texas State, 1969.

### Food & Nutrition

#### Department of

- Yang, Shiang Ping, Chmn. & Prof., 1969. B.S., National Central U. (China), 1942; M.S., Iowa State, 1949; Ph.D., 1956.
- Boren, Angela Rattan, Asst. Prof., 1960, 1967. B.S., Texas Tech, 1950; M.S., 1962.
- Brittin, Dorothy Helen Clark, Instr., 1965. B.S., Florida State, 1960; M.S., Texas Tech, 1965.
- Carruth, Betty Ruth, Instr., 1968. B.S., Texas Tech, 1965; M.S., 1968.
- Carus, Ruth Frenchman, Assoc. Prof., 1969. B.S., California (Berkeley), 1944; M.S., Cornell, 1948.
- Foree, Sherrell, Instr., 1967. B.S., Texas Tech, 1963; M.S., 1964.
- Harden, Margaret L., Instr., 1967. B.S., Texas Tech, 1964; M.S., 1967.
- Hicks, Agnes Abernathy, Visiting Asst. Prof., 1969. B.S., Texas Tech, 1935; M.S., 1940.
- Holberg, Moselle, Asst. Prof., 1968. B.S., Tennessee, 1938; M.S., Syracuse, 1948.
- Hoover, Loretta White, Visiting Part-time Instr., 1968, 1969. B.S. in H.E., North Texas State, 1962; M.S. in H.E., Texas Tech, 1969.
- Kassouny, Margaret, Assoc. Prof., 1962, 1968. B.S., Ohio State, 1957; M.S., 1961.
- Kleiva, Ann, Instr., 1967. B.S., Washington State, 1965; M.S., Iowa, 1967.
- Lamb, Mina Wolf, Margaret W. Weeks Prof., 1940, 1969. B.A., Texas Tech, 1932; M.S., 1937; Ph.D., Columbia, 1942.
- Lind, Martha Lois, Instr., 1969. B.S. Kansas State, 1966; M.S., 1969.
- McPherson, Clara Mueller, Assoc. Prof., 1947, 1968. B.S., Texas Tech, 1943; M.S., 1947.
- Weems, Mary Kate Halbert, Instr., 1967. B.S., Baylor, 1965; M.S., Texas Tech, 1967.
- Wood, Opal Lanier, Asst. Prof., 1945, 1968. B.S., Texas Woman's, 1926.

### Teaching and Research Assistants

- Briley, Margaret Elizabeth, 1969. B.S. in H.E., Texas (Austin), 1950; M.S., Texas Tech, 1969.
- Hatcher, Brenda Jean, 1968. B.S., Mary Hardin-Baylor, 1964.

### Department of

#### Home Economics Education

- Bell, Jean Camille G., Chmn. & Prof., 1963, 1969. B.S., Texas Tech, 1942; M.S., 1949; Ed.D., 1967.
- Boswell, Mary Middleton, Asst. Prof., 1968. B.S., North Texas State, 1941; M.S., 1958.
- Clawson, Barbara, Visiting Assoc. Prof. & Dir., Home Economics Instructional Ma-

- terials Center, 1968. B.S., Iowa State, North Texas State, 1969.  
1957; M.S., North Carolina (Greensboro), 1962.
- Deviney, Linda Ruth, Visiting Instr., 1969. B.S. in Home Economics, Oklahoma, 1959.
- Drake, Phyllis, Assoc. Prof. 1963. B.S., Texas Tech, 1936; M.S., 1943.
- Gromatzky, Irene, Asst. Prof., 1968. B.S., Texas Woman's, 1941; M.A., Michigan State, 1951.
- Lockett, Carolyn Nelson, Instr., 1969. B.S. in H.E., Texas Tech, 1960; M.S. in H.E., 1965.
- Sitton, Margaret Ann Wilson, Prof. & Asst. Dean of the College of Home Economics, 1962, 1969. B.S., North Texas State, 1949; M.Ed., Southwest Texas State, 1953; Ed.D., Texas Tech, 1965.
- Tinsley, Willa Vaughn, Prof. & Dean of the College of Home Economics, 1953. B.S., Texas Woman's, 1928; M.S., Colorado State U., 1936; Ph.D., Minnesota, 1947.
- Tompkins, Virginia Lee, Asst. Prof., 1966. B.S., North Texas State, 1940; M.S., 1947.
- Whigham, Thelma G., Visiting Instr. & Asst. Dir., Home Economic Instructional Materials Center, 1967. B.S., Texas Tech, 1949; M.S., 1967.
- Williams, Maynette Derr, Prof. & Prof. of Clothing & Textiles, 1969. B.S. in H.E., Texas Tech, 1958; M.S., 1961; Ph.D., Ohio State, 1966.
- Williamson, Billie Frances, Prof. & Asst. Dean of the College of Home Economics, 1956, 1968. B.S., Texas Woman's, 1934; M.A., 1936.

### Department of Home & Family Life

- Wallace, Dorothy Estelle Hays, Chmn. & Prof., 1959, 1968. B.S., North Texas State, 1931; M.S., Iowa State, 1937.
- Anderson, Carl Madisnius, Instr., 1965, 1968. B.A., McMurry, 1957; M.D., Perkins School of Theology, Southern Methodist, 1960.
- Ater Elizabeth Carolyn, Assoc. Prof., 1969. B.Sc., Ohio State, 1952; M.Sc., 1955; Ph.D., 1969.
- Camp, Hattie Charlotte Ballow, Asst. Prof., 1946, 1953. B.S., Texas Tech, 1939; M.S., 1946.
- Coulter, Kyle Jane, Part-time Instr., 1968. B.S. in H.E., Texas Tech, 1960; M.S. in H.E., 1968.
- Drew, Lola Marie, Assoc. Prof., 1946, 1949. B.S., Texas Woman's, 1928; M.A., Teachers Coll., Columbia, 1941.
- Edwards, Wildring Sherrod, Assoc. Prof., 1962, 1968. B.S., Texas Tech, 1959; M.A., 1962.
- Ellzey, William Clark, Prof., 1966. B.A., Southeast Missouri State, 1936; B.D., Duke, 1939.
- Flores, Alfredo Rodriguez, Instr., 1969. B.A., Pan American Coll., 1957; M.S., Texas A & I, 1967.
- Gifford, Winnifred Garland, Asst. Prof., 1949. B.S., Illinois, 1928; M.S., Iowa State, 1937.
- Gorden, Joan Carolyn, Part-time Asst. Prof., 1969. B.S., Manchester Coll., 1964; M.S., Georgia, 1967.
- Greenwaldt, Jeannette Carter, Asst. Prof., 1965. B.S., Trinity, 1941; M.A., Syracuse, 1964.
- Henderson, Homer Dimon, Part-time Instr., 1969. B.A., Southern Methodist, 1962; B.D., Yale, 1966.
- Henton, June M., Asst. Prof., 1967. B.S., Oklahoma State, 1961; M.S., Nebraska, 1963.
- Jenkins, Jeanette Davis, Asst. Prof., 1962, 1968. B.S. in Ed., Southern California, 1947; M.Ed., Texas Tech, 1955.
- Landers, Eddy Frances Eubanks, Instr., 1966. B.S. in H.E., Texas Tech, 1963; M.S. in H.E., 1966.
- Larson, Betty Jane Clark, Instr., 1967. B.S., Texas Tech, 1966.
- Larson, Robert Ernest, Assoc. Prof., 1969. B.S., Brigham Young, 1965; M.S., 1967.
- Law, Cillian Mason Skinner, Asst. Prof., 1966. B.A., Alabama Coll., 1955; M.A., Mississippi, 1966.
- Logan, Martha Morrow, Assoc. Prof., 1969. B.Sc., Ohio State, 1940; M.Sc., 1965.
- Longworth, Donald Sherman, Prof., 1966. B.S. in Soc., Bowling Green State, 1943; M.A. in Soc., 1947; Ph.D., Ohio State, 1952.
- Lyle, Francis Katherine Urban, Asst. Prof., 1942, 1966. B.S., Missouri, 1934; M.S., Iowa State, 1942.
- MacPherson, Carol Ann, Instr., 1968. B.S., Wheaton Coll., 1958; M.S., Arizona, 1968.
- Norton, William Kirk, Jr., Asst. Prof., 1969. B.A., Phillips U., 1959; B.D., Texas Christian, 1962.
- Phillips, John Samuel, Asst. Prof., 1966, 1968. B.A., Ouachita Baptist U., 1946; B.D., Southern Baptist Theological Seminary, 1949; Th.M., 1951.
- Randle, Helen Caldwell, Assoc. Prof., 1965. B.S., Texas (Austin), 1934; M.S., Colorado State U., 1940.
- Reeves, Leann Moore, Instr., 1970. B.S., Texas Tech, 1968.
- Sides, Floy Glenn, Asst. Prof., 1954, 1963. B.S., Texas Tech, 1939; M.Ed., 1955.
- Tinsley, Willa Vaughn, Prof. & Dean of the College of Home Economics, 1953. B.S., Texas Woman's, 1928; M.S., Colorado State U., 1936; Ph.D., Minnesota, 1947.
- Turner, Josephine, Instr. & Dir., Home Management Residence, 1968. B.S., Alabama, 1966; M.S., 1968.
- Wagner, Betty Sue Malone, Instr., 1966. B.S. in H.E., Texas Tech, 1950; M.S. in H.E., 1966.
- Wolf, Ilse Hildegrade, Prof., 1965. B.S., Texas Tech, 1932; M.Ed., Texas (Austin), 1939; M.A., Columbia, 1948; Ed.D., 1957.
- Wolfe, Willie May, Asst. Prof., 1955. B.S., Texas (Austin), 1937; M.S., 1938.

### School of Law

- Amandes, Richard Bruce, Dean & Prof., 1966. A.B., California (Berkeley), 1950; J.D., California, Hastings Coll. of Law, 1953; LL.M., New York, 1956.
- Elias, Erwin August, Prof., 1968. B.S., Marquette, 1954; J.D., 1956; LL.M., Michigan, 1958.
- Frey, Martin Alan, Assoc. Prof., 1967, 1969. B.S. M.E., Northwestern, 1962; J.D., Washington U., (St. Louis), 1965; LL.M., George Washington, 1966.
- Hemingway, Richard William, Prof., 1968. B.S., Colorado, 1950; J.D., Southern Methodist, 1955; LL.M., Michigan, 1969.
- Jones, U. V., Law Librarian & Prof., 1966, 1968. B.A., Oklahoma, 1939; LL.B., 1941; M.L.L., Washington, 1962.
- Kirk, Maurice Blake, Prof., 1967. A.B., Indiana, 1943; J.D., 1952; LL.M., New York, 1957; J.S.D., 1963.
- Larkin, Muri Alton, Prof., 1968. LL.B., Southeastern, 1939.
- Leeman, Elizabeth Martin, Asst. Prof. & Asst. Law Librarian, 1967. A.B., Winthrop Coll., 1928; M.A., Texas (Austin), 1939; J.D., St. Mary's, 1953; M.L.L., Washington, 1961.

- Palizzi, Anthony Nicola**, Asst. Prof., 1969. Ph.B., Wayne State, 1964; J.D., 1966; LL.M., Yale, 1967.
- Phillips, Walter Ray**, Prof., 1968. A.B., North Carolina, 1954; LL.B., Emory, 1957; LL.M., 1962.
- Quilliam, William Reed, Jr.**, Prof., 1969. B.A., Texas (Austin), 1949; B.B.A., 1951; J.D., 1953; LL.M., Harvard, 1969.
- Reese, Corrie Thomas**, Asst. Prof. & Asst. Dean, 1968, 1969. B.S., Sam Houston State, 1956; J.D., Houston, 1966.

- Shellhaas, Glen William**, Prof., 1967. A.B., Ohio State, 1941; J.D., 1943.
- Smith, Justin Carey**, Prof. & Assoc. Dean, also Deputy Dir. for Law and Social Sciences, ICASALS, 1967, 1968. B.S., Lawrence, 1950; J.D., Wisconsin, 1954; LL.M., 1959.
- Stevens, George Neff**, Prof., 1969. A.B., Dartmouth, 1931; LL.B., Cornell, 1935; M.A., Louisville, 1941; S.J.D., Michigan, 1951.

## Interdisciplinary Programs

### Computer Science

- Archer, James Elson**, Prof. & Prof. of Engineering Analysis and Design, 1968, 1969. B.S., Texas Tech, 1947; Ph.D., Massachusetts Inst. of Technology, 1950.
- Barton, Richard Fleming**, Prof. & Prof. of Management, also Dir., Planning & Analyses, 1967, 1969. B.S., Northwestern, 1948; Ph.D., California (Berkeley), 1961.
- Burford, Charles Louis**, Assoc. Prof. & Assoc. Prof. of Industrial Engineering, 1957, 1969. B.S., Texas Tech, 1954; M.S., Oklahoma State, 1962; Ph.D., 1966; Reg. Prof. Engr. (Oklahoma, Texas).
- Griffith, Paul Gene**, Prof. & Prof. of Engineering Analysis and Design, 1959, 1969. B.S., Texas Tech, 1954; S.M., Massachusetts Inst. of Technology, 1956; Ph.D., Stanford, 1959.
- Innis, George Seth**, Assoc. Prof. & Assoc. Prof. of Mathematics, also Dir., Computer Services, 1967, 1969. B.A., Texas (Austin), 1958; M.A., 1961; Ph.D., 1962.
- Milnes, Harold Willis**, Prof. & Prof. of Mathematics, 1966, 1969. M.A., Wayne State, 1952; Ph.D., 1955.
- Rigby, Fred Durnford**, Prof. & Prof. of Mathematics and Statistics, also Assoc. V. Pres. for Academic Affairs, 1940, 1969. B.A., Reed Coll., 1935; M.S. State U. of Iowa, 1938; Ph.D., Kentucky, 1940.
- Smith, Milton Louis**, Asst. Prof. & Asst. Prof. of Industrial Engineering, 1968, 1969. B.S., Texas Tech, 1961; M.S., 1966; Ph.D., 1968.
- Vines, Darrell Lee**, Assoc. Prof. & Assoc. Prof. of Electrical Engineering, 1962, 1969. B.A., McMurry, 1959; B.S. in E.E., Texas Tech, 1959; M.S. in E.E., 1960; Ph.D., Texas A & M, 1967.

### Statistics

- Anderson, Dwane Elmer**, Asst. Prof. & Asst. Prof. of Mathematics, 1968, 1969. B.S., California (Santa Barbara), 1957; M.P.H., North Carolina, 1964; Ph.D., Southern Methodist, 1968.
- Ayoub, Mohamed Mohamed**, Prof. & Prof. of Industrial Engineering, 1961, 1969. B.S., U. of Cairo (Egypt), 1953; M.S., Iowa, 1955; Ph.D., 1964; Reg. Prof. Engr. (Texas).
- Balsley, Howard Lloyd**, Prof. & Prof. of Marketing, 1965, 1969. A.B., Indiana, 1946; M.A., 1947; Ph.D., 1950.

- Bouillon, Thomas L.**, Asst. Prof. & Asst. Prof. of Mathematics, 1967, 1969. B.S., Louisiana State, 1961; M.S., Southwestern Louisiana, 1963; Ph.D., Texas (Austin), 1966.
- Cogan, Dennis Clark**, Assoc. Prof. & Assoc. Prof. of Psychology, 1966, 1969. B.S., Wisconsin, 1959; M.A., Missouri, 1964; Ph.D., 1966.
- Footo, Richard Jay**, Prof. & Prof. of Agricultural Economics, 1968, 1969. B.S., Michigan State, 1935; M.S., Iowa State, 1937.
- Gray, Henry Luther**, Assoc. Prof. & Assoc. Prof. of Mathematics, 1967, 1969. B.S., Texas Tech, 1959; M.S., 1961; Ph.D., Texas (Austin), 1966.
- Grubb, Herbert Warren**, Assoc. Prof. & Assoc. Prof. of Agricultural Economics, 1964, 1969. B.S., Berea, 1958; M.S., Oklahoma State, 1960; Ph.D., North Carolina State, 1964.
- Lewis, Truman Orville**, Assoc. Prof. & Assoc. Prof. of Mathematics, 1966, 1969. B.S., Texas Tech, 1956; M.S., 1960; Ph.D., Texas (Austin), 1966.
- Mart, Harry Franklin, Jr.**, Asst. Prof. & Asst. Prof. of Industrial Engineering, 1967, 1969. B.S., Frostburg State Coll., 1964; Ph.D., Virginia Polytechnic Inst., 1968.
- Odell, Patrick Lowry**, Prof. & Chmn. & Prof. of Mathematics, 1966, 1969. B.S., Texas (Austin), 1952; M.S., Oklahoma State, 1958; Ph.D., 1962.
- Osborn, James Ezra**, Assoc. Prof. & Assoc. Prof. of Agricultural Economics, 1965, 1969. B.S., Oklahoma State, 1959; Ph.D., 1964.
- Rigby, Fred Durnford**, Prof. & Prof. of Mathematics and Computer Science, also Assoc. V. Pres. for Academic Affairs, 1940, 1969. B.A., Reed Coll., 1935; M.S., State U. of Iowa, 1938; Ph.D., Kentucky, 1940.
- Roy, Sujit Kumar**, Asst. Prof. & Asst. Prof. of Agricultural Economics, 1968, 1969. B.A., Visva Bharati U. (India), 1958; M.A., 1960; M.S.A., 1964.
- Walvekar, Arun Govind**, Asst. Prof. & Asst. Prof. of Industrial Engineering, 1968, 1969. B.E. in E.E., Bombay U., 1963; B.E. in M.E., 1964; M.S., Illinois Inst. of Technology, 1966; Ph.D., 1967.

## Graduate School

### Dean & Staff

- Graves, Lawrence Lester**, Interim Dean & Prof. of History, 1955, 1967. B.A., Missouri, 1942; M.A., Rochester, 1947; Ph.D., Wisconsin, 1954.

- Langford, Thomas A.**, Asst. Dean & Asst. Prof. of English, 1965, 1968. B.A., California (Riverside), 1956; M.A., Texas Tech, 1963; Ph.D., Texas Christian, 1967.
- Temple, Irene Neale**, Administrative Asst., 1953, 1959.

## Emeritus Officers of Administration and Faculty

- Jones, Clifford Bartlett**, Pres., Emeritus, 1938, 1944. LL.D., Texas Tech, 1940. LL.D.'s (hon.), McMurry, 1939; Texas Tech, 1940; Southwestern, 1941.
- Adams, Otto Vincent**, Prof. of Civil Engineering, Emeritus, 1927, 1955; Dean of the School of Engineering, 1932-1949. B.S. in C. and I.E., Colorado State U., 1918; M.S.E., Michigan, 1924; D.Sc. (hon.), Colorado State U., 1945; Reg. Prof. Engr. (Texas).
- Adams, Vivian Johnson**, Prof. of Home Economics Education, Emeritus, 1928, 1962. B.S., Southwest Texas State, 1924; M.A., Columbia, 1927.
- Allen, Louise Crawford**, Assoc. Prof. of Journalism, Emeritus, 1923, 1963. B.A., Southern Methodist, 1924; M.A., Missouri, 1940.
- Barnett, Albert**, Prof. of Education & Prof. of Psychology, Emeritus, 1933, 1965. B.S., George Peabody Coll. for Teachers, 1916; M.A., 1917; Ph.D., 1926.
- Beitler, Ethel Jane**, Prof. of Art, Emeritus, 1947, 1968. B.S., Iowa State, 1929; M.Ed., Marquette, 1943.
- Bradshaw, Weldon Leroy**, Prof. of Architecture & Allied Arts, Emeritus, 1938, 1966. B.S., Texas A & M, 1924; Reg. Arch. (Texas).
- Bullen, Charles Victor**, Prof. of Electrical Engineering, Emeritus, 1932, 1960. B.S. in E.E., Texas (Austin), 1920; M.S. in E.E., Massachusetts Inst. of Technology, 1927; Reg. Prof. Engr. (Texas).
- Clement, Warren Perry**, Registrar, Emeritus, 1932, 1961. B.A., Baylor, 1919; M.A., 1920.
- Cole, William Conner**, Bookstore Manager, Emeritus, 1927, 1969. B.B.A., Texas (Austin), 1924.
- Cooper, Lewis Brisco**, Prof. of Education, Emeritus, 1938, 1965. B.S., North Texas State, 1922; M.A., Texas (Austin), 1926; Ph.D., Cincinnati, 1931.
- Craig, William Moore**, Prof. of Chemistry, Emeritus, 1926, 1958. B.A., Southwestern, 1906; M.A., 1907; M.A., Texas (Austin), 1916; Ph.D., Harvard, 1927; Reg. Prof. Engr. (Texas).
- Cross, James Cecil**, Prof. of Biology, Emeritus, 1948, 1966. A.B., Southwestern, 1924; M.A., Texas (Austin), 1928; Ph.D., 1931.
- Eaves, Charles Dudley**, Prof. of History, Emeritus, 1925, 1959. B.A., Texas (Austin), 1916; M.A., Chicago, 1923; Ph.D., Texas (Austin), 1943.
- Erwin, Mabel Deane**, Prof. of Clothing & Textiles, Emeritus, 1926, 1955. B.S., Purdue, 1913; M.A., Teachers Coll., Columbia, 1925.
- Fuller, Gordon**, Prof. of Mathematics, Emeritus, 1950, 1968. B.A., West Texas State, 1926; M.A., Michigan, 1928; Ph.D., 1933.
- Garlin, Raymond Ernest**, Prof. of Education, Emeritus, 1927, 1966. B.A., Texas (Austin), 1920; M.A., 1921; Ph.D., 1927.
- Gates, Eunice Joiner**, Prof. of Foreign Languages, Emeritus, 1925, 1963. B.A., Southwestern, 1921; M.A., 1924; M.A., Michigan, 1927; Ph.D., Pennsylvania, 1933.
- Gates, William Bryan**, Dean of the Graduate School, Emeritus, 1925, 1963. B.S., Millsaps, 1918; M.A., Vanderbilt, 1921; M.A., Michigan, 1927; Ph.D., Pennsylvania, 1932.
- Gunn, Alan Murray Finlay**, Prof. of English, Emeritus, 1939, 1969. B.A., Huron Coll., 1927; M.A., Denver, 1928; Ph.D., Princeton, 1938.
- Holden, William Curry**, Prof. of History, Emeritus, 1929, 1968. B.A., Texas (Austin), 1923; M.A., 1924; Ph.D., 1928.
- Horne, Cecil**, Prof. & Head of the Department of Journalism, Emeritus, 1926, 1951. B.A., Baylor, 1908; B.A., Yale, 1911.
- Jackson, J. W.**, Prof. of Government, Emeritus, 1929, 1969. B.A., Texas Tech, 1929; M.A., 1929.
- Jennings, William Morley**, Prof. of Health, Physical Education, and Recreation for Men, Emeritus, 1941, 1966. B.S., Mississippi State, 1912.
- Kinchen, Oscar Arvle**, Prof. of History, Emeritus, 1929, 1965. B.A., Oklahoma, 1916; M.A., 1920; Ph.D., Iowa, 1934.
- Klienschmidt, Florian Arthur**, Prof. of Architecture & Allied Arts, Emeritus, 1928, 1966. B.S. in Arch., Minnesota, 1920; M.Arch., Harvard, 1922; *Diplome d'Architecture*, U. of Fontainebleau (France), 1925; Reg. Arch. (Texas).
- Landwer, Milton Frederic**, Prof. of Zoology, Emeritus, 1927, 1966. B.S., Northwestern, 1920; M.A., Nebraska, 1925; Ph.D., Michigan, 1940.
- Langford, Johnnye Gilkerson**, Prof. of Physical Education, Emeritus, 1925, 1955. B.B.A., Texas (Austin), 1924; M.A., Southern California, 1929.
- Lindell, Helen Alma**, Asst. Prof. of Speech, Emeritus, 1948, 1969. B.A., Washburn U. of Topeka, 1924; M.A., Wisconsin, 1945.
- Michie, Jonnie McCrery**, Prof. of Food & Nutrition, Emeritus, 1925, 1955. B.S., Columbia, 1920; M.A., 1923.
- Mills, Rufus Arthur**, Prof. of English, Emeritus, 1926, 1951. B.A., Texas (Austin), 1914; M.A., 1923.
- Mize, Fredis Lloyd**, Prof. of Management, Emeritus, 1946, 1967. B.S., Sul Ross State, 1930; M.Ed., Oklahoma, 1935; Ed.D., 1947.
- Murdough, James Harold**, Prof. of Civil Engineering, Emeritus, 1925, 1962. B.S., Massachusetts Inst. of Technology, 1916; M.S.E., Michigan, 1930; Reg. Prof. Engr. (Texas).
- Pendleton, Annah Joe**, Prof. of Speech, Emeritus, 1927, 1961. B.A., Texas Christian, 1918; M.A., Iowa, 1931.
- Perryman, Conner Columbus**, Prof. of Engineering Drawing, Emeritus, 1929, 1965. B.S., North Texas State, 1926; Reg. Prof. Engr. (Texas).
- Rainey, Sue Ava**, Prof. of Health, Physical Education, and Recreation for Women, Emeritus, 1945, 1969. B.S., George Peabody Coll. for Teachers, 1922; M.A., Columbia, 1926.
- St. Clair, Oscar Allen**, Prof. of Industrial Engineering, Emeritus, 1934, 1959. B.S., Illinois Inst. of Technology, 1905; Reg. Prof. Engr. (Texas).
- Schmidt, Clarence Carl**, Prof. of Physics, Emeritus, 1927, 1964. B.A., Cornell, 1917; M.A., Illinois, 1922; Ph.D., 1927.
- Sealey, Jesse Q.**, Prof. of Biology, Emeritus, 1928, 1968. B.A., Texas (Austin), 1928; M.A., 1928; Ph.D., 1951.
- Slagle, William Mackey**, Prof. of Chemistry, Emeritus, 1926, 1960. B.A., Southwestern, 1916; M.A., Texas (Austin), 1928.
- Sparks, Fred Winchell**, Prof. of Mathematics, Emeritus, 1926, 1951. B.A., Southwestern, 1920; M.A., 1922; M.S., Chicago, 1924; Ph.D., 1931.
- Stangel, Wenzel Louis**, Dean of the School of Agriculture, Emeritus, 1925, 1958. B.S., Texas A & M, 1915; M.S., Missouri, 1916; LL.D. (hon.), Texas A&M, 1956.
- Strehli, Alfred Bell**, Prof. of Spanish, Emeritus, 1928, 1969. B.A., Ohio State, 1925; B.S., 1925; M.A., 1926.
- Strout, Alan Lang**, Prof. of English, Emeritus, 1928, 1961. B.A., Dartmouth, 1918; M.A., Chicago, 1920; M.A., Wisconsin, 1923; Ph.D., Yale, 1925.
- Underwood, Ralph Sylvester**, Prof. of Mathematics, Emeritus, 1927, 1961. B.A., Minnesota, 1916; M.A., 1917; Ph.D., Chicago, 1930.

**Wiesen, Thomas Ferdinand**, Prof. of Economics, Emeritus, 1940, 1962. B.S., Texas A. & M., 1920; M.B.A., Pennsylvania, 1935.  
**Yocum, Warren Watson**, Prof. of Horticulture, Emeritus, 1937, 1963. B.S., Northeast

Missouri State Teachers, 1923; M.A., Missouri, 1927; Ph.D., Nebraska, 1937.  
**Young, Arthur Wesley**, Prof. of Agronomy, Emeritus, 1935, 1969. B.S., Iowa State, 1929; M.S., 1930; Ph.D., 1932.

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- \* Resigned April 17, 1970.
  - \*\* Resigned August 1, 1970.
  - \*\*\* On leave 1970-71.



## Statistics

## Enrollment for the Fall Semester 1969

	Freshmen	Sophomores	Juniors	Seniors	Graduates	Totals
Agricultural Sciences	356	261	274	349	107	1,347
Arts and Sciences	2,418	1,198	1,083	916	947	6,562
Business Administration	1,519	1,021	1,023	896	338	4,797
Education	807	574	588	471	518	2,958
Engineering	739	376	372	543	235	2,265
Home Economics	459	343	276	233	66	1,377
Law					184	184
<b>TOTALS</b>	<b>6,298</b>	<b>3,773</b>	<b>3,616</b>	<b>3,408</b>	<b>2,395</b>	<b>19,490</b>
Total Men — 11,759			Total Women — 7,731			

## Enrollment for the Spring Semester 1970

	Freshmen	Sophomores	Juniors	Seniors	Graduates	Totals
Agricultural Sciences	364	284	277	276	120	1,321
Arts and Sciences	2,192	1,171	1,012	793	957	6,125
Business Administration	1,533	1,044	988	721	336	4,620
Education	743	531	552	391	602	2,819
Engineering	589	329	361	517	217	2,013
Home Economics	469	323	261	173	78	1,304
Law					165	165
<b>TOTALS</b>	<b>5,890</b>	<b>3,682</b>	<b>3,449</b>	<b>2,871</b>	<b>2,475</b>	<b>18,367</b>
Total Men — 11,263			Total Women — 7,104			

## Enrollment for the Long Session 1969-1970\*

	Freshmen	Sophomores	Juniors	Seniors	Graduates	Totals
Agricultural Sciences	398	302	292	373	132	1,497
Arts and Sciences	2,639	1,334	1,059	977	1,123	7,232
Business Administration	1,712	1,143	1,113	933	409	5,310
Education	882	635	624	494	719	3,354
Engineering	790	403	405	565	266	2,429
Home Economics	497	368	288	238	99	1,490
Law					190	190
<b>TOTALS</b>	<b>6,918</b>	<b>4,185</b>	<b>3,891</b>	<b>3,580</b>	<b>2,938</b>	<b>21,502</b>
Total Men — 13,027			Total Women — 8,475			

## Enrollment for the Summer 1969

FIRST TERM						
	Freshmen	Sophomores	Juniors	Seniors	Graduates	Totals
Agricultural Sciences	68	64	108	136	96	472
Arts and Sciences	504	387	527	432	824	2,674
Business Administration	292	324	469	490	232	1,807
Education	186	211	333	252	731	1,713
Engineering	109	123	108	186	92	618
Home Economics	109	93	146	90	78	516
Law					49	49
<b>TOTALS</b>	<b>1,268</b>	<b>1,202</b>	<b>1,691</b>	<b>1,588</b>	<b>2,102</b>	<b>7,849</b>
Total Men — 4,529			Total Women — 3,320			

SECOND TERM						
	Freshmen	Sophomores	Juniors	Seniors	Graduates	Totals
Agricultural Sciences	31	36	55	129	73	324
Arts and Sciences	280	251	321	485	560	1,897
Business Administration	184	215	343	522	219	1,482
Education	64	71	103	193	91	522
Engineering	57	39	84	124	84	388
Home Economics	94	120	221	279	389	1,103
Law					49	49
<b>TOTALS</b>	<b>710</b>	<b>732</b>	<b>1,126</b>	<b>1,732</b>	<b>1,465</b>	<b>5,765</b>
Total Men — 3,495			Total Women — 2,270			

## Summer Session\*

	Freshmen	Sophomores	Juniors	Seniors	Graduates	Totals
Agricultural Sciences	79	71	122	158	107	537
Arts and Sciences	612	454	613	520	973	3,172
Business Administration	347	371	524	554	285	2,081
Education	219	241	375	298	868	2,001
Engineering	125	135	123	216	99	698
Home Economics	135	105	165	116	148	669
Law					59	59
<b>TOTALS</b>	<b>1,517</b>	<b>1,377</b>	<b>1,922</b>	<b>1,862</b>	<b>2,539</b>	<b>9,217</b>
Total Men — 5,205			Total Women — 4,012			

\* Excluding duplicates.

## Attendance, 1925-1969

Year	TERMS				SUMMER TERMS					Exten- sion	Totals**
	Fall	Winter	Spring	Long Session*	First Term	Second Term	Summer Session*				
1925-26	910	897	704	1,043			336			1,379	
1926-27	1,378	1,357		1,535			677			2,212	
1927-28	1,412	1,401	1,278	1,682	858		965	386		3,033	
1928-29	1,810	1,693	1,570	2,088	1,118		1,298	820		4,206	
1929-30	2,051	1,917	1,730	2,353	1,139		1,316	1,098		4,767	
1930-31	1,983	1,919	1,769	2,319	1,336		1,556	1,227		5,102	
1931-32	1,823	1,813	1,669	2,155	1,368	945	1,606	1,011		4,772	
1932-33	1,950	1,939	1,758	2,332	1,082	738	1,288	833		4,453	

## SEMESTERS

Year	SEMESTERS				SUMMER TERMS			Exten- sion	Totals**
	Fall	Spring	Long Session*	First Term	Second Term	Summer Session*			
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	6,096	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	12,996	
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	
1955-56	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	6,380	21,333	
1962-63	11,183	10,638	12,483	5,169	3,467	5,873	6,818	23,174	
1963-64	12,036	11,676	13,600	5,326	4,125	6,442	7,423	24,665	
1964-65	13,827	13,380	15,457	6,472	4,363	7,462	8,085	28,004	
1965-66	16,305	15,798	17,912	7,344	4,976	8,387	9,483	31,142	
1966-67	17,768	16,917	19,462	7,065	5,342	8,306	9,359	32,127	
1967-68	18,646	18,080	20,551	7,518	5,607	8,894	9,353	33,798	
1968-69	19,034	18,299	21,137	7,849	5,765	9,217	9,452	34,806	
1969-70	19,490	18,367	21,502						

## Degrees Conferred 1927-1969

COLLEGE OF AGRICULTURAL SCIENCES	
Total Degrees Conferred	4,197
COLLEGE OF ARTS AND SCIENCES	
Total Degrees Conferred	14,506
COLLEGE OF BUSINESS ADMINISTRATION	
Total Degrees Conferred	7,359
COLLEGE OF EDUCATION	
Total Degrees Conferred	593
COLLEGE OF ENGINEERING	
Total Degrees Conferred	6,612

COLLEGE OF HOME ECONOMICS	
Total Degrees Conferred	2,755
GRADUATE SCHOOL	
Total Masters' Degrees Conferred	4,961
Total Doctors' Degrees Conferred	279
HONORARY DEGREES CONFERRED	34
TOTAL DEGREES CONFERRED	
1927-1969	41,296

## Summary of Degrees Conferred 1927-1969

Total Bachelors' Degrees	36,022
Total Masters' Degrees	4,961
Total Doctors' Degrees	279
Total Honorary Degrees	34
Total Degrees Conferred	41,296

Total—Men Receiving Degrees	27,006
Total Women Receiving Degrees	14,290
GRAND TOTAL	41,296

\* Duplicates excluded.

\*\* Totals of Long Session, Summer Session, and Extension.

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